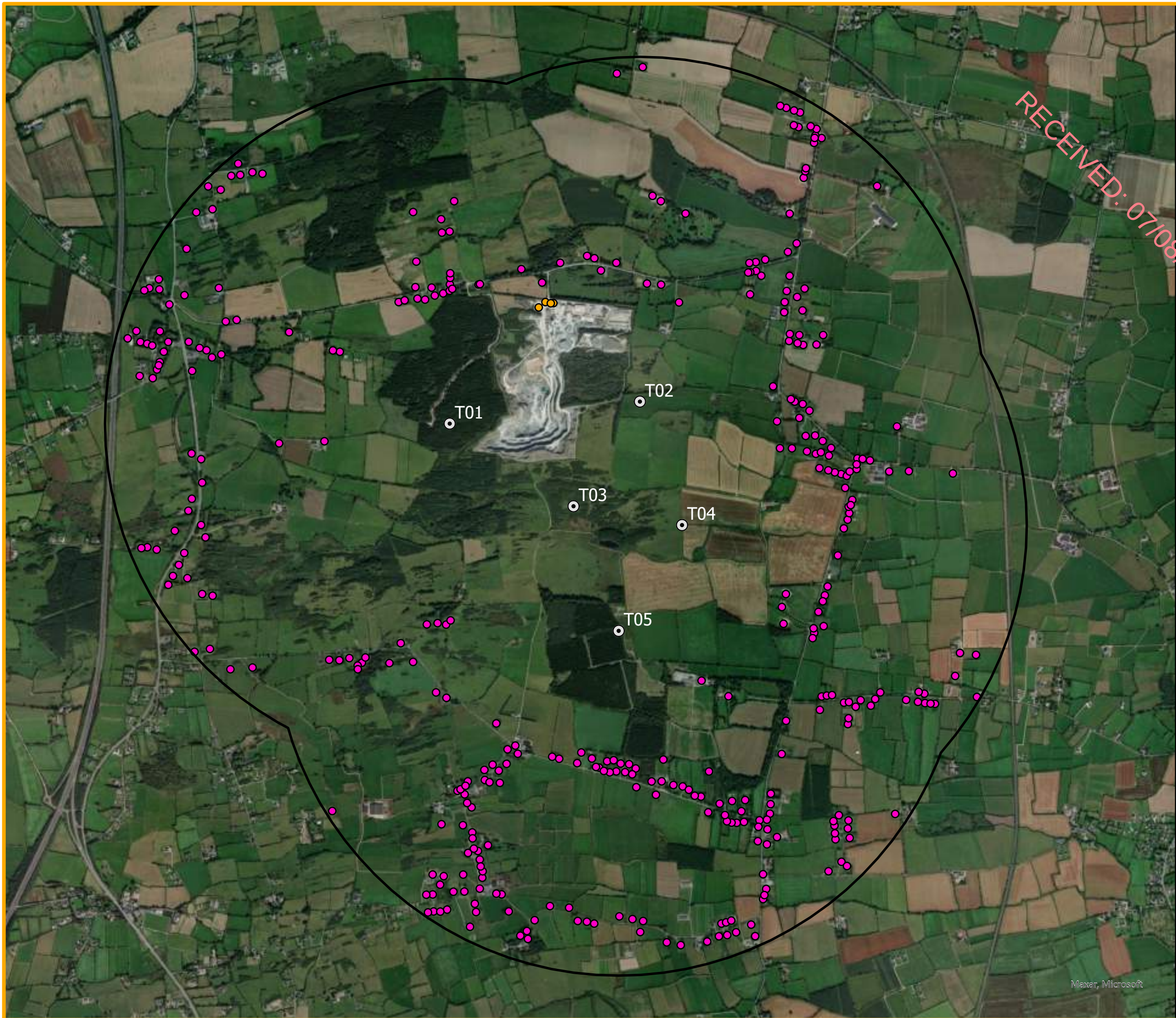




N

Tailte Eireann

Clárúil le hArd
Láidir le hArd
Eagair le hArd
Súil le hArd

Legend

⊙

Turbine Points

□

2km Buffer

●

Dwellings

●

Kilsaran Quarry

●

Office Buildings

00.20.40.8

Kilometers

Client

EDF Renewable Ireland Ltd

Project

Kellystown Wind Farm,
Drumshallon, Co. Louth

Title

Shadow Flicker Study
Area

JENNINGS
O'DONOVAN

an RSK company

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Date	10/06/2025	Revision	0	Job No.	6575
Scale	1:20,000 (A3)	Stage	EIAR	Figure	17.1
Drawing	KF	Checked	RM	Approved	RM

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time
N NNE NE ENE E ESE SE SSE S SSW SW WSW
160 97 158 383 373 261 461 767 532 825 1,031 1,215

W WNW NW NNW Sum
766 673 581 477 8,760

Monthly aggregation of real case reduction
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_6918 Kellystown_3.w
Receptor grid resolution: 1.0 m

All coordinates are in
Irish ITM-IRENET95 (IE), geocentric, GRS80

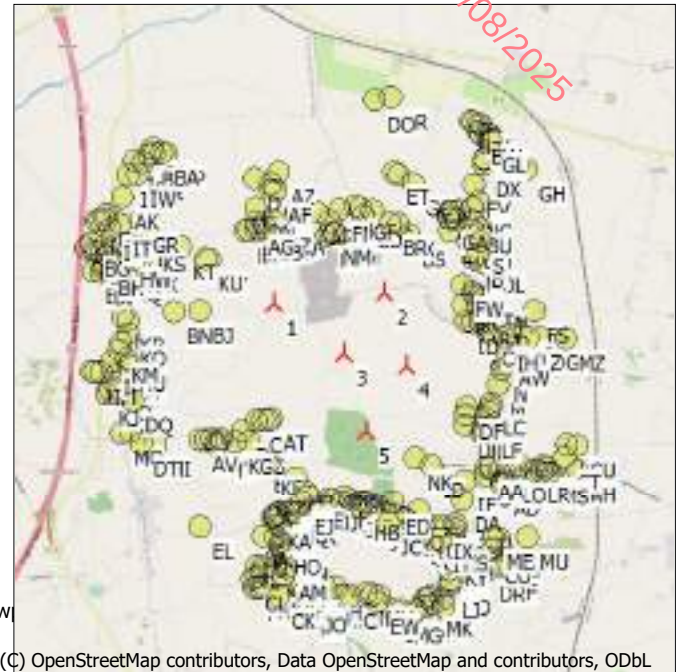
WTGs

Easting	Northing	Z	Row data/Description	WTG type		Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
				Valid	Manufact.	Type-generator			Calculation distance [m]	RPM [RPM]
1	707,338	784,036	115.1 T01	Yes	NORDEX	N149/5.X-5,700	5,700	149.0	105.0	1,809 10.7
2	708,442	784,163	104.9 T02	Yes	NORDEX	N149/5.X-5,700	5,700	149.0	105.0	1,809 10.7
3	708,057	783,557	98.1 T03	Yes	NORDEX	N149/5.X-5,700	5,700	149.0	105.0	1,809 10.7
4	708,686	783,447	90.3 T04	Yes	NORDEX	N149/5.X-5,700	5,700	149.0	105.0	1,809 10.7
5	708,289	782,794	112.2 T05	Yes	NORDEX	N149/5.X-5,700	5,700	149.0	105.0	1,809 10.7

Shadow receptor-Input

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	H1	709,505	784,550	91.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
B	H2	709,367	784,550	93.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
C	H3	707,206	782,871	130.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
D	H4	707,318	782,870	131.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
E	H5	707,444	781,961	140.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
F	H6	707,513	781,507	158.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
G	H7	707,383	781,906	145.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
H	H8	705,584	783,319	107.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
I	H9	705,744	783,414	104.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
J	H10	705,902	783,048	123.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
K	H11	708,134	781,146	127.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
L	H12	706,829	782,648	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
M	H13	709,591	783,271	84.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
N	H14	709,625	783,428	81.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
O	H15	709,647	783,479	84.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
P	H16	709,657	783,517	86.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Q	H17	709,551	783,895	97.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
R	H18	709,459	783,967	94.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
S	H19	709,386	784,693	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
T	H20	709,354	784,771	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
U	H21	709,398	784,820	73.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
V	H22	709,114	784,973	73.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...



SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
W H23		709,077	784,968	73.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
X H24		708,564	785,327	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Y H25		709,371	785,841	63.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Z H26		709,336	785,853	64.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AA H27		709,496	782,453	88.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AB H28		709,526	782,458	88.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AC H29		709,557	782,461	87.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AD H30		709,649	782,293	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AE H31		707,754	784,932	85.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AF H32		707,338	785,150	88.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AG H33		707,139	784,828	105.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AH H34		710,397	782,450	63.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AI H35		705,824	784,510	80.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AJ H36		705,550	783,314	106.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AK H37		705,812	785,050	78.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AL H38		707,240	781,305	179.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AM H39		707,528	781,402	160.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AN H40		707,291	781,712	158.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AO H41		707,540	782,027	136.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AP H42		707,674	782,146	133.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AQ H43		708,690	781,931	116.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AR H44		709,175	781,337	87.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AS H45		707,126	782,653	129.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AT H46		707,344	782,894	131.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AU H47		706,698	782,663	128.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AV H48		706,639	782,666	128.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AW H49		709,674	783,593	86.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AX H50		708,565	784,842	79.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AY H51		707,289	785,222	92.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AZ H52		707,364	785,326	87.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BA H53		706,194	785,494	90.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BB H54		706,039	784,628	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BC H55		707,042	784,741	105.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BD H56		707,077	784,751	104.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BE H57		705,927	784,462	79.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BF H58		705,705	784,510	85.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BG H59		705,521	784,573	88.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BH H60		705,656	784,393	92.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BI H61		705,616	784,300	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BJ H62		706,612	783,934	103.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BK H63		705,816	783,140	110.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BL H64		706,071	785,473	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BM H65		706,123	785,479	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BN H66		706,349	783,922	93.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BO H67		705,540	784,312	102.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BP H68		705,596	784,822	78.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BQ H69		708,136	785,009	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BR H70		708,483	784,848	80.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BS H71		708,669	784,739	80.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BT H72		709,294	784,805	78.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BU H73		709,311	784,893	73.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BV H74		709,363	785,756	61.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BW H75		709,335	785,767	61.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BX H76		709,291	785,868	64.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BY H77		707,293	785,144	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BZ H78		707,340	784,844	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CA H79		707,301	784,792	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CB H80		707,252	784,779	97.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CC H81		709,390	784,492	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CD H82		709,503	783,935	96.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CE H83		709,610	783,743	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CF H84		709,573	783,753	94.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CG H85		709,535	783,765	95.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CH H86		709,484	783,778	96.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
CI H87		708,177	781,136	125.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CJ H88		707,792	781,047	132.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CK H89		707,456	781,117	152.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CL H90		707,203	781,303	180.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CM H91		707,245	781,206	170.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CN H92		707,415	781,706	152.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CO H93		709,577	781,624	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CP H94		709,574	781,659	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CQ H95		709,571	781,704	81.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CR H96		709,565	781,730	82.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CS H97		709,652	781,734	79.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CT H98		710,271	782,572	67.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CU H99		710,392	782,695	67.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CV H100		710,154	782,410	71.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CW H101		710,096	782,415	72.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CX H102		709,782	782,400	81.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CY H103		709,653	782,327	85.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CZ H104		709,486	782,375	89.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DA H105		709,265	782,119	91.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DB H106		709,201	781,889	100.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DC H107		709,196	781,773	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DD H108		709,275	782,875	91.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DE H109		709,266	782,972	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DF H110		709,289	783,047	90.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DG H111		710,003	783,760	89.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DH H112		709,324	783,893	105.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DI H113		709,411	783,875	103.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DJ H114		709,463	783,861	102.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DK H115		709,255	783,893	105.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DL H116		709,467	784,495	94.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DM H117		709,282	784,741	84.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DN H118		707,145	784,976	107.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DO H119		708,308	786,067	65.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DP H120		705,922	783,376	107.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DQ H121		705,963	783,037	123.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DR H122		709,536	781,439	81.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DS H123		706,804	782,632	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DT H124		706,066	782,611	127.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DU H125		706,111	785,544	88.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DV H126		707,126	785,263	97.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DW H127		709,426	784,111	91.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DX H128		709,392	785,462	69.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DY H129		708,305	782,018	122.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DZ H130		708,330	782,064	124.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EA H131		708,379	782,060	124.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EB H132		708,418	782,035	123.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EC H133		708,356	782,014	122.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ED H134		708,578	782,087	121.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EE H135		709,648	781,687	77.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EF H136		709,004	781,720	103.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EG H137		709,126	781,613	94.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EH H138		707,259	782,476	128.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EI H139		709,611	781,494	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EJ H140		707,668	782,062	132.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EK H141		707,304	781,411	179.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EL H142		706,657	781,789	159.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EM H143		707,054	782,762	127.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EN H144		709,238	784,049	99.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EO H145		709,146	784,894	74.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EP H146		709,081	784,786	78.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EQ H147		707,624	782,023	133.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ER H148		708,458	786,104	60.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ES H149		709,179	781,738	99.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ET H150		708,515	785,357	78.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

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No.	Name	Eastings	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
EU	H151	709,357	784,502	92.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EV	H152	709,311	785,254	65.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EW	H153	708,444	781,087	111.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EX	H154	705,947	782,729	126.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EY	H155	705,470	784,531	91.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EZ	H156	707,342	784,881	98.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FA	H157	707,342	784,908	100.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FB	H158	707,196	784,755	100.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FC	H159	709,256	785,879	64.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FD	H160	708,205	782,041	121.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FE	H161	708,510	781,960	119.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FF	H162	707,719	782,168	133.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FG	H163	707,234	784,825	101.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FH	H164	709,237	781,637	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FI	H165	709,111	781,063	90.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FJ	H166	709,367	784,069	93.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FK	H167	709,307	784,515	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FL	H168	709,352	785,081	70.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FM	H169	707,979	784,969	85.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FN	H170	709,169	784,987	73.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FO	H171	709,496	785,693	59.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FP	H172	709,460	785,707	60.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FQ	H173	709,467	785,745	60.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FR	H174	709,433	785,761	62.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FS	H175	709,934	784,019	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FT	H176	709,387	784,150	92.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FU	H177	709,340	784,163	94.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FV	H178	709,318	784,178	94.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FW	H179	709,215	784,252	97.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FX	H180	709,312	784,556	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FY	H181	709,279	784,682	86.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FZ	H182	709,116	784,922	74.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GA	H183	709,082	784,914	74.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GB	H184	709,070	784,913	74.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GC	H185	708,707	785,255	80.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GD	H186	708,216	784,924	80.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GE	H187	707,874	784,854	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GF	H188	708,178	784,996	82.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GG	H189	708,305	784,969	81.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GH	H190	709,818	785,414	62.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GI	H191	709,402	785,500	69.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GJ	H192	709,405	785,517	69.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GK	H193	709,453	785,665	59.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GL	H194	709,456	785,693	59.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GM	H195	705,544	784,509	90.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GN	H196	705,680	784,453	88.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GO	H197	705,657	784,572	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GP	H198	705,651	784,873	80.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GQ	H199	706,010	785,393	90.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GR	H200	705,999	784,823	97.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GS	H201	708,974	781,721	104.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GT	H202	708,947	781,729	104.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GU	H203	708,977	781,847	107.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GV	H204	708,935	781,765	106.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GW	H205	708,905	781,831	109.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GX	H206	708,838	781,781	109.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GY	H207	708,796	781,872	111.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GZ	H208	708,636	781,939	116.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HA	H209	708,397	782,002	121.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HB	H210	708,267	782,013	120.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HC	H211	708,078	782,066	123.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HD	H212	707,212	781,200	170.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HE	H213	707,323	781,217	168.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HF	H214	707,484	781,251	162.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

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SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Eastings	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
HG	H215	708,081	781,151	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HH	H216	708,031	781,228	128.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HI	H217	707,920	781,237	134.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HJ	H218	707,831	781,155	137.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HK	H219	707,748	781,065	135.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HL	H220	707,681	781,206	148.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HM	H221	707,513	781,338	162.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HN	H222	707,561	781,590	149.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HO	H223	707,469	781,664	152.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HP	H224	707,425	781,885	142.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HQ	H225	707,542	781,969	136.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HR	H226	707,609	782,297	132.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HS	H227	707,268	782,879	130.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HT	H228	706,805	782,611	128.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HU	H229	705,896	783,448	103.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HV	H230	705,841	783,863	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HW	H231	705,887	784,475	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HX	H232	706,014	784,437	79.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HY	H233	706,701	784,453	96.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HZ	H234	707,338	784,807	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IA	H235	707,506	784,843	97.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IB	H236	707,514	784,845	97.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IC	H237	708,102	782,128	123.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ID	H238	708,956	782,454	108.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IE	H239	709,290	782,312	91.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IF	H240	709,136	781,735	101.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IG	H241	709,182	781,682	97.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IH	H242	709,642	783,733	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
II	H243	709,515	783,040	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IJ	H244	709,454	782,822	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IK	H245	709,444	782,792	92.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IL	H246	705,567	784,809	77.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IM	H247	705,638	783,305	105.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IN	H248	705,640	784,350	95.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IO	H249	705,650	784,374	93.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IP	H250	705,583	784,500	89.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IQ	H251	705,613	784,489	89.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IR	H252	705,712	784,727	77.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IS	H253	705,654	784,815	78.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IT	H254	705,800	784,781	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IU	H255	705,868	785,262	73.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IV	H256	705,937	785,412	86.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IW	H257	705,962	785,280	81.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IX	H258	709,053	781,852	105.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IY	H259	709,046	781,725	102.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IZ	H260	708,843	782,018	113.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JA	H261	708,760	781,877	112.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JB	H262	708,726	781,912	114.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JC	H263	708,535	781,883	115.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JD	H264	708,421	781,927	118.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JE	H265	708,252	782,077	123.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JF	H266	708,233	782,021	120.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JG	H267	708,187	782,044	121.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JH	H268	708,163	782,093	122.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JI	H269	707,974	782,092	127.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JJ	H270	707,933	782,103	128.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JK	H271	707,283	781,361	179.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JL	H272	707,284	781,205	168.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JM	H273	707,360	781,320	173.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JN	H274	707,423	781,321	169.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JO	H275	707,786	781,092	135.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JP	H276	707,640	781,305	151.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JQ	H277	707,609	781,309	153.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JR	H278	707,530	781,439	159.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

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SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
JS H279		707,518	781,467	159.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JT H280		707,417	781,420	170.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JU H281		707,445	781,545	160.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JV H282		707,503	781,557	155.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JW H283		707,479	781,570	157.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JX H284		707,471	781,630	157.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JY H285		707,466	781,810	141.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JZ H286		707,440	781,835	140.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KA H287		707,401	781,915	144.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KB H288		707,430	781,935	142.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KC H289		707,570	781,956	135.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KD H290		707,588	782,057	134.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KE H291		707,733	782,121	133.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KF H292		707,320	782,445	128.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KG H293		706,989	782,647	130.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KH H294		706,850	782,679	126.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KI H295		706,756	782,676	128.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KJ H296		705,706	783,101	120.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KK H297		705,767	783,216	110.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KL H298		705,798	783,285	108.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KM H299		705,822	783,531	100.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KN H300		705,842	783,600	106.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KO H301		705,902	783,694	102.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KP H302		705,896	783,830	98.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KQ H303		705,844	784,342	88.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KR H304		705,959	784,420	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KS H305		706,102	784,637	91.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KT H306		706,407	784,566	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KU H307		706,661	784,461	96.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KV H308		707,151	784,761	103.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KW H309		707,353	784,818	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KX H310		709,200	781,828	99.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KY H311		709,179	781,595	93.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KZ H312		709,659	783,758	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LA H313		709,633	783,663	85.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LB H314		709,653	783,554	87.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LC H315		709,531	783,091	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LD H316		709,503	783,005	87.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LE H317		709,478	782,944	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LF H318		709,508	782,861	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LG H319		709,450	782,849	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LH H320		708,598	781,027	105.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LI H321		709,088	781,130	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LJ H322		709,157	781,278	85.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LK H323		708,833	781,031	96.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LL H324		708,900	781,062	94.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LM H325		709,704	783,834	98.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LN H326		709,694	782,393	84.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LO H327		709,723	782,432	83.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LP H328		709,807	782,438	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LQ H329		709,837	782,477	78.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LR H330		709,987	782,433	75.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LS H331		710,055	782,422	73.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LT H332		710,299	782,705	69.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LU H333		709,157	781,422	89.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LV H334		709,700	783,772	96.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LW H335		709,700	783,800	98.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LX H336		709,734	783,831	97.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LY H337		709,777	783,823	96.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LZ H338		709,888	783,758	91.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MA H339		709,626	782,417	86.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MB H340		709,655	782,420	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MC H341		710,093	782,469	72.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MD H342		709,164	781,301	86.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
ME H343		709,597	781,764	80.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MF H344		709,643	781,469	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MG H345		708,679	781,011	102.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MH H346		708,399	781,162	113.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MI H347		706,194	782,621	124.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MJ H348		707,491	781,202	157.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MK H349		709,000	781,085	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ML H350		709,665	783,563	87.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MM H351		708,461	781,151	111.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MN H352		708,290	782,083	124.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MO H353		705,858	782,712	125.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MP H354		706,252	785,486	90.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MQ H355		705,733	783,152	113.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MR H356		709,492	783,870	102.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MS H357		710,128	782,412	71.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MT H358		709,404	783,965	96.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MU H359		709,923	781,772	70.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MV H360		709,659	781,632	75.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MW H361		709,031	781,787	106.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MX H362		707,629	781,952	131.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MY H363		709,130	781,697	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MZ H364		710,258	783,747	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NA H365		710,059	782,479	72.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NB H366		707,240	781,420	179.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NC H367		709,301	785,032	71.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ND H368		708,915	781,135	92.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NE H369		709,539	783,850	102.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NF H370		708,323	781,177	117.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NG H371		708,949	781,069	93.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NH H372		708,942	781,142	92.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NI H373		708,972	781,153	91.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NJ SAINT PATRICK'S NATIONAL SCHOOL		708,565	781,951	118.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NK H374		708,783	782,534	110.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NL Main Office		707,855	784,710	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NM Small Hut		707,894	784,741	94.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NN Welfare Facilities		707,940	784,735	94.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NO Shipping Office		707,925	784,734	94.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

Calculation Results

Shadow receptor

Shadow, worst case

Shadow, expected values

No.	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
	A H1	40:34	119	0:31	6:36
	B H2	37:03	113	0:35	6:14
	C H3	24:39	105	0:31	5:08
	D H4	20:57	70	0:35	4:22
	E H5	0:00	0	0:00	0:00
	F H6	0:00	0	0:00	0:00
	G H7	0:00	0	0:00	0:00
	H H8	0:00	0	0:00	0:00
	I H9	6:32	30	0:20	1:34
	J H10	14:10	63	0:19	3:02
	K H11	0:00	0	0:00	0:00
	L H12	16:44	79	0:20	3:37
	M H13	37:28	98	0:39	8:09
	N H14	56:36	143	0:46	11:47
	O H15	60:12	151	0:48	12:29
	P H16	60:27	157	0:49	12:31
	Q H17	50:46	156	0:36	9:53
	R H18	63:04	179	0:39	12:01
	S H19	25:16	78	0:33	4:22

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
	T H20	27:28	84	0:33	4:39
	U H21	17:40	45	0:31	2:59
	V H22	44:00	92	0:35	6:50
	W H23	44:33	90	0:36	6:53
	X H24	11:36	50	0:21	1:54
	Y H25	0:00	0	0:00	0:00
	Z H26	0:00	0	0:00	0:00
	AA H27	16:05	46	0:29	3:41
	AB H28	15:02	44	0:28	3:26
	AC H29	14:00	42	0:27	3:11
	AD H30	13:07	43	0:25	3:01
	AE H31	72:14	88	1:05	10:19
	AF H32	13:50	50	0:25	2:07
	AG H33	24:53	67	0:43	3:27
	AH H34	0:00	0	0:00	0:00
	AI H35	7:34	28	0:22	1:21
	AJ H36	0:00	0	0:00	0:00
	AK H37	0:00	0	0:00	0:00
	AL H38	0:00	0	0:00	0:00
	AM H39	0:00	0	0:00	0:00
	AN H40	0:00	0	0:00	0:00
	AO H41	0:00	0	0:00	0:00
	AP H42	0:00	0	0:00	0:00
	AQ H43	0:00	0	0:00	0:00
	AR H44	0:00	0	0:00	0:00
	AS H45	13:54	59	0:28	3:12
	AT H46	22:24	72	0:36	4:37
	AU H47	13:15	74	0:18	2:55
	AV H48	10:16	61	0:17	2:19
	AW H49	51:06	139	0:46	10:32
	AX H50	62:08	105	0:53	9:11
	AY H51	12:20	50	0:24	1:52
	AZ H52	19:44	64	0:24	2:43
	BA H53	0:00	0	0:00	0:00
	BB H54	9:56	34	0:25	1:39
	BC H55	62:48	90	1:11	8:36
	BD H56	56:48	87	1:09	7:46
	BE H57	9:00	30	0:24	1:37
	BF H58	6:00	26	0:20	1:05
	BG H59	0:00	0	0:00	0:00
	BH H60	5:23	24	0:20	0:59
	BI H61	4:48	23	0:19	0:55
	BJ H62	48:44	95	0:48	11:04
	BK H63	8:47	43	0:19	2:02
	BL H64	0:00	0	0:00	0:00
	BM H65	0:00	0	0:00	0:00
	BN H66	25:59	70	0:35	5:48
	BO H67	0:00	0	0:00	0:00
	BP H68	0:00	0	0:00	0:00
	BQ H69	51:32	80	0:55	7:26
	BR H70	57:23	102	0:52	8:26
	BS H71	96:39	128	1:08	14:53
	BT H72	31:22	94	0:34	5:16
	BU H73	20:54	51	0:32	3:30
	BV H74	0:00	0	0:00	0:00
	BW H75	0:00	0	0:00	0:00
	BX H76	0:00	0	0:00	0:00
	BY H77	12:17	45	0:25	1:53
	BZ H78	25:37	73	0:30	3:43
	CA H79	35:08	82	0:39	5:02
	CB H80	37:01	81	0:48	5:13
	CC H81	44:36	123	0:35	7:25
	CD H82	56:51	164	0:38	10:55

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
	CE H83	49:50	144	0:36	10:05
	CF H84	53:42	151	0:37	10:50
	CG H85	57:51	158	0:38	11:38
	CH H86	65:06	169	0:41	13:02
	CI H87	0:00	0	0:00	0:00
	CJ H88	0:00	0	0:00	0:00
	CK H89	0:00	0	0:00	0:00
	CL H90	0:00	0	0:00	0:00
	CM H91	0:00	0	0:00	0:00
	CN H92	0:00	0	0:00	0:00
	CO H93	0:00	0	0:00	0:00
	CP H94	0:00	0	0:00	0:00
	CQ H95	0:00	0	0:00	0:00
	CR H96	0:00	0	0:00	0:00
	CS H97	0:00	0	0:00	0:00
	CT H98	0:00	0	0:00	0:00
	CU H99	0:00	0	0:00	0:00
	CV H100	6:16	39	0:14	1:13
	CW H101	3:26	31	0:10	0:40
	CX H102	9:33	36	0:23	2:10
	CY H103	12:39	43	0:25	2:55
	CZ H104	17:36	50	0:29	4:03
	DA H105	12:43	44	0:24	2:28
	DB H106	0:00	0	0:00	0:00
	DC H107	0:00	0	0:00	0:00
	DD H108	45:58	122	0:35	9:39
	DE H109	38:58	107	0:35	8:10
	DF H110	63:05	147	0:41	12:57
	DG H111	15:39	62	0:25	3:16
	DH H112	88:35	222	0:46	17:00
	DI H113	69:36	187	0:42	13:33
	DJ H114	61:32	173	0:40	12:04
	DK H115	113:49	248	0:50	21:41
	DL H116	44:53	124	0:33	7:23
	DM H117	31:40	92	0:35	5:21
	DN H118	7:26	32	0:22	1:09
	DO H119	0:00	0	0:00	0:00
	DP H120	9:38	38	0:23	2:18
	DQ H121	12:30	55	0:19	2:39
	DR H122	0:00	0	0:00	0:00
	DS H123	16:22	80	0:20	3:33
	DT H124	0:00	0	0:00	0:00
	DU H125	0:00	0	0:00	0:00
	DV H126	7:56	37	0:21	1:13
	DW H127	70:45	185	0:36	13:00
	DX H128	17:57	54	0:24	2:34
	DY H129	0:00	0	0:00	0:00
	DZ H130	0:00	0	0:00	0:00
	EA H131	0:00	0	0:00	0:00
	EB H132	0:00	0	0:00	0:00
	EC H133	0:00	0	0:00	0:00
	ED H134	0:00	0	0:00	0:00
	EE H135	0:00	0	0:00	0:00
	EF H136	0:00	0	0:00	0:00
	EG H137	0:00	0	0:00	0:00
	EH H138	22:34	90	0:32	5:15
	EI H139	0:00	0	0:00	0:00
	EJ H140	0:00	0	0:00	0:00
	EK H141	0:00	0	0:00	0:00
	EL H142	0:00	0	0:00	0:00
	EM H143	19:39	99	0:27	4:14
	EN H144	105:59	202	0:45	19:32
	EO H145	46:35	106	0:36	7:25

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
	EP H146	54:37	118	0:40	8:49
	EQ H147	0:00	0	0:00	0:00
	ER H148	0:00	0	0:00	0:00
	ES H149	0:00	0	0:00	0:00
	ET H150	15:13	68	0:21	2:22
	EU H151	43:09	120	0:35	7:14
	EV H152	27:49	72	0:27	4:12
	EW H153	0:00	0	0:00	0:00
	EX H154	0:00	0	0:00	0:00
	EY H155	0:00	0	0:00	0:00
	EZ H156	16:17	58	0:28	2:25
	FA H157	12:12	41	0:28	1:52
	FB H158	46:44	84	1:02	6:25
	FC H159	0:00	0	0:00	0:00
	FD H160	0:00	0	0:00	0:00
	FE H161	0:00	0	0:00	0:00
	FF H162	0:00	0	0:00	0:00
	FG H163	23:16	69	0:30	3:20
	FH H164	0:00	0	0:00	0:00
	FI H165	0:00	0	0:00	0:00
	FJ H166	82:02	195	0:39	15:07
	FK H167	42:08	117	0:37	7:11
	FL H168	20:14	58	0:29	3:22
	FM H169	71:30	72	1:13	10:00
	FN H170	33:02	82	0:33	5:20
	FO H171	0:00	0	0:00	0:00
	FP H172	0:00	0	0:00	0:00
	FQ H173	0:00	0	0:00	0:00
	FR H174	0:00	0	0:00	0:00
	FS H175	16:49	62	0:25	3:23
	FT H176	76:19	177	0:37	13:46
	FU H177	80:17	177	0:38	14:26
	FV H178	81:32	172	0:39	14:35
	FW H179	79:06	157	0:45	13:56
	FX H180	36:24	107	0:37	6:14
	FY H181	31:48	88	0:36	5:26
	FZ H182	46:36	100	0:36	7:20
	GA H183	47:55	98	0:37	7:31
	GB H184	48:26	98	0:37	7:35
	GC H185	0:00	0	0:00	0:00
	GD H186	53:53	96	0:44	7:54
	GE H187	97:55	90	1:19	14:09
	GF H188	48:09	84	0:47	7:03
	GG H189	35:44	93	0:34	5:17
	GH H190	0:00	0	0:00	0:00
	GI H191	16:05	50	0:23	2:16
	GJ H192	15:03	48	0:23	2:07
	GK H193	0:00	0	0:00	0:00
	GL H194	0:00	0	0:00	0:00
	GM H195	0:00	0	0:00	0:00
	GN H196	5:48	25	0:21	1:03
	GO H197	5:31	25	0:20	0:59
	GP H198	0:00	0	0:00	0:00
	GQ H199	0:00	0	0:00	0:00
	GR H200	8:20	32	0:23	1:19
	GS H201	0:00	0	0:00	0:00
	GT H202	0:00	0	0:00	0:00
	GU H203	0:00	0	0:00	0:00
	GV H204	0:00	0	0:00	0:00
	GW H205	0:00	0	0:00	0:00
	GX H206	0:00	0	0:00	0:00
	GY H207	0:00	0	0:00	0:00
	GZ H208	0:00	0	0:00	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
HA	H209	0:00	0	0:00	0:00
HB	H210	0:00	0	0:00	0:00
HC	H211	0:00	0	0:00	0:00
HD	H212	0:00	0	0:00	0:00
HE	H213	0:00	0	0:00	0:00
HF	H214	0:00	0	0:00	0:00
HG	H215	0:00	0	0:00	0:00
HH	H216	0:00	0	0:00	0:00
HI	H217	0:00	0	0:00	0:00
HJ	H218	0:00	0	0:00	0:00
HK	H219	0:00	0	0:00	0:00
HL	H220	0:00	0	0:00	0:00
HM	H221	0:00	0	0:00	0:00
HN	H222	0:00	0	0:00	0:00
HO	H223	0:00	0	0:00	0:00
HP	H224	0:00	0	0:00	0:00
HQ	H225	0:00	0	0:00	0:00
HR	H226	27:09	64	0:36	5:50
HS	H227	22:04	97	0:33	4:35
HT	H228	14:11	74	0:19	3:05
HU	H229	9:06	36	0:23	2:12
HV	H230	7:36	30	0:23	1:44
HW	H231	8:23	30	0:23	1:31
HX	H232	10:27	33	0:25	1:53
HY	H233	45:02	95	0:46	7:18
HZ	H234	33:00	80	0:37	4:45
IA	H235	36:56	92	0:34	5:19
IB	H236	37:45	92	0:35	5:26
IC	H237	0:00	0	0:00	0:00
ID	H238	61:45	87	0:50	13:03
IE	H239	40:53	89	0:34	8:46
IF	H240	0:00	0	0:00	0:00
IG	H241	0:00	0	0:00	0:00
IH	H242	46:58	138	0:35	9:32
II	H243	72:29	150	0:41	15:25
IJ	H244	27:31	92	0:30	5:59
IK	H245	30:37	106	0:30	6:38
IL	H246	0:00	0	0:00	0:00
IM	H247	0:00	0	0:00	0:00
IN	H248	5:11	24	0:20	0:58
IO	H249	5:23	24	0:20	1:00
IP	H250	0:00	0	0:00	0:00
IQ	H251	5:02	24	0:19	0:55
IR	H252	6:10	26	0:20	1:02
IS	H253	0:00	0	0:00	0:00
IT	H254	6:38	28	0:21	1:06
IU	H255	0:00	0	0:00	0:00
IV	H256	0:00	0	0:00	0:00
IW	H257	0:00	0	0:00	0:00
IX	H258	0:00	0	0:00	0:00
IY	H259	0:00	0	0:00	0:00
IZ	H260	0:00	0	0:00	0:00
JA	H261	0:00	0	0:00	0:00
JB	H262	0:00	0	0:00	0:00
JC	H263	0:00	0	0:00	0:00
JD	H264	0:00	0	0:00	0:00
JE	H265	0:00	0	0:00	0:00
JF	H266	0:00	0	0:00	0:00
JG	H267	0:00	0	0:00	0:00
JH	H268	0:00	0	0:00	0:00
JI	H269	0:00	0	0:00	0:00
JJ	H270	0:00	0	0:00	0:00
JK	H271	0:00	0	0:00	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
	JL H272	0:00	0	0:00	0:00
	JM H273	0:00	0	0:00	0:00
	JN H274	0:00	0	0:00	0:00
	JO H275	0:00	0	0:00	0:00
	JP H276	0:00	0	0:00	0:00
	JQ H277	0:00	0	0:00	0:00
	JR H278	0:00	0	0:00	0:00
	JS H279	0:00	0	0:00	0:00
	JT H280	0:00	0	0:00	0:00
	JU H281	0:00	0	0:00	0:00
	JV H282	0:00	0	0:00	0:00
	JW H283	0:00	0	0:00	0:00
	JX H284	0:00	0	0:00	0:00
	JY H285	0:00	0	0:00	0:00
	JZ H286	0:00	0	0:00	0:00
	KA H287	0:00	0	0:00	0:00
	KB H288	0:00	0	0:00	0:00
	KC H289	0:00	0	0:00	0:00
	KD H290	0:00	0	0:00	0:00
	KE H291	0:00	0	0:00	0:00
	KF H292	29:05	106	0:34	6:44
	KG H293	9:10	54	0:24	2:03
	KH H294	19:24	84	0:22	4:11
	KI H295	18:40	91	0:19	4:03
	KJ H296	0:00	0	0:00	0:00
	KK H297	7:00	35	0:19	1:39
	KL H298	7:24	34	0:20	1:46
	KM H299	7:50	33	0:22	1:51
	KN H300	7:27	30	0:22	1:45
	KO H301	8:36	32	0:23	2:00
	KP H302	8:38	31	0:24	1:59
	KQ H303	7:43	29	0:23	1:26
	KR H304	9:32	31	0:24	1:44
	KS H305	10:56	35	0:26	1:49
	KT H306	19:43	47	0:33	3:12
	KU H307	40:38	92	0:44	6:38
	KV H308	46:56	83	1:03	6:25
	KW H309	31:22	80	0:35	4:32
	KX H310	0:00	0	0:00	0:00
	KY H311	0:00	0	0:00	0:00
	KZ H312	42:57	135	0:34	8:40
	LA H313	53:07	145	0:42	10:51
	LB H314	59:09	165	0:50	12:13
	LC H315	71:22	156	0:40	15:26
	LD H316	68:03	146	0:41	14:18
	LE H317	53:01	138	0:39	10:55
	LF H318	35:00	126	0:29	7:19
	LG H319	28:56	111	0:30	6:13
	LH H320	0:00	0	0:00	0:00
	LI H321	0:00	0	0:00	0:00
	LJ H322	0:00	0	0:00	0:00
	LK H323	0:00	0	0:00	0:00
	LL H324	0:00	0	0:00	0:00
	LM H325	36:41	128	0:32	7:16
	LN H326	11:11	38	0:25	2:33
	LO H327	10:31	37	0:24	2:23
	LP H328	9:03	33	0:23	2:02
	LQ H329	8:35	32	0:23	1:56
	LR H330	6:50	29	0:21	1:32
	LS H331	8:07	53	0:19	1:46
	LT H332	8:20	38	0:20	1:52
	LU H333	0:00	0	0:00	0:00
	LV H334	38:42	128	0:33	7:47

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SHADOW - Main Result

Calculation: Kellystown N149 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
LW	H335	37:23	128	0:32	7:28
LX	H336	34:38	123	0:31	6:52
LY	H337	26:41	91	0:30	5:29
LZ	H338	19:14	68	0:27	4:02
MA	H339	12:28	40	0:26	2:51
MB	H340	11:52	39	0:26	2:42
MC	H341	8:07	43	0:16	1:34
MD	H342	0:00	0	0:00	0:00
ME	H343	0:00	0	0:00	0:00
MF	H344	0:00	0	0:00	0:00
MG	H345	0:00	0	0:00	0:00
MH	H346	0:00	0	0:00	0:00
MI	H347	0:00	0	0:00	0:00
MJ	H348	0:00	0	0:00	0:00
MK	H349	0:00	0	0:00	0:00
ML	H350	54:38	150	0:48	11:18
MM	H351	0:00	0	0:00	0:00
MN	H352	0:00	0	0:00	0:00
MO	H353	0:00	0	0:00	0:00
MP	H354	0:00	0	0:00	0:00
MQ	H355	0:00	0	0:00	0:00
MR	H356	57:03	168	0:39	11:11
MS	H357	4:59	36	0:12	0:58
MT	H358	72:11	194	0:40	13:42
MU	H359	0:00	0	0:00	0:00
MV	H360	0:00	0	0:00	0:00
MW	H361	0:00	0	0:00	0:00
MX	H362	0:00	0	0:00	0:00
MY	H363	0:00	0	0:00	0:00
MZ	H364	5:29	26	0:20	1:04
NA	H365	13:07	67	0:19	2:44
NB	H366	0:00	0	0:00	0:00
NC	H367	22:14	58	0:30	3:42
ND	H368	0:00	0	0:00	0:00
NE	H369	51:12	155	0:37	10:06
NF	H370	0:00	0	0:00	0:00
NG	H371	0:00	0	0:00	0:00
NH	H372	0:00	0	0:00	0:00
NI	H373	0:00	0	0:00	0:00
NJ	SAINT PATRICK'S NATIONAL SCHOOL	0:00	0	0:00	0:00
NK	H374	73:40	83	1:05	15:27
NL	Main Office	106:36	116	1:26	16:25
NM	Small Hut	114:59	108	1:27	17:18
NN	Welfare Facilities	117:36	106	1:28	17:38
NO	Shipping Office	117:40	107	1:27	17:41

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	T01	471:16	79:24
2	T02	734:30	123:59
3	T03	238:07	43:49
4	T04	366:11	69:52
5	T05	346:09	70:05

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

The calculation of the total expected values for a given receptor assumes a weighted average directional reduction for all WTGs contributing to shadow flicker within the same day. In the case where shadow flicker from different WTGs is not concurrent within the day, the total expected time at a given receptor may deviate marginally from the individual flicker time caused by each turbine separately.

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: A - H1

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June	
1	08:44	15:03 (4)	08:14	16:31 (3)	07:16	17:09 (2)	07:01	05:52	05:03		
	16:15	26	15:29 (4)	17:06	3	16:34 (3)	18:02	25	17:34 (2)	20:00	21:45
2	08:44	15:04 (4)	08:12	16:30 (3)	07:14	17:08 (2)	06:59	05:50	05:02		
	16:16	26	15:30 (4)	17:08	7	16:37 (3)	18:04	28	17:36 (2)	20:02	21:46
3	08:44	15:04 (4)	08:10	16:30 (3)	07:12	17:08 (2)	06:56	05:48	05:01		
	16:17	26	15:30 (4)	17:10	9	16:39 (3)	18:06	30	17:38 (2)	20:04	21:48
4	08:43	15:05 (4)	08:08	16:30 (3)	07:09	17:08 (2)	06:54	05:46	05:00		
	16:18	25	15:30 (4)	17:12	11	16:41 (3)	18:07	30	17:38 (2)	20:06	21:49
5	08:43	15:05 (4)	08:07	16:30 (3)	07:07	17:07 (2)	06:51	05:44	04:59		
	16:19	25	15:30 (4)	17:14	13	16:43 (3)	18:09	31	17:38 (2)	20:07	21:50
6	08:43	15:06 (4)	08:05	16:30 (3)	07:04	17:07 (2)	06:49	05:42	04:58		
	16:21	25	15:31 (4)	17:16	15	16:45 (3)	18:11	31	17:38 (2)	20:09	21:51
7	08:42	15:07 (4)	08:03	16:30 (3)	07:02	17:07 (2)	06:47	05:40	04:58		
	16:22	24	15:31 (4)	17:18	17	16:47 (3)	18:13	30	17:37 (2)	20:11	21:52
8	08:42	15:07 (4)	08:01	16:30 (3)	07:00	17:07 (2)	06:44	05:38	04:57		
	16:24	24	15:31 (4)	17:20	20	16:50 (3)	18:15	30	17:37 (2)	20:13	21:53
9	08:41	15:09 (4)	07:59	16:31 (3)	06:57	17:07 (2)	06:42	05:36	04:57		
	16:25	22	15:31 (4)	17:22	19	16:50 (3)	18:17	28	17:35 (2)	20:15	21:54
10	08:40	15:09 (4)	07:57	16:32 (3)	06:55	17:08 (2)	06:39	05:34	04:56		
	16:26	22	15:31 (4)	17:24	17	16:49 (3)	18:19	27	17:35 (2)	20:17	21:55
11	08:40	15:10 (4)	07:55	16:33 (3)	06:52	17:10 (2)	06:37	05:33	04:56		
	16:28	21	15:31 (4)	17:26	15	16:48 (3)	18:21	24	17:34 (2)	20:19	21:55
12	08:39	15:11 (4)	07:53	16:35 (3)	06:50	17:10 (2)	06:35	05:31	04:55		
	16:30	20	15:31 (4)	17:28	11	16:46 (3)	18:23	22	17:32 (2)	20:20	21:56
13	08:38	15:13 (4)	07:51	16:38 (3)	06:48	17:12 (2)	06:32	05:29	04:55		
	16:31	17	15:30 (4)	17:30	5	16:43 (3)	18:25	18	17:30 (2)	20:22	21:57
14	08:37	15:14 (4)	07:49	06:45		17:15 (2)	06:30	05:27	04:55		
	16:33	16	15:30 (4)	17:32		18:27	11	17:26 (2)	20:24	21:18	21:58
15	08:36	15:16 (4)	07:47	06:43		06:28		05:25	04:54		
	16:34	13	15:29 (4)	17:34		20:26		21:20	21:58		
16	08:35	15:17 (4)	07:45	06:40		06:25		05:24	04:54		
	16:36	10	15:27 (4)	17:36		20:28		21:22	21:59		
17	08:34	15:21 (4)	07:43	06:38		06:23		05:22	04:54		
	16:38	3	15:24 (4)	17:38		20:30		21:23	21:59		
18	08:33		07:41	06:35		06:21		05:21	04:54		
	16:40		17:40	18:34		20:31		21:25	22:00		
19	08:32		07:39	06:33		06:18		05:19	04:54		
	16:41		17:42	18:36		20:33		21:27	22:00		
20	08:31		07:36	06:31		06:16		05:18	04:54		
	16:43		17:44	18:38		20:35		21:28	22:00		
21	08:30		07:34	06:28		06:14		05:16	04:54		
	16:45		17:46	18:40		20:37		21:30	22:01		
22	08:29		07:32	06:26		06:12		05:15	04:55		
	16:47		17:48	18:42		20:39		21:31	22:01		
23	08:27		07:30	06:23		06:09		05:13	04:55		
	16:49		17:50	18:43		20:41		21:33	22:01		
24	08:26		07:28	17:18 (2)	06:21	06:07		05:12	04:55		
	16:50		17:52	6	17:24 (2)	18:45		20:43	21:34	22:01	
25	08:24		07:25	17:14 (2)	06:18	06:05		05:11	04:55		
	16:52		17:54	12	17:26 (2)	18:47		20:44	21:36	22:01	
26	08:23		07:23	17:13 (2)	06:16	06:03		05:09	04:56		
	16:54		17:56	15	17:28 (2)	18:49		20:46	21:37	22:01	
27	08:22		07:21	17:12 (2)	06:13	06:00		05:08	04:56		
	16:56		17:58	19	17:31 (2)	18:51		20:48	21:39	22:01	
28	08:20		07:18	17:10 (2)	06:11	05:58		05:07	04:57		
	16:58		18:00	22	17:32 (2)	18:53		20:50	21:40	22:01	
29	08:19			07:08		05:56		05:06	04:57		
	17:00			19:54		20:52		21:41	22:01		
30	08:17			07:06		05:54		05:05	04:58		
	17:02			19:56		20:54		21:43	22:00		
31	08:15			07:04				05:04			
	17:04			19:58				21:44			
Potential sun hours	250		273	367		420		494	510		
Total, worst case	345		236	365							
Sun reduction	0.24		0.23	0.27							
Oper. time red.	1.00		1.00	1.00							
Wind dir. red.	0.65		0.66	0.68							
Total reduction	0.16		0.15	0.18							
Total, real	54		36	67							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: A - H1

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:50 (2) 18:10 (2)	07:24 16:54	16:02 (3) 16:19 (3)	08:19 16:10	14:52 (4) 15:13 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:48 (2) 18:11 (2)	07:26 16:52	16:01 (3) 16:19 (3)	08:21 16:09	14:52 (4) 15:13 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:47 (2) 18:12 (2)	07:28 16:50	16:00 (3) 16:19 (3)	08:22 16:08	14:52 (4) 15:14 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:46 (2) 18:13 (2)	07:30 16:48	16:00 (3) 16:17 (3)	08:24 16:08	14:52 (4) 15:16 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:45 (2) 18:13 (2)	07:32 16:46	15:59 (3) 16:15 (3)	08:25 16:07	14:52 (4) 15:16 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:44 (2) 18:14 (2)	07:34 16:44	15:59 (3) 16:12 (3)	08:26 16:07	14:52 (4) 15:17 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:43 (2) 18:13 (2)	07:36 16:43	16:00 (3) 16:10 (3)	08:28 16:06	14:52 (4) 15:17 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:42 (2) 18:13 (2)	07:38 16:41	16:00 (3) 16:08 (3)	08:29 16:06	14:52 (4) 15:17 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:42 (2) 18:13 (2)	07:40 16:39	16:01 (3) 16:07 (3)	08:30 16:05	14:53 (4) 15:19 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:42 (2) 18:12 (2)	07:42 16:37	16:02 (3) 16:05 (3)	08:31 16:05	14:53 (4) 15:19 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:42 (2) 18:11 (2)	07:44 16:35	08:33 16:05	14:53 (4) 15:19 (4)	
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:42 (2) 18:09 (2)	07:45 16:34	08:34 16:05	14:53 (4) 15:20 (4)	
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:43 (2) 18:07 (2)	07:47 16:32	08:35 16:04	14:54 (4) 15:20 (4)	
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:44 (2) 18:04 (2)	07:49 16:31	08:36 16:04	14:54 (4) 15:21 (4)	
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:44 (2) 18:02 (2)	07:51 16:29	08:37 16:04	14:54 (4) 15:21 (4)	
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:46 (2) 17:59 (2)	07:53 16:27	08:38 16:05	14:55 (4) 15:22 (4)	
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:47 (2) 17:57 (2)	07:55 16:26	08:38 16:05	14:55 (4) 15:23 (4)	
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:50 (2) 17:55 (2)	07:57 16:24	08:39 16:05	14:56 (4) 15:23 (4)	
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	07:59 16:23	08:40 16:05	14:57 (4) 15:24 (4)	
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:00 16:22	08:41 16:06	14:57 (4) 15:24 (4)	
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:02 16:20	08:41 16:06	14:58 (4) 15:25 (4)	
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:04 16:19	08:42 16:06	14:58 (4) 15:25 (4)	
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:06 16:18	08:42 16:07	14:59 (4) 15:26 (4)	
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:08 16:17	08:43 16:08	14:59 (4) 15:26 (4)	
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	15:00 (4) 15:01 (4)	08:43 16:08	14:59 (4) 15:26 (4)	
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	14:56 (4) 15:06 (4)	08:43 16:09	14:59 (4) 15:26 (4)	
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	14:55 (4) 15:08 (4)	08:44 16:10	15:01 (4) 15:28 (4)	
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	14:54 (4) 15:10 (4)	08:44 16:10	15:01 (4) 15:28 (4)	
29	05:34 21:30	06:27 20:25	07:22 19:09	17:57 (2) 18:06 (2)	07:18 17:00	08:16 16:13 (3)	08:44 16:11	15:02 (4) 15:29 (4)	
30	05:35 21:28	06:29 20:23	07:24 19:07	17:52 (2) 18:08 (2)	07:20 16:58	16:03 (3) 16:15 (3)	08:18 16:11	14:53 (4) 15:12 (4)	
31	05:37 21:27	06:31 20:21		07:22 16:56	16:02 (3) 16:17 (3)		08:44 16:13	15:02 (4) 15:29 (4)	
Potential sun hours	512	460	382	328	259	233			
Total, worst case			25	455	203	805			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.68	0.68	0.65	0.65			
Total reduction			0.22	0.20	0.17	0.13			
Total, real			5	90	35	108			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: B - H2

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		14:47 (4)	08:14		16:18 (3)	07:16		16:56 (2)	07:01		05:52			05:03		
	16:15	18	15:05 (4)	17:06	16	16:34 (3)	18:02	34	17:30 (2)	20:00		20:55			21:45		
2	08:44		14:48 (4)	08:12		16:19 (3)	07:14		16:55 (2)	06:59		05:50			05:02		
	16:16	18	15:06 (4)	17:08	18	16:37 (3)	18:04	35	17:30 (2)	20:02		20:57			21:46		
3	08:44		14:48 (4)	08:10		16:19 (3)	07:12		16:55 (2)	06:56		05:48			05:01		
	16:17	17	15:05 (4)	17:10	20	16:39 (3)	18:06	35	17:30 (2)	20:04		20:59			21:48		
4	08:43		14:50 (4)	08:08		16:19 (3)	07:09		16:56 (2)	06:54		05:46			05:00		
	16:18	15	15:05 (4)	17:12	21	16:40 (3)	18:07	34	17:30 (2)	20:06		21:01			21:49		
5	08:43		14:51 (4)	08:07		16:20 (3)	07:07		16:55 (2)	06:51		05:44			04:59		
	16:19	13	15:04 (4)	17:14	20	16:40 (3)	18:09	34	17:29 (2)	20:07		21:03			21:50		
6	08:43		14:53 (4)	08:05		16:20 (3)	07:04		16:56 (2)	06:49		05:42			04:58		
	16:21	11	15:04 (4)	17:16	19	16:39 (3)	18:11	33	17:29 (2)	20:09		21:04			21:51		
7	08:42		14:54 (4)	08:03		16:21 (3)	07:02		16:56 (2)	06:47		05:40			04:58		
	16:22	9	15:03 (4)	17:18	17	16:38 (3)	18:13	31	17:27 (2)	20:11		21:06			21:52		
8	08:42		14:57 (4)	08:01		16:23 (3)	07:00		16:57 (2)	06:44		05:38			04:57		
	16:24	3	15:00 (4)	17:20	14	16:37 (3)	18:15	30	17:27 (2)	20:13		21:08			21:53		
9	08:41			07:59		16:25 (3)	06:57		16:57 (2)	06:42		05:36			04:57		
	16:25			17:22	11	16:36 (3)	18:17	28	17:25 (2)	20:15		21:10			21:54		
10	08:40			07:57		16:29 (3)	06:55		16:58 (2)	06:39		05:34			04:56		
	16:26			17:24	3	16:32 (3)	18:19	26	17:24 (2)	20:17		21:11			21:55		
11	08:40			07:55			06:53		17:00 (2)	06:37		05:33			04:56		
	16:28			17:26			18:21	22	17:22 (2)	20:19		21:13			21:55		
12	08:39			07:53			06:50		17:02 (2)	06:35		05:31			04:55		
	16:30			17:28			18:23	17	17:19 (2)	20:20		21:15			21:56		
13	08:38			07:51			06:48		17:05 (2)	06:32		05:29			04:55		
	16:31			17:30			18:25	11	17:16 (2)	20:22		21:17			21:57		
14	08:37			07:49			06:45		06:30	05:27		04:55					
	16:33			17:32			18:27		20:24	21:18		21:58					
15	08:36			07:47			06:43		06:28	05:26		04:54					
	16:34			17:34			18:28		20:26	21:20		21:58					
16	08:35			07:45			06:40		06:25	05:24		04:54					
	16:36			17:36			18:30		20:28	21:22		21:59					
17	08:34			07:43			06:38		06:23	05:22		04:54					
	16:38			17:38			18:32		20:30	21:23		21:59					
18	08:33			07:41			06:35		06:21	05:21		04:54					
	16:40			17:40			18:34		20:31	21:25		22:00					
19	08:32			07:39			06:33		06:18	05:19		04:54					
	16:41			17:42			18:36		20:33	21:27		22:00					
20	08:31			07:36		17:07 (2)	06:31		06:16	05:18		04:54					
	16:43			17:44	9	17:16 (2)	18:38		20:35	21:28		22:00					
21	08:30			07:34		17:05 (2)	06:28		06:14	05:16		04:54					
	16:45			17:46	13	17:18 (2)	18:40		20:37	21:30		22:01					
22	08:29			07:32		17:02 (2)	06:26		06:12	05:15		04:55					
	16:47			17:48	17	17:19 (2)	18:42		20:39	21:31		22:01					
23	08:27			07:30		17:01 (2)	06:23		06:09	05:13		04:55					
	16:49			17:50	21	17:22 (2)	18:43		20:41	21:33		22:01					
24	08:26			07:28		17:00 (2)	06:21		06:07	05:12		04:55					
	16:50			17:52	24	17:24 (2)	18:45		20:43	21:34		22:01					
25	08:24			07:25		16:58 (2)	06:18		06:05	05:11		04:55					
	16:52			17:54	28	17:26 (2)	18:47		20:44	21:36		22:01					
26	08:23		16:19 (3)	07:23		16:58 (2)	06:16		06:03	05:09		04:56					
	16:54	2	16:21 (3)	17:56	30	17:28 (2)	18:49		20:46	21:37		22:01					
27	08:22		16:19 (3)	07:21		16:57 (2)	06:13		06:00	05:08		04:56					
	16:56	4	16:23 (3)	17:58	33	17:30 (2)	18:51		20:48	21:39		22:01					
28	08:20		16:19 (3)	07:18		16:56 (2)	06:11		05:58	05:07		04:57					
	16:58	7	16:26 (3)	18:00	34	17:30 (2)	18:53		20:50	21:40		22:01					
29	08:19		16:18 (3)				07:08		05:56	05:06		04:57					
	17:00	10	16:28 (3)				19:54		20:52	21:41		22:01					
30	08:17		16:18 (3)				07:06		05:54	05:05		04:58					
	17:02	11	16:29 (3)				19:56		20:54	21:43		22:00					
31	08:15		16:18 (3)				07:04			05:04							
	17:04	13	16:31 (3)				19:58			21:44							
Potential sun hours	250			273			367		420	494		510					
Total, worst case	151			368			370										
Sun reduction	0.24			0.23			0.27										
Oper. time red.	1.00			1.00			1.00										
Wind dir. red.	0.65			0.67			0.67										
Total reduction	0.16			0.16			0.18										
Total, real	24			57			68										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: B - H2

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:42 (2) 17:57 (2)	07:24 16:03 (3)	15:57 (3) 16:10	08:19 16:21	
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:39 (2) 17:59 (2)	07:26 16:52	15:54 (3) 16:06 (3)	08:21 16:09	
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:37 (2) 18:01 (2)	07:28 16:50	15:52 (3) 16:07 (3)	08:22 16:08	
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:35 (2) 18:02 (2)	07:30 16:48	15:51 (3) 16:08 (3)	08:24 16:08	14:43 (4) 14:45 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:34 (2) 18:03 (2)	07:32 16:46	15:50 (3) 16:09 (3)	08:25 16:07	14:40 (4) 14:48 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:33 (2) 18:04 (2)	07:34 16:44	15:49 (3) 16:10 (3)	08:26 16:07	14:39 (4) 14:50 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:31 (2) 18:03 (2)	07:36 16:43	15:49 (3) 16:10 (3)	08:28 16:06	14:38 (4) 14:51 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:30 (2) 18:04 (2)	07:38 16:41	15:48 (3) 16:08 (3)	08:29 16:06	14:37 (4) 14:52 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:30 (2) 18:04 (2)	07:40 16:39	15:49 (3) 16:07 (3)	08:30 16:05	14:37 (4) 14:54 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:29 (2) 18:04 (2)	07:42 16:37	15:49 (3) 16:05 (3)	08:31 16:05	14:37 (4) 14:55 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:29 (2) 18:04 (2)	07:44 16:35	15:49 (3) 16:03 (3)	08:33 16:05	14:37 (4) 14:55 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:29 (2) 18:04 (2)	07:45 16:34	15:50 (3) 16:01 (3)	08:34 16:05	14:37 (4) 14:56 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:29 (2) 18:03 (2)	07:47 16:32	15:50 (3) 15:59 (3)	08:35 16:05	14:37 (4) 14:57 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:29 (2) 18:03 (2)	07:49 16:31	15:51 (3) 15:57 (3)	08:36 16:04	14:37 (4) 14:58 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:29 (2) 18:02 (2)	07:51 16:29	15:52 (3) 15:56 (3)	08:37 16:04	14:37 (4) 14:58 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:30 (2) 17:59 (2)	07:53 16:27	15:52 (3) 15:54 (3)	08:38 16:05	14:37 (4) 14:59 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:31 (2) 17:57 (2)	07:55 16:26	16:05 16:05	08:38 16:05	14:38 (4) 15:00 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:31 (2) 17:55 (2)	07:57 16:24	16:05 16:05	08:39 16:05	14:38 (4) 15:01 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:32 (2) 17:52 (2)	07:59 16:23	16:05 16:05	08:40 16:05	14:39 (4) 15:01 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:34 (2) 17:50 (2)	08:00 16:22	16:05 16:06	08:41 16:06	14:39 (4) 15:01 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:36 (2) 17:48 (2)	08:02 16:20	16:05 16:06	08:41 16:06	14:40 (4) 15:02 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:39 (2) 17:45 (2)	08:04 16:19	16:06 16:06	08:42 16:06	14:40 (4) 15:02 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:45 (2) 17:45 (2)	08:06 16:18	16:06 16:07	08:42 16:07	14:41 (4) 15:03 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:45 (2) 17:45 (2)	08:08 16:17	16:07 16:08	08:43 16:08	14:41 (4) 15:03 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	17:45 (2) 17:45 (2)	08:09 16:16	16:08 16:08	08:43 16:08	14:41 (4) 15:04 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	17:45 (2) 17:45 (2)	08:11 16:14	16:08 16:09	08:43 16:09	14:42 (4) 15:04 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	17:45 (2) 17:45 (2)	08:13 16:13	16:09 16:10	08:44 16:10	14:43 (4) 15:05 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	17:45 (2) 17:45 (2)	08:14 16:12	16:10 16:10	08:44 16:10	14:44 (4) 15:05 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	17:45 (2) 17:45 (2)	08:16 16:12	16:11 16:11	08:44 16:11	14:44 (4) 15:05 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:47 (2) 17:53 (2)	17:45 (2) 17:45 (2)	08:18 16:11	16:11 16:12	08:44 16:12	14:44 (4) 15:05 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	17:45 (2) 17:45 (2)		16:12 16:13	08:44 16:13	14:45 (4) 15:05 (4)
Potential sun hours	512	460	382	328	259	233	532		
Total, worst case			6	585	211	532			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.67	0.67	0.66	0.65			
Total reduction			0.22	0.20	0.17	0.13			
Total, real			1	116	37	71			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: C - H3

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	06:18 (4) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	06:16 (4) 20:57	05:02 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	06:15 (4) 20:59	05:01 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	06:16 (4) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	05:51 20:54	05:04 21:44	05:34 (3) 05:37 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case			370	52	54	408
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.68	0.67	0.66
Total reduction			0.18	0.24	0.26	0.21
Total, real			67	12	14	86

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: C - H3

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33		07:26		07:24		08:19	
	22:00	14 05:46 (3)	21:25	20:18		19:05		16:54		16:10	
2	05:00	05:33 (3)	05:40	06:35		07:28		07:26		08:21	
	22:00	13 05:46 (3)	21:23	20:16		19:02		16:52		16:09	
3	05:00	05:33 (3)	05:42	06:36		07:30		07:28		08:22	
	21:59	13 05:46 (3)	21:21	20:14		19:00		16:50		16:09	
4	05:01	05:34 (3)	05:44	06:38		07:32		07:30		08:24	
	21:59	12 05:46 (3)	21:19	20:11		18:57		16:48		16:08	
5	05:02	05:35 (3)	05:46	06:40		07:33		07:32		08:25	
	21:58	11 05:46 (3)	21:17	20:09		18:55		16:46		16:07	
6	05:03	05:36 (3)	05:47	06:42		07:35		07:34		08:26	
	21:58	10 05:46 (3)	21:16	20:06		18:53		16:45		16:07	
7	05:04	05:37 (3)	05:49	06:44		07:37		07:36		08:28	
	21:57	9 05:46 (3)	21:14	20:04		18:50		16:43		16:06	
8	05:05	05:38 (3)	05:51	06:45		07:39		07:38		08:29	
	21:56	8 05:46 (3)	21:12	5 06:28 (4)	20:01	18:48		16:41		16:06	
9	05:06	05:39 (3)	05:52	06:25 (4)	06:47	07:41		07:40		08:30	
	21:55	7 05:46 (3)	21:10	11 06:36 (4)	19:59	18:45		16:39		16:06	
10	05:07	05:40 (3)	05:54	06:24 (4)	06:49	07:43		07:42		08:32	
	21:55	6 05:46 (3)	21:08	14 06:38 (4)	19:57	18:43		16:37		16:05	
11	05:08	05:41 (3)	05:56	06:25 (4)	06:51	07:44		07:44		08:33	
	21:54	5 05:46 (3)	21:06	14 06:39 (4)	19:54	18:41		16:36		16:05	
12	05:09	05:42 (3)	05:58	06:27 (4)	06:52	07:46		07:46		08:34	
	21:53	3 05:45 (3)	21:03	13 06:40 (4)	19:52	11 07:55 (5)	18:38	16:34		16:05	
13	05:11	05:43 (3)	05:59	06:29 (4)	06:54	07:41 (5)	07:48	07:47		08:35	
	21:52	2 05:45 (3)	21:01	12 06:41 (4)	19:49	17 07:58 (5)	18:36	16:32		16:05	
14	05:12	06:01	06:56	06:30 (4)	06:56	07:38 (5)	07:50	07:49		08:36	
	21:51	11 06:41 (4)	19:47	21 07:59 (5)	18:34	16:31		16:05			
15	05:13	06:03	06:58	06:32 (4)	06:58	07:36 (5)	07:52	07:51		08:37	
	21:50	9 06:41 (4)	19:44	24 08:00 (5)	18:31	16:29		16:05			
16	05:14	06:05	06:59	06:33 (4)	06:59	07:35 (5)	07:54	07:53		08:38	
	21:49	7 06:40 (4)	19:42	26 08:01 (5)	18:29	16:28		16:05			
17	05:16	06:06	07:01	06:35 (4)	07:01	07:34 (5)	07:56	07:55		08:39	
	21:47	6 06:41 (4)	19:39	28 08:02 (5)	18:27	16:26		16:05			
18	05:17	06:08	07:03	06:37 (4)	07:03	07:32 (5)	07:57	07:57		08:39	
	21:46	4 06:41 (4)	19:37	30 08:02 (5)	18:24	16:25		16:05			
19	05:19	06:10	07:05	06:38 (4)	07:05	07:31 (5)	07:59	07:59		08:40	
	21:45	1 06:39 (4)	19:34	31 08:02 (5)	18:22	16:23		16:05			
20	05:20	06:12	07:06	07:06	07:33 (5)	08:01	08:01	08:41			
	21:44	29 08:02 (5)	18:20	29 08:02 (5)	18:20	16:22		16:06			
21	05:21	06:13	07:08	07:35 (5)	08:03	08:02	08:41				
	21:42	27 08:02 (5)	18:18	27 08:02 (5)	18:18	16:21		16:06			
22	05:23	06:15	07:10	07:36 (5)	08:05	08:04	08:42				
	21:41	25 08:01 (5)	18:15	25 08:01 (5)	18:15	16:19		16:07			
23	05:24	06:17	07:12	07:38 (5)	08:07	08:06	08:42				
	21:39	23 08:01 (5)	18:13	23 08:01 (5)	18:13	16:18		16:07			
24	05:26	06:19	07:14	07:40 (5)	08:09	08:08	08:43				
	21:38	21 08:01 (5)	18:11	21 08:01 (5)	18:11	16:17		16:08			
25	05:27	06:21	07:15	07:42 (5)	07:11	08:09	08:43				
	21:36	18 08:00 (5)	17:09	18 08:00 (5)	17:09	16:16		16:08			
26	05:29	06:22	07:17	07:43 (5)	07:13	08:11	08:43				
	21:35	15 07:58 (5)	17:07	15 07:58 (5)	17:07	16:15		16:09			
27	05:31	06:24	07:19	07:45 (5)	07:15	08:13	08:44				
	21:33	12 07:57 (5)	17:05	12 07:57 (5)	17:05	16:14		16:10			
28	05:32	06:26	07:21	07:47 (5)	07:17	08:14	08:44				
	21:32	9 07:56 (5)	17:02	9 07:56 (5)	17:02	16:13		16:11			
29	05:34	06:28	07:23	07:49 (5)	07:18	08:16	08:44				
	21:30	6 07:55 (5)	17:00	6 07:55 (5)	17:00	16:12		16:12			
30	05:35	06:29	07:24	07:51 (5)	07:20	08:18	08:44				
	21:28	2 07:53 (5)	16:58	2 07:53 (5)	16:58	16:11		16:13			
31	05:37	06:31	07:22	07:22	07:22	08:44					
	21:27	16:56	16:14	16:56	16:56	16:14					
Potential sun hours	512	460	382	328	259	233					
Total, worst case	113	107	375								
Sun reduction	0.32	0.34	0.32								
Oper. time red.	1.00	1.00	1.00								
Wind dir. red.	0.66	0.68	0.67								
Total reduction	0.21	0.23	0.21								
Total, real	24	25	80								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: D - H4

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	07:51 (5)	05:52
	16:15	17:06	18:02	20:00	16	08:07 (5)
2	08:44	08:12	07:14	06:59	07:56 (5)	05:50
	16:16	17:08	18:04	20:02	7	08:03 (5)
3	08:44	08:10	07:12	06:56		05:48
	16:17	17:10	18:06	20:04		06:14 (4)
4	08:43	08:09	07:09	06:54		05:01
	16:18	17:12	18:08	20:06		06:28 (4)
5	08:43	08:07	07:07	06:52		05:48
	16:20	17:14	18:10	20:08		06:14 (4)
6	08:43	08:05	07:05	06:49		05:01
	16:21	17:16	18:11	20:09		06:28 (4)
7	08:42	08:03	07:02	06:47		05:00
	16:22	17:18	18:13	20:11		06:12 (4)
8	08:42	08:01	07:00	06:44		05:00
	16:24	17:20	18:15	20:13		06:27 (4)
9	08:41	07:59	06:57	06:42		05:49
	16:25	17:22	18:17	20:15		06:10 (4)
10	08:40	07:57	06:55	06:40		05:49
	16:27	17:24	18:19	20:17		06:09 (4)
11	08:40	07:55	06:53	06:37		05:49
	16:28	17:26	18:21	20:19		06:13 (4)
12	08:39	07:53	06:50	06:35		05:47
	16:30	17:28	18:23	20:20		06:24 (4)
13	08:38	07:51	06:48	07:12 (5)	06:32	05:47
	16:31	17:30	18:25	07:17 (5)	20:22	06:10 (4)
14	08:37	07:49	06:45	07:09 (5)	06:30	05:46
	16:33	17:32	18:27	07:18 (5)	20:24	06:16 (4)
15	08:36	07:47	06:43	07:07 (5)	06:28	05:46
	16:35	17:34	18:29	07:19 (5)	20:26	06:28 (4)
16	08:35	07:45	06:40	07:04 (5)	06:25	05:45
	16:36	17:36	18:30	07:19 (5)	20:28	06:12 (4)
17	08:34	07:43	06:38	07:02 (5)	06:23	05:45
	16:38	17:38	18:32	07:20 (5)	20:30	06:13 (4)
18	08:33	07:41	06:36	06:59 (5)	06:21	05:44
	16:40	17:40	18:34	07:20 (5)	20:32	06:24 (4)
19	08:32	07:39	06:33	06:57 (5)	06:18	05:44
	16:41	17:42	18:36	07:21 (5)	20:33	06:13 (4)
20	08:31	07:37	06:31	06:54 (5)	06:16	05:44
	16:43	17:44	18:38	07:21 (5)	20:35	06:22 (4)
21	08:30	07:34	06:28	06:52 (5)	06:14	05:45
	16:45	17:46	18:40	07:21 (5)	20:37	06:14 (4)
22	08:29	07:32	06:26	06:50 (5)	06:12	05:45
	16:47	17:48	18:42	07:21 (5)	20:39	06:15 (4)
23	08:27	07:30	06:23	06:47 (5)	06:09	05:45
	16:49	17:50	18:43	07:20 (5)	20:41	06:15 (4)
24	08:26	07:28	06:21	06:45 (5)	06:07	05:45
	16:51	17:52	18:45	07:20 (5)	20:43	06:16 (4)
25	08:25	07:25	06:18	06:45 (5)	06:05	05:46
	16:53	17:54	18:47	07:19 (5)	20:44	06:17 (4)
26	08:23	07:23	06:16	06:45 (5)	06:03	05:46
	16:54	17:56	18:49	07:18 (5)	20:46	06:18 (4)
27	08:22	07:21	06:14	06:45 (5)	06:01	05:47
	16:56	17:58	18:51	07:17 (5)	20:48	06:19 (4)
28	08:20	07:19	06:11	06:46 (5)	05:59	05:47
	16:58	18:00	18:53	07:16 (5)	20:50	06:20 (4)
29	08:19		07:09	07:47 (5)	05:56	05:48
	17:00		19:55	08:14 (5)	20:52	06:22 (4)
30	08:17		07:06	07:48 (5)	05:54	05:48
	17:02		19:56	08:13 (5)	20:54	06:24 (4)
31	08:15		07:04	07:49 (5)		05:49
	17:04		19:58	08:10 (5)		06:26 (4)
Potential sun hours	250	273	367	420	494	510
Total, worst case			461		48	117
Sun reduction			0.27		0.35	0.38
Oper. time red.			1.00		1.00	1.00
Wind dir. red.			0.67		0.67	0.67
Total reduction			0.18		0.24	0.26
Total, real			84		11	30

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: D - H4

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (5) 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (5) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:22 (4) 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:46 21:17	06:20 (4) 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:18 (4) 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57	05:49 21:14	06:19 (4) 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:20 (4) 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:22 (4) 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55	05:54 21:08	06:24 (4) 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:25 (4) 19:54	07:44 (5) 18:41	07:44 16:36	08:33 16:05
12	05:09 21:53	05:58 21:03	06:27 (4) 19:52	07:46 (5) 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	06:28 (4) 19:49	07:48 (5) 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:30 (4) 19:47	07:50 (5) 18:34	07:50 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	06:32 (4) 19:44	07:52 (5) 18:31	07:51 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	06:33 (4) 19:42	07:54 (5) 18:29	07:53 16:28	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	07:56 (5) 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 (5) 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 (5) 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 (5) 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 (5) 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 (5) 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 (5) 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 (5) 18:11	08:08 16:17	08:43 16:08
25	05:27 21:36	06:21 20:35	07:15 19:19	08:11 (5) 18:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	08:13 (5) 18:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	08:15 (5) 18:04	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	08:17 (5) 18:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	08:19 (5) 18:00	08:16 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	08:21 (5) 17:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		08:23 (5) 17:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case		141	488	2		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.67	0.67	0.67		
Total reduction		0.23	0.21	0.20		
Total, real		32	104	0		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: E - H5

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: F - H6

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: G - H7

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: H - H8

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:07 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: I - H9

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
2	16:15	17:06	18:02	20:00	20:56	06:36 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:41	06:35	07:28	07:26	08:21	
3	16:16	17:08	18:04	20:02	20:57	06:36 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09	
	08:44	08:10	07:12	06:57	05:48	06:15 (1)	05:01	05:01	05:42	06:37	07:30	07:28	08:22	
4	16:17	17:10	18:06	20:04	20:59	06:35 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09	
	08:43	08:09	07:09	06:54	05:46	06:16 (1)	05:00	05:01	05:44	06:32 (1)	07:32	07:30	08:24	
5	16:18	17:12	18:08	20:06	21:01	06:34 (1)	21:49	21:59	21:19	5 06:37 (1)	20:11	18:57	16:48	16:08
	08:43	08:07	07:07	06:52	05:44	06:16 (1)	04:59	05:02	05:46	06:30 (1)	06:40	07:33	07:32	08:25
6	16:20	17:14	18:10	20:08	21:03	06:33 (1)	21:50	21:58	21:18	10 06:40 (1)	20:09	18:55	16:47	16:07
	08:43	08:05	07:05	06:49	05:42	06:18 (1)	04:59	05:03	05:47	06:28 (1)	06:42	07:35	07:34	08:27
7	16:21	17:16	18:12	20:10	21:05	06:33 (1)	21:51	21:58	21:16	13 06:41 (1)	20:06	18:53	16:45	16:07
	08:42	08:03	07:02	06:47	05:40	06:19 (1)	04:58	05:04	05:49	06:27 (1)	06:44	07:37	07:36	08:28
8	16:22	17:18	18:13	20:11	21:06	06:31 (1)	21:52	21:57	21:14	16 06:43 (1)	20:04	18:50	16:43	16:06
	08:42	08:01	07:00	06:44	05:38	06:20 (1)	04:57	05:05	05:51	06:25 (1)	06:45	07:39	07:38	08:29
9	16:24	17:20	18:15	20:13	21:08	06:29 (1)	21:53	21:56	21:12	18 06:43 (1)	20:02	18:48	16:41	16:06
	08:41	07:59	06:58	06:42	05:36		04:57	05:06	05:52	06:25 (1)	06:47	07:41	07:40	08:30
10	16:25	17:22	18:17	20:15	21:10		21:54	21:56	21:10	19 06:44 (1)	19:59	18:45	16:39	16:06
	08:41	07:57	06:55	06:40	05:35		04:56	05:07	05:54	06:25 (1)	06:49	07:43	07:42	08:32
11	16:27	17:24	18:19	20:17	21:12		21:55	21:55	21:08	20 06:45 (1)	19:57	18:43	16:37	16:05
	08:40	07:55	06:53	06:37	05:33		04:56	05:08	05:56	06:25 (1)	06:51	07:44	07:44	08:33
12	16:28	17:26	18:21	20:19	21:13		21:56	21:54	21:06	19 06:44 (1)	19:54	18:41	16:36	16:05
	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	06:27 (1)	06:52	07:46	07:46	08:34
13	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	17 06:44 (1)	19:52	18:38	16:34	16:05
	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	06:29 (1)	06:54	07:48	07:48	08:35
14	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	16 06:45 (1)	19:49	18:36	16:32	16:05
	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:30 (1)	06:56	07:50	07:49	08:36
15	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	14 06:44 (1)	19:47	18:34	16:31	16:05
	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:32 (1)	06:58	07:52	07:51	08:37
16	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	12 06:44 (1)	19:44	18:31	16:29	16:05
	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	06:34 (1)	07:00	07:54	07:53	08:38
17	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	9 06:43 (1)	19:42	18:29	16:28	16:05
	08:35	07:43	06:38	06:23	05:22		04:54	05:16	06:06	06:35 (1)	07:01	07:56	07:55	08:39
18	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	7 06:42 (1)	19:39	18:27	16:26	16:05
	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08	06:37 (1)	07:03	07:58	07:57	08:39
19	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51	4 06:41 (1)	19:37	18:24	16:25	16:05
	08:32	07:39	06:33	06:19	05:19		04:54	05:19	06:10		07:05	07:59	07:59	08:40
20	16:42	17:42	18:36	20:34	21:27		22:00	21:45	20:49		19:34	18:22	16:23	16:05
	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12		07:07	08:01	08:01	08:41
21	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46		19:32	18:20	16:22	16:06
	08:30	07:34	06:28	06:14	05:16		04:55	05:22	06:14		07:08	08:03	08:02	08:41
22	16:45	17:46	18:40	20:37	21:30		22:01	21:42	20:44		19:29	18:18	16:21	16:06
	08:29	07:32	06:26	06:12	05:15		04:55	05:23	06:15		07:10	08:05	08:04	08:42
23	16:47	17:48	18:42	20:39	21:32		22:01	21:41	20:42		19:27	18:15	16:19	16:07
	08:27	07:30	06:23	06:10	05:13		04:55	05:24	06:17		07:12	08:07	08:06	08:42
24	16:49	17:50	18:44	20:41	21:33		22:01	21:40	20:39		19:24	18:13	16:18	16:07
	08:26	07:28	06:21	06:07	05:12	06:32 (1)	04:55	05:26	06:19		07:14	08:09	08:08	08:43
25	16:51	17:52	18:45	20:43	1 06:33 (1)	21:35	22:01	21:38	20:37		19:22	18:11	16:17	16:08
	08:25	07:26	06:19	06:05	05:11	06:30 (1)	04:56	05:28	06:21		07:15	07:11	08:09	08:43
26	16:53	17:54	18:47	20:45	4 06:34 (1)	21:36	22:01	21:37	20:35		19:20	17:09	16:16	16:08
	08:23	07:23	06:16	06:03	05:10	06:28 (1)	04:56	05:29	06:22		07:17	07:13	08:11	08:44
27	16:55	17:56	18:49	20:46	7 06:35 (1)	21:37	22:01	21:35	20:33		19:17	17:07	16:15	16:09
	08:22	07:21	06:14	06:01	05:08	06:26 (1)	04:57	05:31	06:24		07:19	07:15	08:13	08:44
28	16:56	17:58	18:51	20:48	10 06:36 (1)	21:39	22:01	21:33	20:30		19:15	17:05	16:14	16:10
	08:20	07:19	06:11	05:59	05:07	06:24 (1)	04:57	05:32	06:26		07:21	07:17	08:15	08:44
29	16:58	18:00	18:53	20:50	12 06:36 (1)	21:40	22:01	21:32	20:28		19:12	17:02	16:13	16:11
	08:19		07:09	05:56	06:22 (1)	05:06	04:58	05:34	06:28		07:23	07:19	08:16	08:44
30	17:00		19:55	20:52	14 06:36 (1)	21:42	22:01	21:30	20:26		19:10	17:00	16:12	16:12
	08:17		07:06	05:54	06:20 (1)	05:05	04:58	05:36	06:29		07:24	07:21	08:18	08:44
31	17:02		19:57	20:54	16 06:36 (1)	21:43	22:01	21:28	20:23		19:07	16:58	16:11	16:13
	08:15		07:04		05:04			05:37	06:31			07:22		08:44
	17:04		19:58		21:44			21:27	20:21			16:56		16:14
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case						129				199				
Sun reduction				0.35		0.38				0.34				
Oper. time red.				1.00		1.00				1.00				
Wind dir. red.				0.68		0.68				0.68				
Total reduction				0.24		0.26				0.23				
Total, real				15		33				46				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: J - H10

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December					
1	08:44	08:14	07:16	07:01	05:52	05:03	05:34 (1)	04:59	05:36 (1)	05:39	06:33	07:26	07:24	08:19			
2	16:15	17:06	18:02	20:00	20:56	21:45	15	05:49 (1)	22:00	16	05:52 (1)	21:25	20:18	19:05	16:54	16:10	
	08:44	08:12	07:14	06:59	05:50	05:02	05:33 (1)	05:00	05:36 (1)	05:41	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	21:47	16	05:49 (1)	22:00	17	05:53 (1)	21:23	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48	05:01	05:32 (1)	05:01	05:36 (1)	05:42	06:37	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	21:48	17	05:49 (1)	21:59	18	05:54 (1)	21:21	20:14	19:00	16:50	16:09	
	08:43	08:09	07:09	06:54	05:46	05:00	05:31 (1)	05:01	05:35 (1)	05:44	06:38	07:32	07:30	08:24			
4	16:18	17:12	18:08	20:06	21:01	21:49	17	05:48 (1)	21:59	18	05:53 (1)	21:19	20:11	18:57	16:48	16:08	
	08:43	08:07	07:07	06:52	05:44	04:59	05:31 (1)	05:02	05:35 (1)	05:46	06:40	07:33	07:32	08:25			
	16:20	17:14	18:10	20:08	21:03	21:50	18	05:49 (1)	21:58	19	05:54 (1)	21:18	20:09	18:55	16:47	16:07	
6	08:43	08:05	07:05	06:49	05:42	04:59	05:30 (1)	05:03	05:36 (1)	05:47	06:42	07:35	07:34	08:27			
	16:21	17:16	18:12	20:09	21:05	21:51	18	05:48 (1)	21:58	19	05:55 (1)	21:16	20:06	18:53	16:45	16:07	
	08:42	08:03	07:02	06:47	05:40	04:58	05:30 (1)	05:04	05:37 (1)	05:49	06:44	07:37	07:36	08:28			
8	16:22	17:18	18:13	20:11	21:06	21:52	19	05:49 (1)	21:57	18	05:55 (1)	21:14	20:04	18:50	16:43	16:06	
	08:42	08:01	07:00	06:44	05:38	04:57	05:30 (1)	05:05	05:38 (1)	05:51	06:45	07:39	07:38	08:29			
	16:24	17:20	18:15	20:13	21:08	21:53	18	05:48 (1)	21:56	17	05:55 (1)	21:12	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	05:36	04:57	05:31 (1)	05:06	05:39 (1)	05:52	06:47	07:41	07:40	08:30			
	16:25	17:22	18:17	20:15	21:10	21:54	18	05:49 (1)	21:56	17	05:56 (1)	21:10	19:59	18:45	16:39	16:06	
	08:41	07:57	06:55	06:40	05:35	04:56	05:31 (1)	05:07	05:40 (1)	05:54	06:49	07:43	07:42	08:32			
10	16:27	17:24	18:19	20:17	21:12	21:55	17	05:48 (1)	21:55	16	05:56 (1)	21:08	19:57	18:43	16:37	16:05	
	08:40	07:55	06:53	06:37	05:33	04:56	05:31 (1)	05:08	05:41 (1)	05:56	06:51	07:44	07:44	08:33			
	16:28	17:26	18:21	20:19	21:13	21:56	17	05:48 (1)	21:54	15	05:56 (1)	21:06	19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31	04:56	05:32 (1)	05:10	05:42 (1)	05:58	06:52	07:46	07:46	08:34			
	16:30	17:28	18:23	20:21	21:15	21:56	17	05:49 (1)	21:53	15	05:57 (1)	21:04	19:52	18:38	16:34	16:05	
	08:38	07:51	06:48	06:33	05:29	04:55	05:32 (1)	05:11	05:43 (1)	05:59	06:54	07:48	07:48	08:35			
13	16:31	17:30	18:25	20:22	21:17	21:57	16	05:48 (1)	21:52	14	05:57 (1)	21:01	19:49	18:36	16:32	16:05	
	08:37	07:49	06:45	06:30	05:27	04:55	05:32 (1)	05:12	05:44 (1)	06:01	06:56	07:50	07:49	08:36			
	16:33	17:32	18:27	20:24	21:19	21:58	16	05:48 (1)	21:51	13	05:57 (1)	20:59	19:47	18:34	16:31	16:06	
15	08:36	07:47	06:43	06:28	05:26	04:55	05:33 (1)	05:13	05:46 (1)	06:03	06:58	07:52	07:51	08:37			
	16:35	17:34	18:29	20:26	21:20	21:58	15	05:48 (1)	21:50	12	05:58 (1)	20:57	19:44	18:31	16:29	16:05	
	08:36	07:45	06:41	06:25	05:24	04:55	05:33 (1)	05:15	05:47 (1)	06:05	07:00	07:54	07:53	08:38			
16	16:36	17:36	18:31	20:28	21:22	21:59	15	05:48 (1)	21:49	10	05:57 (1)	20:55	19:42	18:29	16:28	16:05	
	08:35	07:43	06:38	06:23	05:22	04:54	05:34 (1)	05:16	05:48 (1)	06:06	07:01	07:56	07:55	08:39			
	16:38	17:38	18:32	20:30	21:24	21:59	14	05:48 (1)	21:48	9	05:57 (1)	20:53	19:39	18:27	16:26	16:05	
18	08:33	07:41	06:36	06:21	05:21	04:54	05:34 (1)	05:17	05:49 (1)	06:08	07:03	07:58	07:57	08:39			
	16:40	17:40	18:34	20:32	21:25	22:00	14	05:48 (1)	21:46	8	05:57 (1)	20:51	19:37	18:24	16:25	16:05	
	08:32	07:39	06:33	06:19	05:19	04:54	05:34 (1)	05:19	05:51 (1)	06:10	07:05	07:59	07:59	08:40			
19	16:42	17:42	18:36	20:33	21:27	22:00	14	05:48 (1)	21:45	6	05:57 (1)	20:48	19:34	18:22	16:23	16:05	
	08:31	07:37	06:31	06:16	05:18	04:55	05:34 (1)	05:20	05:52 (1)	06:12	07:07	08:01	08:01	08:41			
	16:43	17:44	18:38	20:35	21:28	22:00	14	05:48 (1)	21:44	5	05:57 (1)	20:46	19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16	04:55	05:35 (1)	05:22	05:53 (1)	06:14	07:08	08:03	08:02	08:41			
	16:45	17:46	18:40	20:37	21:30	1	05:46 (1)	22:01	05:49 (1)	21:42	3	05:56 (1)	20:44	19:29	18:18	16:21	16:06
	08:29	07:32	06:26	06:12	05:15	04:55	05:35 (1)	05:23	05:55 (1)	06:15	07:10	08:05	08:04	08:42			
22	16:47	17:48	18:42	20:39	21:31	2	05:46 (1)	22:01	05:49 (1)	21:41	2	05:57 (1)	20:42	19:27	18:15	16:19	16:07
	08:27	07:30	06:23	06:10	05:13	04:53 (1)	05:43 (1)	21:45	05:35 (1)	05:24	06:17	07:12	08:07	08:06	08:42		
	16:49	17:50	18:44	20:41	21:33	4	05:47 (1)	22:01	05:49 (1)	21:40	20:39	19:24	18:13	16:18	16:07		
24	08:26	07:28	06:21	06:07	05:12	04:51 (1)	05:41 (1)	21:45	05:35 (1)	05:26	06:19	07:14	08:09	08:08	08:43		
	16:51	17:52	18:45	20:43	21:35	6	05:47 (1)	22:01	05:49 (1)	21:38	20:37	19:22	18:11	16:17	16:08		
	08:25	07:26	06:19	06:05	05:11	04:50 (1)	05:40 (1)	21:46	05:36 (1)	05:28	06:21	07:15	08:11	08:09	08:43		
25	16:53	17:54	18:47	20:45	21:36	7	05:47 (1)	22:01	05:49 (1)	21:37	20:35	19:20	17:09	16:16	16:08		
	08:23	07:23	06:16	06:03	05:10	04:59 (1)	05:49 (1)	21:46	05:35 (1)	05:29	06:22	07:17	08:13	08:11	08:44		
	16:55	17:56	18:49	20:46	21:37	9	05:48 (1)	22:01	05:50 (1)	21:35	20:33	19:17	17:07	16:15	16:09		
27	08:22	07:21	06:14	06:01	05:08	04:57 (1)	05:47 (1)	21:47	05:36 (1)	05:31	06:24	07:19	08:15	08:13	08:44		
	16:56	17:58	18:51	20:48	21:39	10	05:48 (1)	22:01	05:51 (1)	21:33	20:30	19:15	17:05	16:14	16:10		
	08:20	07:19	06:11	05:59	05:07	04:57 (1)	05:47 (1)	21:47	05:35 (1)	05:32	06:26	07:21	08:17	08:15	08:44		
28	16:58	18:00	18:53	20:50	21:40	11	05:48 (1)	22:01	05:51 (1)	21:32	20:28	19:12	17:02	16:13	16:11		
	08:19		07:09	05:56	05:06	04:58 (1)	05:48 (1)	22:01	05:36 (1)	05:34	06:28	07:23	08:19	08:16	08:44		
	17:00		19:55	20:52	21:42	12	05:48 (1)	22:01	05:52 (1)	21:30	20:26	19:10	17:00	16:12	16:12		
30	08:17		07:06	05:54	05:05	04:58 (1)	05:48 (1)	22:01	05:35 (1)	05:36	06:29	07:24	08:21	08:18	08:44		
	17:02		19:57	20:54	21:43	13	05:48 (1)	22:00	05:52 (1)	21:28	20:23	19:07	16:58	16:11	16:13		
	08:15		07:04		05:04	04:53 (1)	05:43 (1)		05:37	05:37	06:31		07:22		08:44		
31	17:04		19:58		21:44	14	05:48 (1)		21:27	20:21	16:56			16:14			
	Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233				
	Total, worst case					89	474	287									
Sun reduction					0.38	0.32	0.32										
Oper. time red.					1.00	1.00	1.00										
Wind dir. red.					0.66	0.66	0.66										
Total reduction					0.25	0.21	0.21										
Total, real					22	99	61										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: K - H11

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: L - H12

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	07:01	07:25 (5)	05:52	05:03	05:34 (3)					
2	08:44	16:16	08:12	17:08	18:04	07:14	18:04	20:00	07:35 (5)	20:55	21:45	05:43 (3)	9	05:43 (3)			
3	08:44	16:17	08:10	17:10	18:06	07:12	18:06	06:59	07:23 (5)	20:50	21:47	05:33 (3)		05:33 (3)			
4	08:43	16:18	08:09	17:12	18:08	07:09	18:08	20:02	07:35 (5)	20:57	21:47	05:43 (3)	10	05:43 (3)			
5	08:43	16:20	08:07	17:14	18:10	07:07	18:10	06:56	07:20 (5)	20:58	21:47	05:32 (3)		05:32 (3)			
6	08:43	16:21	08:05	17:16	18:11	07:05	18:11	20:04	07:34 (5)	20:59	21:48	05:43 (3)	11	05:43 (3)			
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	06:54	07:18 (5)	20:56	21:49	05:31 (3)		05:31 (3)			
8	08:42	16:24	08:01	17:20	18:15	07:00	18:15	20:06	07:34 (5)	21:01	21:49	05:42 (3)	11	05:42 (3)			
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	06:52	07:15 (5)	20:54	21:50	05:31 (3)	12	05:31 (3)			
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	20:08	07:33 (5)	21:03	21:50	05:43 (3)	12	05:43 (3)			
11	08:40	16:28	07:55	17:26	18:21	06:53	18:21	06:49	07:13 (5)	20:52	21:51	05:30 (3)	13	05:30 (3)			
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	20:09	07:33 (5)	21:04	21:51	05:43 (3)	13	05:43 (3)			
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	06:47	07:12 (5)	20:50	21:52	05:30 (3)	14	05:30 (3)			
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	20:11	07:32 (5)	21:06	21:52	05:44 (3)	14	05:44 (3)			
15	08:36	16:35	07:47	17:34	18:29	06:43	18:29	06:44	07:12 (5)	20:58	21:53	05:29 (3)	14	05:29 (3)			
16	08:35	16:36	07:45	17:36	18:30	06:41	18:30	20:13	07:30 (5)	21:08	21:53	05:43 (3)	14	05:43 (3)			
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	06:42	07:13 (5)	20:56	21:54	05:29 (3)	15	05:29 (3)			
18	08:33	16:40	07:41	17:40	18:34	06:36	18:34	20:15	07:29 (5)	21:10	21:54	05:44 (3)	15	05:44 (3)			
19	08:32	16:42	07:39	17:42	18:36	06:33	18:36	06:40	07:14 (5)	20:55	21:54	05:28 (3)	15	05:28 (3)			
20	08:31	16:43	07:37	17:44	18:38	06:31	18:38	20:17	07:26 (5)	21:12	21:55	05:43 (3)	15	05:43 (3)			
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	06:37		20:53	21:56	05:28 (3)	16	05:28 (3)			
22	08:29	16:47	07:32	17:48	18:42	06:26	18:42	20:19		21:13	21:55	05:44 (3)	16	05:44 (3)			
23	08:27	16:49	07:30	17:50	18:44	06:23	18:44	06:35		20:51	21:56	05:28 (3)	16	05:28 (3)			
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45	20:21		21:15	21:56	05:44 (3)	16	05:44 (3)			
25	08:25	16:53	07:25	17:54	18:47	06:18	18:47	06:32		20:52	21:57	05:27 (3)	17	05:27 (3)			
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	20:22		21:17	21:57	05:43 (3)	16	05:43 (3)			
27	08:22	16:56	07:21	17:58	18:51	06:14	18:51	20:24		21:18	21:58	05:27 (3)	17	05:27 (3)			
28	08:20	16:58	07:19	18:00	18:53	06:11	18:53	20:26		21:20	21:58	05:44 (3)	17	05:44 (3)			
29	08:19	17:00	07:17	18:02	18:55	06:09	18:55	20:28		21:22	21:59	05:27 (3)	17	05:27 (3)			
30	08:17	17:02	07:15	18:04	18:57	06:07	18:57	20:30		21:23	21:59	05:44 (3)	17	05:44 (3)			
31	08:15	17:04	07:13	18:06	19:00	06:05	19:00	20:32		21:25	22:00	05:44 (3)	17	05:44 (3)			
								06:19		20:51	21:54	05:27 (3)	17	05:27 (3)			
								20:33		21:27	22:00	05:45 (3)	18	05:45 (3)			
								06:16		20:58	21:59	05:27 (3)	18	05:27 (3)			
								20:35		21:28	22:00	05:45 (3)	18	05:45 (3)			
								06:14		20:56	21:59	05:28 (3)	18	05:28 (3)			
								20:37		21:30	22:01	05:46 (3)	18	05:46 (3)			
								06:12		20:55	21:59	05:28 (3)	18	05:28 (3)			
								20:39		21:31	22:01	05:46 (3)	18	05:46 (3)			
								06:09		20:53	21:59	05:28 (3)	18	05:28 (3)			
								20:41		21:33	22:01	05:46 (3)	18	05:46 (3)			
								06:07		20:52	21:59	05:28 (3)	18	05:28 (3)			
								20:43		21:34	22:01	05:45 (3)	17	05:45 (3)			
								06:05		20:51	21:59	05:27 (3)	17	05:27 (3)			
								20:44		21:36	22:01	05:46 (3)	17	05:46 (3)			
								06:03		20:50	21:59	05:29 (3)	17	05:29 (3)			
								20:46		21:37	22:01	05:46 (3)	17	05:46 (3)			
								06:01		20:50	21:59	05:30 (3)	17	05:30 (3)			
								20:48		21:39	22:01	05:47 (3)	17	05:47 (3)			
								05:59		20:57	21:59	05:30 (3)	17	05:30 (3)			
								20:50		21:40	22:01	05:47 (3)	17	05:47 (3)			
								05:56		20:56	21:59	05:31 (3)	16	05:31 (3)			
								20:52		21:41	22:01	05:47 (3)	16	05:47 (3)			
								05:54		20:55	21:59	05:31 (3)	16	05:31 (3)			
								20:54		21:43	22:00	05:47 (3)	16	05:47 (3)			
								05:04		20:50	21:59	05:34 (3)					
								21:44		21:44	21:44	05:42 (3)					
Potential sun hours	250	273	367					420		494	510						
Total, worst case						12		156			28		464				
Sun reduction						0.27		0.35			0.38		0.32				
Oper. time red.						1.00		1.00			1.00		1.00				
Wind dir. red.						0.68		0.68			0.66		0.66				
Total reduction						0.18		0.24			0.25		0.21				
Total, real						2		37			7		98				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: L - H12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 16	05:32 (3) 05:48 (3) 21:25	05:39 21:25 20:18	06:33 20:18	07:26 19:05 16:54	08:19 16:10
2	05:00 22:00 15	05:33 (3) 05:48 (3) 21:23	05:40 21:23 20:16	06:35 20:16 12	07:13 (5) 19:02 16:52	08:21 16:09
3	05:00 21:59 15	05:33 (3) 05:48 (3) 21:21	05:42 21:21 20:14	06:37 20:14 16	07:11 (5) 19:00 16:50	08:22 16:09
4	05:01 21:59 14	05:34 (3) 05:48 (3) 21:19	05:44 21:19 20:11	06:38 20:11 18	07:09 (5) 18:57 16:48	08:24 16:08
5	05:02 21:58 14	05:35 (3) 05:49 (3) 21:17	05:46 21:17 20:09	06:40 20:09 20	07:08 (5) 18:55 16:46	08:25 16:07
6	05:03 21:58 13	05:36 (3) 05:49 (3) 21:16	05:47 21:16 20:06	06:42 20:06 20	07:09 (5) 18:53 16:45	08:26 16:07
7	05:04 21:57 13	05:37 (3) 05:50 (3) 21:14	05:49 21:14 20:04	06:44 20:04 18	07:10 (5) 18:50 16:43	08:28 16:06
8	05:05 21:56 12	05:38 (3) 05:50 (3) 21:12	05:51 21:12 20:01	06:45 20:01 17	07:12 (5) 18:48 16:41	08:29 16:06
9	05:06 21:55 11	05:39 (3) 05:50 (3) 21:10	05:52 21:10 19:59	06:47 19:59 15	07:14 (5) 18:45 16:39	08:30 16:06
10	05:07 21:55 10	05:40 (3) 05:50 (3) 21:08	05:54 21:08 19:57	06:49 19:57 12	07:16 (5) 18:43 16:37	08:32 16:05
11	05:08 21:54 9	05:41 (3) 05:50 (3) 21:06	05:56 21:06 19:54	06:51 19:54 10	07:17 (5) 18:41 16:36	08:33 16:05
12	05:10 21:53 8	05:42 (3) 05:50 (3) 21:03	05:58 21:03 19:52	06:52 19:52 7	07:19 (5) 18:38 16:34	08:34 16:05
13	05:11 21:52 7	05:43 (3) 05:50 (3) 21:01	05:59 21:01 19:49	06:54 19:49 5	07:21 (5) 18:36 16:32	08:35 16:05
14	05:12 21:51 6	05:44 (3) 05:50 (3) 20:59	06:01 20:59 19:47	06:56 19:47 1	07:22 (5) 18:34 16:31	08:36 16:05
15	05:13 21:50 5	05:45 (3) 05:50 (3) 20:57	06:03 20:57 19:44	06:58 19:44 10	07:23 (5) 18:31 16:29	08:37 16:05
16	05:15 21:49 3	05:47 (3) 05:50 (3) 20:55	06:05 20:55 19:42	06:59 19:42 10	07:54 18:29 16:28	08:38 16:05
17	05:16 21:47 2	05:48 (3) 05:50 (3) 20:53	06:06 20:53 19:39	07:01 19:39 10	07:56 18:27 16:26	08:39 16:05
18	05:17 21:46 1	06:08 20:51 19:37	07:03 19:37 10	07:03 18:24 16:25	07:57 16:25 10	08:39 16:05
19	05:19 21:45 1	06:10 20:48 19:34	07:05 19:34 10	07:05 18:22 16:23	07:59 16:23 10	08:40 16:05
20	05:20 21:44 1	06:12 20:46 19:32	07:07 19:32 10	07:07 18:20 16:22	08:01 16:22 10	08:41 16:06
21	05:21 21:42 1	06:14 20:44 19:29	07:08 19:29 10	07:08 18:18 16:21	08:03 16:21 10	08:41 16:06
22	05:23 21:41 1	06:15 20:42 19:27	07:10 19:27 10	07:10 18:15 16:19	08:05 16:19 10	08:42 16:07
23	05:24 21:39 1	06:17 20:39 19:24	07:12 19:24 10	07:12 18:13 16:18	08:07 16:18 10	08:42 16:07
24	05:26 21:38 1	06:19 20:37 19:22	07:14 19:22 10	07:14 18:11 16:17	08:09 16:17 10	08:43 16:08
25	05:28 21:36 1	06:21 20:35 19:19	07:15 19:19 10	07:15 17:09 16:16	08:11 16:16 10	08:43 16:08
26	05:29 21:35 1	06:22 20:33 19:17	07:17 19:17 10	07:17 17:07 16:15	08:11 16:15 10	08:43 16:09
27	05:31 21:33 1	06:24 20:30 19:15	07:19 19:15 10	07:19 17:05 16:14	08:13 16:14 10	08:44 16:10
28	05:32 21:32 1	06:26 20:28 19:12	07:21 19:12 10	07:21 17:02 16:13	08:14 16:13 10	08:44 16:11
29	05:34 21:30 1	06:28 20:25 19:10	07:23 19:10 10	07:23 17:00 16:12	08:16 16:12 10	08:44 16:12
30	05:35 21:28 1	06:29 20:23 19:07	07:24 19:07 10	07:24 16:58 16:11	08:18 16:11 10	08:44 16:13
31	05:37 21:27 1	06:31 20:21 19:05	07:26 19:05 10	07:26 16:56 16:10	08:20 16:10 10	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	173		171			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	37		37			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: M - H13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	17:12 (5) 22 17:34 (5)	07:01 20:00	05:52 33 20:03 (4)
2	08:44 16:16	08:12 17:08	07:14 18:04	17:11 (5) 25 17:36 (5)	06:59 20:02	05:50 32 20:02 (4)
3	08:43 16:17	08:10 17:10	07:11 18:06	17:11 (5) 25 17:36 (5)	06:56 20:04	05:48 30 20:01 (4)
4	08:43 16:18	08:08 17:12	07:09 18:07	17:11 (5) 25 17:36 (5)	06:54 20:06	05:46 27 19:59 (4)
5	08:43 16:20	08:07 17:14	07:07 18:09	17:11 (5) 24 17:35 (5)	06:51 20:07	05:44 25 19:58 (4)
6	08:42 16:21	08:05 17:16	07:04 18:11	17:11 (5) 24 17:35 (5)	06:49 20:09	05:42 22 19:56 (4)
7	08:42 16:22	08:03 17:18	07:02 18:13	17:11 (5) 23 17:34 (5)	06:47 20:11	05:40 18 19:55 (4)
8	08:41 16:24	08:01 17:20	07:00 18:15	17:12 (5) 21 17:33 (5)	06:44 20:13	05:38 14 19:53 (4)
9	08:41 16:25	07:59 17:22	06:57 18:17	17:12 (5) 19 17:31 (5)	06:42 20:15	05:36 5 19:48 (4)
10	08:40 16:26	07:57 17:24	06:55 18:19	17:14 (5) 16 17:30 (5)	06:39 20:17	05:34 21:11
11	08:40 16:28	07:55 17:26	06:52 18:21	17:17 (5) 11 17:28 (5)	06:37 20:19	05:33 7 19:44 (4)
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 12 19:53 (4)	21:13 21:15
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 16 19:54 (4)	21:17 21:17
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 20 19:56 (4)	21:17 21:18
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 23 19:58 (4)	21:20 21:20
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 26 20:00 (4)	21:22 21:22
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 29 20:01 (4)	21:22 21:23
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 32 20:03 (4)	21:25 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 35 20:05 (4)	21:27 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 37 20:07 (4)	21:28 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 38 20:06 (4)	21:30 22:00
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 38 20:06 (4)	21:31 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 38 20:06 (4)	21:33 22:01
24	08:26 16:50	07:28 17:52	17:21 (5) 3 17:24 (5)	06:21 20:42	05:12 38 20:06 (4)	21:34 22:01
25	08:24 16:52	07:25 17:54	17:17 (5) 9 17:26 (5)	06:18 20:44	05:11 38 20:06 (4)	21:36 22:01
26	08:23 16:54	07:23 17:56	17:16 (5) 12 17:28 (5)	06:17 20:46	05:09 38 20:06 (4)	21:37 22:01
27	08:22 16:56	07:21 17:58	17:15 (5) 16 17:31 (5)	06:13 20:48	05:08 37 20:05 (4)	21:39 22:01
28	08:20 16:58	07:18 18:00	17:13 (5) 19 17:32 (5)	06:11 20:50	05:07 37 20:05 (4)	21:40 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 35 20:04 (4)	21:41 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 35 20:04 (4)	21:43 22:00
31	08:15 17:04		07:04 19:58		05:04 21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case		59	235	609	206	7
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.68	0.68	0.65	0.65	0.61
Total reduction		0.16	0.18	0.23	0.25	0.19
Total, real		9	43	140	51	1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: M - H13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:43 (4) 19:50 (4)	07:26 19:05	07:24 16:54
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:57 (5) 18:04 (5)	07:26 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:53 (5) 18:07 (5)	07:28 16:50
4	05:01 21:59	05:44 21:19	19:51 (4) 20:00 (4)	06:38 20:11	07:31 18:57	07:30 16:48
5	05:02 21:58	05:45 21:17	19:47 (4) 20:03 (4)	06:40 20:09	07:33 18:55	07:32 16:46
6	05:03 21:57	05:47 21:15	19:45 (4) 20:05 (4)	06:42 20:06	07:35 18:52	07:34 16:44
7	05:04 21:57	05:49 21:13	19:44 (4) 20:07 (4)	06:43 20:04	07:37 18:50	07:36 16:43
8	05:05 21:56	05:51 21:11	19:42 (4) 20:08 (4)	06:45 20:01	07:39 18:48	07:38 16:41
9	05:06 21:55	05:52 21:09	19:41 (4) 20:09 (4)	06:47 19:59	07:41 18:45	07:40 16:39
10	05:07 21:55	05:54 21:07	19:39 (4) 20:09 (4)	06:49 19:56	07:42 18:43	07:42 16:37
11	05:08 21:54	05:56 21:05	19:38 (4) 20:11 (4)	06:50 19:54	07:44 18:40	07:44 16:35
12	05:09 21:53	05:57 21:03	19:38 (4) 20:11 (4)	06:52 19:51	07:46 18:38	07:45 16:34
13	05:11 21:52	05:59 21:01	19:36 (4) 20:11 (4)	06:54 19:49	07:48 18:36	07:47 16:32
14	05:12 21:51	06:01 20:59	19:36 (4) 20:12 (4)	06:56 19:47	07:50 18:33	07:49 16:31
15	05:13 21:50	06:03 20:57	19:36 (4) 20:13 (4)	06:58 19:44	07:52 18:31	07:51 16:29
16	05:14 21:49	06:05 20:55	19:35 (4) 20:12 (4)	06:59 19:42	07:54 18:29	07:53 16:27
17	05:16 21:47	06:06 20:53	19:34 (4) 20:12 (4)	07:01 19:39	07:55 18:26	07:55 16:26
18	05:17 21:46	06:08 20:50	19:34 (4) 20:13 (4)	07:03 19:37	07:57 18:24	07:57 16:25
19	05:18 21:45	06:10 20:48	19:33 (4) 20:12 (4)	07:05 19:34	07:59 18:22	07:59 16:23
20	05:20 21:44	06:12 20:46	19:34 (4) 20:12 (4)	07:06 19:32	08:01 18:20	08:00 16:22
21	05:21 21:42	06:13 20:44	19:34 (4) 20:12 (4)	07:08 19:29	08:03 18:17	08:02 16:20
22	05:23 21:41	06:15 20:42	19:33 (4) 20:11 (4)	07:10 19:27	08:05 18:15	08:04 16:19
23	05:24 21:39	06:17 20:39	19:34 (4) 20:10 (4)	07:12 19:24	08:07 18:13	08:06 16:18
24	05:26 21:38	06:19 20:37	19:34 (4) 20:09 (4)	07:13 19:22	08:09 18:11	08:08 16:17
25	05:27 21:36	06:20 20:35	19:34 (4) 20:06 (4)	07:15 19:19	07:11 17:09	08:09 16:16
26	05:29 21:35	06:22 20:32	19:35 (4) 20:04 (4)	07:17 19:17	07:13 17:06	08:11 16:14
27	05:30 21:33	06:24 20:30	19:35 (4) 20:02 (4)	07:19 19:14	07:14 17:04	08:13 16:13
28	05:32 21:32	06:26 20:28	19:36 (4) 19:59 (4)	07:21 19:12	07:16 17:02	08:14 16:12
29	05:34 21:30	06:27 20:25	19:37 (4) 19:57 (4)	07:22 19:09	07:18 17:00	08:16 16:12
30	05:35 21:28	06:29 20:23	19:39 (4) 19:55 (4)	07:24 19:07	07:20 16:58	08:18 16:11
31	05:37 21:26	06:31 20:21	19:40 (4) 19:52 (4)	07:26 16:56	07:22 16:56	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		823	7	302		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.65	0.68		
Total reduction		0.22	0.21	0.20		
Total, real		183	1	60		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: N - H14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14		07:16	16:59 (5)	07:01	19:06 (4)	05:52		05:03	20:49 (2)
	16:15	17:06		18:02	17:16 (5)	20:00	19:33 (4)	20:55		21:45	21:10 (2)
2	08:44	08:12		07:14	17:00 (5)	06:59	19:04 (4)	05:50		05:02	20:50 (2)
	16:16	17:08		18:04	17:13 (5)	20:02	19:35 (4)	20:57		21:46	21:12 (2)
3	08:43	08:10		07:11	17:03 (5)	06:56	19:03 (4)	05:48		05:01	20:49 (2)
	16:17	17:10		18:06	17:10 (5)	20:04	19:37 (4)	20:59		21:48	21:13 (2)
4	08:43	08:08		07:09		06:54	19:03 (4)	05:46		05:00	20:49 (2)
	16:18	17:12		18:07		20:06	19:39 (3)	21:01		21:49	21:14 (2)
5	08:43	08:07		07:07		06:51	19:02 (4)	05:44		04:59	20:49 (2)
	16:19	17:14		18:09		20:07	19:40 (3)	21:03		21:50	21:14 (2)
6	08:42	08:05		07:04		06:49	19:01 (4)	05:42		04:59	20:49 (2)
	16:21	17:16		18:11		20:09	19:42 (3)	21:04		21:51	21:16 (2)
7	08:42	08:03		07:02		06:47	19:00 (4)	05:40		04:58	20:49 (2)
	16:22	17:18		18:13		20:11	19:43 (3)	21:06		21:52	21:16 (2)
8	08:41	08:01		07:00		06:44	19:01 (4)	05:38		04:57	20:50 (2)
	16:24	17:20		18:15		20:13	19:46 (3)	21:08		21:53	21:16 (2)
9	08:41	07:59		06:57		06:42	19:01 (4)	05:36		04:57	20:49 (2)
	16:25	17:22		18:17		20:15	19:47 (3)	21:10		21:54	21:16 (2)
10	08:40	07:57		06:55		06:39	19:00 (4)	05:34		04:56	20:50 (2)
	16:26	17:24		18:19		20:17	19:46 (3)	21:11		21:55	21:17 (2)
11	08:40	07:55		06:52		06:37	19:01 (4)	05:33		04:56	20:50 (2)
	16:28	17:26		18:21		20:19	19:45 (3)	21:13		21:55	21:17 (2)
12	08:39	07:53		06:50		06:35	19:01 (4)	05:31		04:55	20:50 (2)
	16:30	17:28		18:23		20:20	19:44 (3)	21:15		21:56	21:17 (2)
13	08:38	07:51		06:48		06:32	19:01 (4)	05:29		04:55	20:50 (2)
	16:31	17:30		18:25		20:22	19:42 (3)	21:17		21:57	21:17 (2)
14	08:37	07:49		06:45		06:30	19:02 (4)	05:27		04:55	20:50 (2)
	16:33	17:32		18:27		20:24	19:40 (3)	21:18		21:57	21:17 (2)
15	08:36	07:47		06:43		06:28	19:03 (4)	05:26		04:55	20:51 (2)
	16:34	17:34		18:28		20:26	19:37 (3)	21:20		21:58	21:18 (2)
16	08:35	07:45	17:04 (5)	06:40		06:25	19:04 (4)	05:24		04:54	20:51 (2)
	16:36	17:36	3	18:30		20:28	19:31 (4)	21:22		21:59	21:18 (2)
17	08:34	07:43	17:02 (5)	06:38		06:23	19:05 (4)	05:22		04:54	20:51 (2)
	16:38	17:38	7	18:32		20:30	19:28 (4)	21:23		21:59	21:18 (2)
18	08:33	07:41	16:59 (5)	06:35		06:21	19:07 (4)	05:21		04:54	20:51 (2)
	16:40	17:40	12	18:34		20:31	19:26 (4)	21:25		22:00	21:19 (2)
19	08:32	07:39	16:58 (5)	06:33		06:18	19:09 (4)	05:19		04:54	20:52 (2)
	16:41	17:42	15	18:36		20:33	19:24 (4)	21:27		22:00	21:19 (2)
20	08:31	07:36	16:58 (5)	06:31		06:16	19:14 (4)	05:18		04:54	20:52 (2)
	16:43	17:44	18	18:38		20:35	19:19 (4)	21:28		22:00	21:19 (2)
21	08:30	07:34	16:57 (5)	06:28		06:14		05:16		04:54	20:52 (2)
	16:45	17:46	21	18:40		20:37		21:30		22:01	21:19 (2)
22	08:28	07:32	16:56 (5)	06:26		06:12		05:15	20:56 (2)	04:55	20:53 (2)
	16:47	17:48	23	18:41		20:39		21:31	3	20:59 (2)	22:01
23	08:27	07:30	16:56 (5)	06:23		06:09		05:13	20:54 (2)	04:55	20:53 (2)
	16:49	17:50	24	18:43		20:41		21:33	5	20:59 (2)	22:01
24	08:26	07:28	16:56 (5)	06:21		06:07		05:12	20:53 (2)	04:55	20:53 (2)
	16:50	17:52	24	18:45		20:42		21:34	8	21:01 (2)	22:01
25	08:24	07:25	16:56 (5)	06:18		06:05		05:11	20:52 (2)	04:56	20:53 (2)
	16:52	17:54	23	18:47		20:44		21:36	10	21:02 (2)	22:01
26	08:23	07:23	16:56 (5)	06:16		06:03		05:09	20:51 (2)	04:56	20:53 (2)
	16:54	17:56	23	18:49		20:46		21:37	13	21:04 (2)	22:01
27	08:22	07:21	16:57 (5)	06:13	18:17 (4)	06:01		05:08	20:51 (2)	04:56	20:53 (2)
	16:56	17:58	21	18:51	7	18:24 (4)	20:48	21:39	14	21:05 (2)	22:01
28	08:20	07:18	16:57 (5)	06:11	18:14 (4)	05:58		05:07	20:50 (2)	04:57	20:54 (2)
	16:58	18:00	20	18:53	12	18:26 (4)	20:50	21:40	16	21:06 (2)	22:01
29	08:18		17:17 (5)	07:08	19:11 (4)	05:56		05:06	20:50 (2)	04:57	20:54 (2)
	17:00			19:54	17	19:28 (4)	20:52	21:41	17	21:07 (2)	22:01
30	08:17			07:06	19:09 (4)	05:54		05:05	20:50 (2)	04:58	20:54 (2)
	17:02			19:56	21	19:30 (4)	20:53	21:43	18	21:08 (2)	22:00
31	08:15			07:04		19:07 (4)		05:04	20:49 (2)		
	17:04			19:58	24	19:31 (4)		21:44	20	21:09 (2)	
Potential sun hours	250	273		367		420		494		510	
Total, worst case		234		118		676		124		792	
Sun reduction		0.23		0.27		0.35		0.38		0.32	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.67		0.67		0.67		0.62		0.62	
Total reduction		0.16		0.18		0.24		0.24		0.20	
Total, real		37		22		160		29		156	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: N - H14

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:54 (2)	05:39	06:33	18:59 (4)	07:26		07:24	08:19		
	22:00	27	21:21 (2)	21:25	20:18	45	19:44 (3)	19:05	16:54	16:10	
2	05:00	20:55 (2)	05:40	06:35	18:59 (4)	07:28		07:26	08:21		
	22:00	27	21:22 (2)	21:23	20:16	46	19:45 (3)	19:02	16:52	16:09	
3	05:00	20:54 (2)	05:42	06:36	18:58 (4)	07:30		07:28	08:22		
	21:59	27	21:21 (2)	21:21	20:13	46	19:44 (3)	19:00	16:50	16:08	
4	05:01	20:55 (2)	05:44	06:38	18:58 (4)	07:31		07:30	08:24		
	21:59	27	21:22 (2)	21:19	20:11	45	19:43 (3)	18:57	16:48	16:08	
5	05:02	20:55 (2)	05:45	06:40	18:57 (4)	07:33		07:32	08:25		
	21:58	27	21:22 (2)	21:17	20:09	44	19:41 (3)	18:55	16:46	16:07	
6	05:03	20:56 (2)	05:47	06:42	18:58 (4)	07:35		07:34	08:26		
	21:57	26	21:22 (2)	21:15	20:06	41	19:39 (3)	18:52	16:44	16:07	
7	05:04	20:56 (2)	05:49	06:43	18:57 (4)	07:37		07:36	08:28		
	21:57	26	21:22 (2)	21:13	20:04	38	19:35 (3)	18:50	16:43	16:06	
8	05:05	20:56 (2)	05:51	06:45	18:57 (4)	07:39		07:38	08:29		
	21:56	25	21:21 (2)	21:11	20:01	36	19:33 (4)	18:48	16:41	16:06	
9	05:06	20:57 (2)	05:52	06:47	18:57 (4)	07:41		07:40	08:30		
	21:55	24	21:21 (2)	21:09	19:59	34	19:31 (4)	18:45	16:39	16:05	
10	05:07	20:57 (2)	05:54	06:49	18:57 (4)	07:42		07:42	08:31		
	21:55	23	21:20 (2)	21:07	19:56	31	19:28 (4)	18:43	16:37	16:05	
11	05:08	20:57 (2)	05:56	06:50	18:58 (4)	07:44		17:35 (5)	07:44	08:33	
	21:54	22	21:19 (2)	21:05	19:54	28	19:26 (4)	18:40	17:46 (5)	16:35	16:05
12	05:09	20:58 (2)	05:57	06:52	18:59 (4)	07:46		17:33 (5)	07:45	08:34	
	21:53	20	21:18 (2)	21:03	19:51	25	19:24 (4)	18:38	17:48 (5)	16:34	16:05
13	05:10	20:58 (2)	05:59	06:54	19:00 (4)	07:48		17:31 (5)	07:47	08:35	
	21:52	19	21:17 (2)	21:01	19:49	22	19:22 (4)	18:36	17:49 (5)	16:32	16:05
14	05:12	20:58 (2)	06:01	06:56	19:01 (4)	07:50		17:30 (5)	07:49	08:36	
	21:51	18	21:16 (2)	20:59	19:47	17	19:18 (4)	18:33	17:50 (5)	16:31	16:05
15	05:13	20:59 (2)	06:03	06:58	19:03 (4)	07:52		17:29 (5)	07:51	08:37	
	21:50	16	21:15 (2)	20:57	19:44	13	19:16 (4)	18:31	17:51 (5)	16:29	16:05
16	05:14	20:59 (2)	06:04	06:59	19:06 (4)	07:54		17:28 (5)	07:53	08:38	
	21:49	15	21:14 (2)	20:55	19:42	8	19:14 (4)	18:29	17:51 (5)	16:27	16:05
17	05:16	21:01 (2)	06:06	07:01		07:55		17:28 (5)	07:55	08:38	
	21:47	13	21:14 (2)	20:53	19:39		18:26	23	17:51 (5)	16:26	16:05
18	05:17	21:01 (2)	06:08	07:03	19:28 (4)	07:57		17:27 (5)	07:57	08:39	
	21:46	11	21:12 (2)	20:50	19:37		18:24	24	17:51 (5)	16:24	16:05
19	05:18	21:02 (2)	06:10	07:05		07:59		17:27 (5)	07:59	08:40	
	21:45	9	21:11 (2)	20:48	19:34		18:22	24	17:51 (5)	16:23	16:05
20	05:20	21:04 (2)	06:12	07:06		08:01		17:27 (5)	08:00	08:41	
	21:44	6	21:10 (2)	20:46	19:32		18:20	23	17:50 (5)	16:22	16:06
21	05:21	21:05 (2)	06:13	07:08		08:03		17:28 (5)	08:02	08:41	
	21:42	4	21:09 (2)	20:44	19:29		18:17	20	17:48 (5)	16:20	16:06
22	05:23		06:15	07:10		08:05		17:28 (5)	08:04	08:42	
	21:41		20:42	19:27		18:15	17	17:45 (5)	16:19	16:06	
23	05:24		06:17	07:12		08:07		17:29 (5)	08:06	08:42	
	21:39		20:39	19:24 (4)	19:24		18:13	14	17:43 (5)	16:18	16:07
24	05:26		06:19	19:13 (4)	07:13		08:09		17:30 (5)	08:08	08:43
	21:38		20:37	19:22		18:11	11	17:41 (5)	16:17	16:08	
25	05:27		06:20	19:09 (4)	07:15		07:11		16:32 (5)	08:09	08:43
	21:36		20:35	19:29 (4)	19:19		17:09	6	16:38 (5)	16:16	16:08
26	05:29		06:22	19:07 (4)	07:17		07:13		16:35 (5)	08:11	08:43
	21:35		20:32	19:31 (4)	19:17		17:06	1	16:36 (5)	16:14	16:09
27	05:30		06:24	19:06 (4)	07:19		07:14		08:13	08:44	
	21:33		20:30	19:33 (4)	19:14		17:04		16:13	16:10	
28	05:32		06:26	19:04 (4)	07:21		07:16		08:14	08:44	
	21:32		20:28	19:38 (3)	19:12		17:02		16:12	16:11	
29	05:34		06:27	19:03 (4)	07:22		07:18		08:16	08:44	
	21:30		20:25	19:41 (3)	19:09		17:00		16:12	16:11	
30	05:35		06:29	19:02 (4)	07:24		07:20		08:18	08:44	
	21:28		20:23	19:43 (3)	19:07		16:58		16:11	16:12	
31	05:37		06:31	19:00 (4)			07:22			08:44	
	21:26		20:21	19:43 (3)			16:56			16:13	
Potential sun hours	512		460		382		328		259	233	
Total, worst case		412		249		519		272			
Sun reduction		0.32		0.34		0.32		0.29			
Oper. time red.		1.00		1.00		1.00		1.00			
Wind dir. red.		0.62		0.67		0.67		0.67			
Total reduction		0.20		0.23		0.22		0.20			
Total, real		82		57		112		53			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: O - H15

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:54 (4) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:53 (4) 20:57	05:02 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:54 (4) 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:54 (4) 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	18:53 (4) 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	18:54 (4) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	18:54 (4) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	18:55 (4) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	18:56 (4) 21:10	04:57 21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	18:56 (4) 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	18:58 (4) 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	19:00 (4) 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:02 (4) 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	16:58 (5) 17:02 (5)	06:45 18:27	05:27 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	16:57 (5) 17:05 (5)	06:43 18:28	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	16:55 (5) 17:07 (5)	06:40 18:30	05:24 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	16:55 (5) 17:09 (5)	06:38 18:32	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	16:53 (5) 17:11 (5)	06:35 18:34	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	16:53 (5) 17:13 (5)	06:33 18:36	05:19 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	16:53 (5) 17:16 (5)	06:31 18:38	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	16:53 (5) 17:16 (5)	06:28 18:40	05:16 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	16:52 (5) 17:15 (5)	06:26 18:41	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	16:53 (5) 17:15 (5)	06:23 18:43	05:13 21:33	04:55 22:01
24	08:26 16:50	07:28 17:52	16:53 (5) 17:15 (5)	06:21 18:45	05:12 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	16:53 (5) 17:13 (5)	06:18 18:47	05:11 21:36	04:55 22:01
26	08:23 16:54	07:23 17:56	16:55 (5) 17:12 (5)	06:16 18:49	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	16:56 (5) 17:11 (5)	06:13 18:51	05:08 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	16:58 (5) 17:08 (5)	06:11 18:53	05:07 21:40	04:57 22:01
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	05:54 (4) 19:31 (3)	05:04 21:44	20:40 (2) 21:07 (2)
Potential sun hours	250	273	367	420	494	510
Total, worst case		251	230	503	290	750
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.62	0.62
Total reduction		0.16	0.18	0.24	0.24	0.20
Total, real		39	42	120	69	150

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: O - H15

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:47 (2)	05:39	06:33	18:57 (4)	07:26		07:24	08:19		
	22:00	25	21:12 (2)	21:25	20:18	32	19:33 (3)	19:05	16:54	16:10	
2	04:59	20:48 (2)	05:40	06:35	18:55 (4)	07:28		07:26	08:21		
	22:00	25	21:13 (2)	21:23	20:16	40	19:36 (3)	19:02	16:52	16:09	
3	05:00	20:47 (2)	05:42	06:36	18:53 (4)	07:30		07:28	08:22		
	21:59	26	21:13 (2)	21:21	20:13	43	19:36 (3)	19:00	16:50	16:08	
4	05:01	20:47 (2)	05:44	06:38	18:52 (4)	07:31		07:30	08:24		
	21:59	26	21:13 (2)	21:19	20:11	45	19:37 (3)	18:57	16:48	16:08	
5	05:02	20:48 (2)	05:45	06:40	18:51 (4)	07:33		07:32	08:25		
	21:58	26	21:14 (2)	21:17	20:09	47	19:38 (3)	18:55	16:46	16:07	
6	05:03	20:48 (2)	05:47	06:42	18:50 (4)	07:35		07:34	08:26		
	21:57	26	21:14 (2)	21:15	20:06	48	19:38 (3)	18:52	16:44	16:07	
7	05:04	20:48 (2)	05:49	06:43	18:49 (4)	07:37		07:36	08:28		
	21:57	26	21:14 (2)	21:13	20:04	46	19:35 (3)	18:50	16:43	16:06	
8	05:05	20:48 (2)	05:51	06:45	18:48 (4)	07:39		07:38	08:29		
	21:56	27	21:15 (2)	21:11	20:01	45	19:33 (3)	18:48	16:41	16:06	
9	05:06	20:48 (2)	05:52	06:47	18:48 (4)	07:41		07:40	08:30		
	21:55	27	21:15 (2)	21:09	19:59	43	19:31 (3)	18:45	16:39	16:05	
10	05:07	20:48 (2)	05:54	06:49	18:47 (4)	07:42		07:42	08:31		
	21:55	27	21:15 (2)	21:07	19:56	41	19:28 (3)	18:43	16:37	16:05	
11	05:08	20:48 (2)	05:56	06:50	18:47 (4)	07:44		07:44	08:33		
	21:54	27	21:15 (2)	21:05	19:54	39	19:26 (3)	18:40	16:35	16:05	
12	05:09	20:48 (2)	05:57	06:52	18:47 (4)	07:46		07:45	08:34		
	21:53	27	21:15 (2)	21:03	19:51	37	19:24 (3)	18:38	16:34	16:05	
13	05:10	20:48 (2)	05:59	06:54	18:47 (4)	07:48		07:47	08:35		
	21:52	27	21:15 (2)	21:01	19:49	35	19:22 (4)	18:36	16:32	16:05	
14	05:12	20:48 (2)	06:01	06:56	18:46 (4)	07:50	4	17:38 (5)	16:32	16:05	
	21:51	27	21:15 (2)	20:59	19:47	32	19:18 (4)	18:33	17:30 (5)	16:32	16:05
15	05:13	20:48 (2)	06:03	06:58	18:47 (4)	07:52	12	17:42 (5)	16:31	16:05	
	21:50	27	21:15 (2)	20:57	19:44	29	19:16 (4)	18:31	17:28 (5)	16:31	16:05
16	05:14	20:49 (2)	06:04	06:59	18:48 (4)	07:54	16	17:44 (5)	16:29	16:05	
	21:49	25	21:14 (2)	20:55	19:42	26	19:14 (4)	18:29	17:26 (5)	16:27	16:05
17	05:16	20:50 (2)	06:06	07:01	18:48 (4)	07:55	19	17:45 (5)	16:27	16:05	
	21:47	24	21:14 (2)	20:53	19:39	23	19:11 (4)	18:26	17:25 (5)	16:26	16:05
18	05:17	20:50 (2)	06:08	07:03	18:49 (4)	07:57	21	17:46 (5)	16:26	16:05	
	21:46	22	21:12 (2)	20:50	19:37	19	19:08 (4)	18:24	17:24 (5)	16:26	16:05
19	05:18	20:50 (2)	06:10	07:05	18:50 (4)	07:59	22	17:46 (5)	16:24	16:05	
	21:45	21	21:11 (2)	20:48	19:34	16	19:06 (4)	18:22	17:23 (5)	16:23	16:05
20	05:20	20:51 (2)	06:12	07:06	18:52 (4)	08:01	22	17:46 (5)	16:23	16:05	
	21:44	19	21:10 (2)	20:46	19:32	12	19:04 (4)	18:20	17:23 (5)	16:22	16:06
21	05:21	20:51 (2)	06:13	07:08	18:54 (4)	08:03	23	17:23 (5)	16:22	16:06	
	21:42	18	21:09 (2)	20:44	19:29	7	19:01 (4)	18:17	17:23 (5)	16:20	16:06
22	05:23	20:51 (2)	06:15	07:10	18:51 (4)	08:05	23	17:46 (5)	16:20	16:06	
	21:41	16	21:07 (2)	20:42	19:27			18:15	17:23 (5)	16:19	16:06
23	05:24	20:52 (2)	06:17	07:12	18:50 (4)	08:07	22	17:45 (5)	16:19	16:06	
	21:39	15	21:07 (2)	20:39	19:24			18:13	17:23 (5)	16:18	16:07
24	05:26	20:53 (2)	06:19	07:13	18:49 (4)	08:09	20	17:43 (5)	16:18	16:07	
	21:38	12	21:05 (2)	20:37	19:22			18:11	17:24 (5)	16:17	16:08
25	05:27	20:54 (2)	06:20	07:15	18:48 (4)	08:11	17	17:41 (5)	16:17	16:08	
	21:36	10	21:04 (2)	20:35	19:19			16:24 (5)	16:16	16:08	
26	05:29	20:55 (2)	06:22	07:17	18:47 (4)	08:13	14	16:38 (5)	16:16	16:08	
	21:35	7	21:02 (2)	20:32	19:17			16:25 (5)	16:15	16:09	
27	05:30	20:56 (2)	06:24	07:19	18:46 (4)	08:14	11	16:36 (5)	16:14	16:09	
	21:33	4	21:00 (2)	20:30	19:14			16:26 (5)	16:13	16:10	
28	05:32		06:26	07:21	18:45 (4)	08:15	8	16:34 (5)	16:13	16:10	
	21:32		20:28	19:12	18:59 (4)	08:16	3	16:31 (5)	16:12	16:11	
29	05:34		06:27	07:22	19:08 (4)	08:17			16:12	16:11	
	21:30		20:25	19:09	19:11 (4)	08:18			16:11	16:11	
30	05:35		06:29	07:24	19:02 (4)	08:19			16:11	16:11	
	21:28		20:23	19:07	19:17 (4)	08:20			16:11	16:12	
31	05:37		06:31	07:22	18:59 (4)	08:21			16:11	16:12	
	21:26		20:21	19:18 (4)	19:18 (4)	08:22			16:11	16:13	
Potential sun hours	512		460	382		328		259	233		
Total, worst case		589	37	705		257					
Sun reduction		0.32	0.34	0.32		0.29					
Oper. time red.		1.00	1.00	1.00		1.00					
Wind dir. red.		0.62	0.68	0.67		0.67					
Total reduction		0.20	0.23	0.22		0.20					
Total, real		119	9	152		50					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: P - H16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	18:48 (4)	05:52
	16:15	17:06	18:02	20:00	45	19:33 (3)
2	08:44	08:12	07:14	06:59	18:48 (4)	05:50
	16:16	17:08	18:04	20:02	47	19:35 (3)
3	08:43	08:10	07:11	06:56	18:49 (4)	05:48
	16:17	17:10	18:06	20:04	48	19:37 (3)
4	08:43	08:08	07:09	06:54	18:50 (4)	05:46
	16:18	17:12	18:07	20:06	48	19:38 (3)
5	08:43	08:07	07:07	06:51	18:50 (4)	05:44
	16:19	17:14	18:09	20:07	47	19:37 (3)
6	08:42	08:05	07:04	06:49	18:51 (4)	05:42
	16:21	17:16	18:11	20:09	44	19:36 (3)
7	08:42	08:03	07:02	06:47	18:52 (4)	05:40
	16:22	17:18	18:13	20:11	39	19:34 (3)
8	08:42	08:01	07:00	06:44	18:54 (4)	05:38
	16:24	17:20	18:15	20:13	31	19:32 (3)
9	08:41	07:59	06:57	06:42	18:57 (4)	05:36
	16:25	17:22	18:17	20:15	19	19:29 (3)
10	08:40	07:57	06:55	06:39	05:34	05:34
	16:26	17:24	18:19	20:17	21:11	21:55
11	08:40	07:55	06:52	06:37	05:33	04:56
	16:28	17:26	18:21	20:19	21:13	21:55
12	08:39	07:53	16:55 (5)	06:35	05:31	20:42 (2)
	16:30	17:28	18:23	20:20	21:15	20:43 (2)
13	08:38	07:51	16:53 (5)	06:32	05:29	20:40 (2)
	16:31	17:30	18:25	20:22	21:17	20:44 (2)
14	08:37	07:49	16:52 (5)	06:30	05:27	20:39 (2)
	16:33	17:32	18:27	20:24	21:18	20:47 (2)
15	08:36	07:47	16:51 (5)	06:28	05:26	20:37 (2)
	16:34	17:34	18:28	20:26	21:20	20:48 (2)
16	08:35	07:45	16:50 (5)	06:25	05:24	20:37 (2)
	16:36	17:36	18:30	20:28	21:22	20:50 (2)
17	08:34	07:43	16:50 (5)	06:23	05:22	20:35 (2)
	16:38	17:38	18:32	20:30	21:23	20:51 (2)
18	08:33	07:41	16:49 (5)	06:21	05:21	20:35 (2)
	16:40	17:40	18:34	20:31	21:25	20:53 (2)
19	08:32	07:39	16:49 (5)	06:33	05:19	20:35 (2)
	16:41	17:42	18:36	8	18:02 (4)	06:18
20	08:31	07:36	16:49 (5)	06:31	05:18	20:34 (2)
	16:43	17:44	18:38	12	18:11 (4)	20:35
21	08:30	07:34	16:50 (5)	06:28	05:16	20:34 (2)
	16:45	17:46	18:40	16	18:13 (4)	20:37
22	08:28	07:32	16:50 (5)	06:26	05:15	20:34 (2)
	16:47	17:48	18:41	20	18:15 (4)	20:39
23	08:27	07:30	16:51 (5)	06:23	05:13	20:33 (2)
	16:49	17:50	18:43	23	18:17 (4)	20:41
24	08:26	07:28	16:52 (5)	06:21	05:12	20:34 (2)
	16:50	17:52	18:45	26	18:18 (4)	20:42
25	08:24	07:25	16:53 (5)	06:18	05:11	20:34 (2)
	16:52	17:54	17:07 (5)	30	18:21 (4)	20:44
26	08:23	07:23	16:55 (5)	06:16	05:09	20:34 (2)
	16:54	17:56	17:05 (5)	32	18:22 (4)	20:46
27	08:22	07:21	06:13	17:50 (4)	05:08	20:34 (2)
	16:56	17:58	18:51	34	18:24 (4)	20:48
28	08:20	07:18	06:11	17:49 (4)	05:07	20:34 (2)
	16:58	18:00	18:53	37	18:26 (3)	20:50
29	08:18		07:08	18:49 (4)	05:06	20:35 (2)
	17:00		19:54	39	19:28 (3)	20:52
30	08:17		07:06	18:49 (4)	05:05	20:35 (2)
	17:02		19:56	41	19:30 (3)	20:53
31	08:15		07:04	18:48 (4)	05:04	20:35 (2)
	17:04		19:58	43	19:31 (3)	21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case		241	361	368	397	615
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.68	0.67	0.63	0.63
Total reduction		0.16	0.18	0.24	0.24	0.20
Total, real		37	66	88	95	124

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: P - H16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:44 (2)	05:39	06:33		07:26		07:24	08:19		
	22:00	21	21:05 (2)	21:25	20:18	19:05		16:54	16:10		
2	04:59	20:44 (2)	05:40	06:35		07:28		07:26	08:21		
	22:00	21	21:05 (2)	21:23	20:16	19:02		16:52	16:09		
3	05:00	20:44 (2)	05:42	06:36		18:54 (4)	07:30	07:28	08:22		
	21:59	21	21:05 (2)	21:21	20:13	19:26 (3)	19:00	16:50	16:08		
4	05:01	20:44 (2)	05:44	06:38		18:51 (4)	07:31	07:30	08:24		
	21:59	22	21:06 (2)	21:19	20:11	19:29 (3)	18:57	16:48	16:08		
5	05:02	20:44 (2)	05:45	06:40		18:49 (4)	07:33	07:32	08:25		
	21:58	22	21:06 (2)	21:17	20:09	19:31 (3)	18:55	16:46	16:07		
6	05:03	20:44 (2)	05:47	06:42		18:47 (4)	07:35	07:34	08:26		
	21:58	23	21:07 (2)	21:15	20:06	19:32 (3)	18:52	16:44	16:07		
7	05:04	20:44 (2)	05:49	06:43		18:45 (4)	07:37	07:36	08:28		
	21:57	24	21:08 (2)	21:13	20:04	19:32 (3)	18:50	16:43	16:06		
8	05:05	20:44 (2)	05:51	06:45		18:44 (4)	07:39	07:38	08:29		
	21:56	24	21:08 (2)	21:11	20:01	19:33 (3)	18:48	16:41	16:06		
9	05:06	20:44 (2)	05:52	06:47		18:43 (4)	07:41	07:40	08:30		
	21:55	24	21:08 (2)	21:09	19:59	19:31 (3)	18:45	16:39	16:05		
10	05:07	20:44 (2)	05:54	06:49		18:41 (4)	07:42	07:42	08:31		
	21:55	25	21:09 (2)	21:07	19:56	19:28 (3)	18:43	16:37	16:05		
11	05:08	20:44 (2)	05:56	06:50		18:41 (4)	07:44	07:44	08:33		
	21:54	25	21:09 (2)	21:05	19:54	19:26 (3)	18:40	16:35	16:05		
12	05:09	20:43 (2)	05:57	06:52		18:40 (4)	07:46	07:45	08:34		
	21:53	26	21:09 (2)	21:03	19:51	19:24 (3)	18:38	16:34	16:05		
13	05:10	20:43 (2)	05:59	06:54		18:40 (4)	07:48	07:47	08:35		
	21:52	26	21:09 (2)	21:01	19:49	19:22 (3)	18:36	16:32	16:05		
14	05:12	20:43 (2)	06:01	06:56		18:39 (4)	07:50	07:49	08:36		
	21:51	27	21:10 (2)	20:59	19:47	19:18 (3)	18:33	16:31	16:05		
15	05:13	20:43 (2)	06:03	06:58		18:39 (4)	07:52	17:31 (5)	07:51	08:37	
	21:50	27	21:10 (2)	20:57	19:44	19:16 (3)	18:31	17:34 (5)	16:29	16:05	
16	05:14	20:43 (2)	06:04	06:59		18:39 (4)	07:54	17:27 (5)	07:53	08:38	
	21:49	27	21:10 (2)	20:55	19:42	19:14 (4)	18:29	17:38 (5)	16:27	16:05	
17	05:16	20:44 (2)	06:06	07:01		18:38 (4)	07:55	17:24 (5)	07:55	08:38	
	21:47	27	21:11 (2)	20:53	19:39	19:11 (4)	18:26	17:40 (5)	16:26	16:05	
18	05:17	20:43 (2)	06:08	07:03		18:39 (4)	07:57	17:23 (5)	07:57	08:39	
	21:46	27	21:10 (2)	20:50	19:37	19:08 (4)	18:24	17:41 (5)	16:24	16:05	
19	05:18	20:43 (2)	06:10	07:05		18:39 (4)	07:59	17:22 (5)	07:59	08:40	
	21:45	27	21:10 (2)	20:48	19:34	19:06 (4)	18:22	17:42 (5)	16:23	16:05	
20	05:20	20:44 (2)	06:12	07:06		18:40 (4)	08:01	17:21 (5)	08:00	08:41	
	21:44	26	21:10 (2)	20:46	19:32	19:04 (4)	18:20	17:42 (5)	16:22	16:06	
21	05:21	20:44 (2)	06:13	07:08		18:40 (4)	08:03	17:20 (5)	08:02	08:41	
	21:42	25	21:09 (2)	20:44	19:29	19:01 (4)	18:17	17:42 (5)	16:20	16:06	
22	05:23	20:44 (2)	06:15	07:10		18:41 (4)	08:05	17:20 (5)	08:04	08:42	
	21:41	23	21:07 (2)	20:42	19:27	18:58 (4)	18:15	17:42 (5)	16:19	16:06	
23	05:24	20:45 (2)	06:17	07:12		18:43 (4)	08:07	17:19 (5)	08:06	08:42	
	21:39	22	21:07 (2)	20:39	19:24	18:56 (4)	18:13	17:42 (5)	16:18	16:07	
24	05:26	20:45 (2)	06:19	07:13		18:45 (4)	08:09	17:19 (5)	08:08	08:43	
	21:38	20	21:05 (2)	20:37	19:22	18:54 (4)	18:11	17:41 (5)	16:17	16:08	
25	05:27	20:46 (2)	06:20	07:15		18:48 (4)	07:11	16:20 (5)	08:09	08:43	
	21:36	18	21:04 (2)	20:35	19:19	18:51 (4)	17:09	16:38 (5)	16:16	16:08	
26	05:29	20:46 (2)	06:22	07:17			07:13	16:20 (5)	08:11	08:43	
	21:35	16	21:02 (2)	20:32	19:17		17:06	16:36 (5)	16:14	16:09	
27	05:30	20:46 (2)	06:24	07:19			07:14	16:21 (5)	08:13	08:44	
	21:33	14	21:00 (2)	20:30	19:14		17:04	16:34 (5)	16:13	16:10	
28	05:32	20:47 (2)	06:26	07:21			07:16	16:21 (5)	08:14	08:44	
	21:32	12	20:59 (2)	20:28	19:12		17:02	16:31 (5)	16:12	16:11	
29	05:34	20:48 (2)	06:27	07:22			07:18	16:23 (5)	08:16	08:44	
	21:30	9	20:57 (2)	20:25	19:09		17:00	16:29 (5)	16:12	16:11	
30	05:35	20:50 (2)	06:29	07:24			07:20	16:25 (5)	08:18	08:44	
	21:28	6	20:56 (2)	20:23	19:07		16:58	16:27 (5)	16:11	16:12	
31	05:37	20:52 (2)	06:31				07:22		08:44		
	21:26	3	20:55 (2)	20:21			16:56		16:13		
Potential sun hours	512		460	382		328		259	233		
Total, worst case	660			742		243					
Sun reduction	0.32			0.32		0.29					
Oper. time red.	1.00			1.00		1.00					
Wind dir. red.	0.63			0.67		0.67					
Total reduction	0.20			0.22		0.20					
Total, real	134			160		47					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: Q - H17

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:06 (5)	07:16	16:45 (4)	07:01	05:52	19:44 (2)	05:03		
	16:15	17:06	16:23 (5)	18:02	17:14 (4)	20:00	20:55	20:11 (2)	21:45		
2	08:44	08:12	16:07 (5)	07:14	16:46 (4)	06:59	05:50	19:45 (2)	05:02		
	16:16	17:08	16:22 (5)	18:04	17:12 (4)	20:02	20:57	20:10 (2)	21:46		
3	08:44	08:10	16:09 (5)	07:12	16:48 (4)	06:56	05:48	19:45 (2)	05:01		
	16:17	17:10	16:21 (5)	18:06	17:10 (4)	20:04	20:59	20:09 (2)	21:48		
4	08:43	08:08	16:11 (5)	07:09	16:51 (4)	06:54	05:46	19:46 (2)	05:00		
	16:18	17:12	16:18 (5)	18:07	17:08 (4)	20:06	21:01	20:08 (2)	21:49		
5	08:43	08:07		07:07	16:54 (4)	06:51	05:44	19:47 (2)	04:59		
	16:19	17:14		18:09	17:04 (4)	20:07	21:03	20:06 (2)	21:50		
6	08:42	08:05		07:04	17:43 (3)	06:49	05:42	19:49 (2)	04:59		
	16:21	17:16		18:11	17:45 (3)	20:09	21:04	20:04 (2)	21:51		
7	08:42	08:03		07:02	17:41 (3)	06:47	05:40	19:52 (2)	04:58		
	16:22	17:18		18:13	17:46 (3)	20:11	21:06	20:03 (2)	21:52		
8	08:42	08:01		07:00	17:40 (3)	06:44	05:38		04:57		
	16:24	17:20		18:15	17:48 (3)	20:13	21:08		21:53		
9	08:41	07:59		06:57	17:39 (3)	06:42	05:36		04:57		
	16:25	17:22		18:17	17:50 (3)	20:15	21:10		21:54		
10	08:40	07:57	16:53 (4)	06:55	17:39 (3)	06:39	05:34		04:56		
	16:26	17:24	16:54 (4)	18:19	17:52 (3)	20:17	21:11		21:55		
11	08:40	07:55	16:51 (4)	06:52	17:39 (3)	06:37	05:33		04:56		
	16:28	17:26	16:56 (4)	18:21	17:55 (3)	20:19	21:13		21:55		
12	08:39	07:53	16:48 (4)	06:50	17:38 (3)	06:35	05:31		04:55		
	16:30	17:28	16:58 (4)	18:23	17:56 (3)	20:20	21:15		21:56		
13	08:38	07:51	16:47 (4)	06:48	17:38 (3)	06:32	05:29		04:55		
	16:31	17:30	17:00 (4)	18:25	17:58 (3)	20:22	21:17		21:57		
14	08:37	07:49	16:46 (4)	06:45	17:38 (3)	06:30	05:27		04:55		
	16:33	17:32	17:02 (4)	18:27	17:59 (3)	20:24	21:18		21:58		
15	08:36	07:47	16:45 (4)	06:43	17:39 (3)	06:28	05:26		04:54		
	16:34	17:34	17:05 (4)	18:28	17:59 (3)	20:26	19:55 (2)	05:26	21:58		
16	08:35	07:45	16:45 (4)	06:40	17:39 (3)	06:25	05:24		04:54		
	16:36	17:36	17:07 (4)	18:30	17:57 (3)	20:28	20:00 (2)	05:24	21:59		
17	08:34	07:43	16:44 (4)	06:38	17:41 (3)	06:23	05:22		04:54		
	16:38	17:38	17:09 (4)	18:32	17:55 (3)	20:30	20:01 (2)	05:22	21:59		
18	08:33	16:03 (5)	07:41	06:35	17:43 (3)	06:21	05:21		04:54		
	16:40	16:05 (5)	17:40	18:34	17:52 (3)	20:31	19:48 (2)	05:21	22:00		
19	08:32	16:03 (5)	07:39	06:33		06:18	05:19		04:54		
	16:41	16:07 (5)	17:42	18:36		20:33	20:07 (2)	05:19	22:00		
20	08:31	16:02 (5)	07:36	06:31		06:16	05:18		04:54		
	16:43	16:08 (5)	17:44	18:38		20:35	20:07 (2)	05:18	22:00		
21	08:30	16:02 (5)	07:34	06:28		06:14	05:16		04:54		
	16:45	16:11 (5)	17:46	18:40		20:37	20:08 (2)	05:16	22:01		
22	08:29	16:02 (5)	07:32	06:26		06:12	05:15		04:55		
	16:47	16:12 (5)	17:48	18:41		20:39	20:10 (2)	05:15	22:01		
23	08:27	16:02 (5)	07:30	06:23		06:09	05:13		04:55		
	16:49	16:15 (5)	17:50	18:43		20:41	20:12 (2)	05:13	22:01		
24	08:26	16:02 (5)	07:28	06:21		06:07	05:12		04:55		
	16:50	16:17 (5)	17:52	18:45		20:42	20:14 (2)	05:12	22:01		
25	08:24	16:02 (5)	07:25	06:18		06:05	05:11		04:55		
	16:52	16:19 (5)	17:54	18:47		20:44	20:14 (2)	05:11	22:01		
26	08:23	16:02 (5)	07:23	06:16		06:03	05:09		04:56		
	16:54	16:21 (5)	17:56	18:49		20:46	20:14 (2)	05:09	22:01		
27	08:22	16:02 (5)	07:21	06:13		06:01	05:08		04:56		
	16:56	16:23 (5)	17:58	18:51		20:48	20:14 (2)	05:08	22:01		
28	08:20	16:03 (5)	07:18	06:11		05:58	05:07		04:57		
	16:58	16:24 (5)	18:00	18:53		20:50	20:13 (2)	05:07	22:01		
29	08:18	16:03 (5)		07:08		05:56	05:06		04:57		
	17:00	16:24 (5)		19:54		20:52	20:13 (2)	05:06	22:01		
30	08:17	16:04 (5)		07:06		05:54	05:05		04:58		
	17:02	16:24 (5)		19:56		20:53	20:12 (2)	05:05	22:01		
31	08:15	16:04 (5)		07:04			05:04				
	17:04	16:23 (5)		19:58			21:44				
Potential sun hours	250		273	367		420	494		510		
Total, worst case	197		527	279		369	143				
Sun reduction	0.24		0.23	0.27		0.35	0.38				
Oper. time red.	1.00		1.00	1.00		1.00	1.00				
Wind dir. red.	0.66		0.67	0.67		0.65	0.65				
Total reduction	0.16		0.16	0.18		0.23	0.25				
Total, real	32		82	51		84	35				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: Q - H17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:17 (3) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:17 (3) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:17 (3) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:17 (3) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	20:04 (2) 20:09 (2)	06:40 20:09	07:33 18:55	08:25 16:07
6	05:03 21:58	05:47 21:15	20:01 (2) 20:13 (2)	06:42 20:06	07:35 18:52	08:26 16:07
7	05:04 21:57	05:49 21:13	19:59 (2) 20:15 (2)	06:43 20:04	07:37 18:50	15:41 (5) 16:06
8	05:05 21:56	05:50 21:12	19:56 (2) 20:16 (2)	06:45 20:01	07:39 18:48	15:38 (5) 16:06
9	05:06 21:55	05:52 21:10	19:55 (2) 20:18 (2)	06:47 19:59	07:41 18:45	15:37 (5) 16:05
10	05:07 21:55	05:54 21:07	19:53 (2) 20:18 (2)	06:49 19:56	07:42 18:43	15:37 (5) 16:05
11	05:08 21:54	05:56 21:05	19:53 (2) 20:19 (2)	06:50 19:54	07:44 18:40	15:36 (5) 16:05
12	05:09 21:53	05:57 21:03	19:52 (2) 20:20 (2)	06:52 19:51	07:46 18:38	15:36 (5) 16:05
13	05:10 21:52	05:59 21:01	19:51 (2) 20:20 (2)	06:54 19:49	07:48 18:36	15:35 (5) 16:05
14	05:12 21:51	06:01 20:59	19:51 (2) 20:20 (2)	06:56 19:47	07:50 18:33	15:35 (5) 16:04
15	05:13 21:50	06:03 20:57	19:50 (2) 20:21 (2)	06:58 19:44	07:52 18:31	15:35 (5) 16:05
16	05:14 21:49	06:04 20:55	19:49 (2) 20:20 (2)	06:59 19:42	07:54 18:29	15:35 (5) 16:05
17	05:16 21:47	06:06 20:53	19:49 (2) 20:20 (2)	07:01 19:39	07:55 18:26	15:35 (5) 16:05
18	05:17 21:46	06:08 20:51	19:49 (2) 20:21 (2)	07:03 19:37	07:57 18:24	15:36 (5) 16:05
19	05:18 21:45	06:10 20:48	19:49 (2) 20:19 (2)	07:05 19:34	07:59 18:22	15:36 (5) 16:05
20	05:20 21:44	06:12 20:46	19:49 (2) 20:17 (2)	07:06 19:32	08:01 18:20	15:37 (5) 16:06
21	05:21 21:42	06:13 20:44	19:49 (2) 20:15 (2)	07:08 19:29	08:03 18:17	15:37 (5) 16:06
22	05:23 21:41	06:15 20:42	19:49 (2) 20:12 (2)	07:10 19:27	08:05 18:15	15:38 (5) 16:06
23	05:24 21:39	06:17 20:39	19:50 (2) 20:10 (2)	07:12 19:24	08:07 18:13	15:39 (5) 16:07
24	05:26 21:38	06:19 20:37	19:51 (2) 20:09 (2)	07:13 19:22	08:09 18:11	15:40 (5) 16:08
25	05:27 21:36	06:20 20:35	19:51 (2) 20:06 (2)	07:15 19:19	18:11 (3) 18:33 (3)	16:17 16:16
26	05:29 21:35	06:22 20:32	19:52 (2) 20:04 (2)	07:17 19:17	17:09 18:36 (3)	16:16 16:14
27	05:30 21:33	06:24 20:30	19:54 (2) 20:02 (2)	07:19 19:14	17:15 18:38 (3)	16:15 16:13
28	05:32 21:32	06:26 20:28	19:56 (2) 19:59 (2)	07:21 19:12	17:16 18:39 (3)	16:16 16:12
29	05:34 21:30	06:27 20:25	07:22 19:09	18:19 (3) 18:40 (3)	07:18 17:00	16:17 (4) 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	18:17 (3) 18:38 (3)	07:20 16:58	16:18 (4) 16:11
31	05:37 21:26	06:31 20:21	07:25 16:56	18:39 (3) 16:56	07:21 16:25 (4)	16:19 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		521	95	665	250	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.18	
Total, real		115	21	130	44	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: R - H18

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44		08:14	16:25 (4)	07:16		17:32 (3)	07:01	05:52	19:35 (2)	05:03
	16:15		17:06	16:35 (4)	18:02	2	17:34 (3)	20:00	20:55	20:00 (2)	21:45
2	08:44		08:12	16:23 (4)	07:14		17:29 (3)	06:59	05:50	19:36 (2)	05:02
	16:16		17:08	16:37 (4)	18:04	7	17:36 (3)	20:02	20:57	19:58 (2)	21:46
3	08:44		08:10	16:22 (4)	07:12		17:29 (3)	06:56	05:48	19:37 (2)	05:01
	16:17		17:10	16:39 (4)	18:06	9	17:38 (3)	20:04	20:59	19:56 (2)	21:48
4	08:43		08:08	16:21 (4)	07:09		17:28 (3)	06:54	05:46	19:39 (2)	05:00
	16:18		17:12	16:41 (4)	18:07	13	17:41 (3)	20:06	21:01	19:54 (2)	21:49
5	08:43		08:07	16:20 (4)	07:07		17:27 (3)	06:51	05:44	19:42 (2)	04:59
	16:19		17:14	16:43 (4)	18:09	15	17:42 (3)	20:07	21:03	19:51 (2)	21:50
6	08:43		08:05	16:20 (4)	07:04		17:27 (3)	06:49	05:42		04:59
	16:21		17:16	16:45 (4)	18:11	18	17:45 (3)	20:09	21:04		21:51
7	08:42	15:44 (5)	08:03	16:19 (4)	07:02		17:26 (3)	06:47	05:40		04:58
	16:22	1	15:45 (5)	17:18	18:13	20	17:46 (3)	20:11	21:06		21:52
8	08:42	15:43 (5)	08:01	16:19 (4)	07:00		17:26 (3)	06:44	05:38		04:57
	16:24	3	15:46 (5)	17:20	18:15	22	17:48 (3)	20:13	21:08		21:53
9	08:41	15:44 (5)	07:59	16:19 (4)	06:57		17:26 (3)	06:42	05:36		04:57
	16:25	5	15:49 (5)	17:22	18:17	23	17:49 (3)	20:15	21:10		21:54
10	08:40	15:44 (5)	07:57	16:18 (4)	06:55		17:27 (3)	06:39	05:34		04:56
	16:26	6	15:50 (5)	17:24	18:19	21	17:48 (3)	20:17	21:11		21:55
11	08:40	15:44 (5)	07:55	16:18 (4)	06:52		17:28 (3)	06:37	19:46 (2)	05:33	04:56
	16:28	8	15:52 (5)	17:26	18:21	19	17:47 (3)	20:19	19:51 (2)	21:13	21:55
12	08:39	15:44 (5)	07:53	16:17 (4)	06:50		17:28 (3)	06:35	19:43 (2)	05:31	04:55
	16:30	10	15:54 (5)	17:28	18:23	17	17:45 (3)	20:20	19:53 (2)	21:15	21:56
13	08:38	15:44 (5)	07:51	16:17 (4)	06:48		17:30 (3)	06:32	19:39 (2)	05:29	04:55
	16:31	11	15:55 (5)	17:30	18:25	14	17:44 (3)	20:22	19:54 (2)	21:17	21:57
14	08:37	15:44 (5)	07:49	16:18 (4)	06:45		17:33 (3)	06:30	19:38 (2)	05:27	04:55
	16:33	13	15:57 (5)	17:32	18:27	7	17:40 (3)	20:24	19:56 (2)	21:18	21:58
15	08:36	15:44 (5)	07:47	16:18 (4)	06:43			06:28	19:37 (2)	05:26	04:54
	16:34	15	15:59 (5)	17:34	18:28			20:26	19:58 (2)	21:20	21:58
16	08:35	15:43 (5)	07:45	16:19 (4)	06:40			06:25	19:36 (2)	05:24	04:54
	16:36	17	16:00 (5)	17:36	18:30			20:28	20:00 (2)	21:22	21:59
17	08:34	15:44 (5)	07:43	16:19 (4)	06:38			06:23	19:34 (2)	05:22	04:54
	16:38	19	16:03 (5)	17:38	18:32			20:30	20:01 (2)	21:23	21:59
18	08:33	15:44 (5)	07:41	16:19 (4)	06:35			06:21	19:33 (2)	05:21	04:54
	16:40	21	16:05 (5)	17:40	18:34			20:31	20:03 (2)	21:25	22:00
19	08:32	15:45 (5)	07:39	16:20 (4)	06:33			06:18	19:33 (2)	05:19	04:54
	16:41	22	16:07 (5)	17:42	18:36			20:33	20:05 (2)	21:27	22:00
20	08:31	15:45 (5)	07:36	16:21 (4)	06:31			06:16	19:32 (2)	05:18	04:54
	16:43	22	16:07 (5)	17:44	18:38			20:35	20:06 (2)	21:28	22:00
21	08:30	15:46 (5)	07:34	16:22 (4)	06:28			06:14	19:31 (2)	05:16	04:54
	16:45	22	16:08 (5)	17:46	18:40			20:37	20:05 (2)	21:30	22:01
22	08:29	15:46 (5)	07:32	16:23 (4)	06:26			06:12	19:31 (2)	05:15	04:55
	16:47	21	16:07 (5)	17:48	18:42			20:39	20:05 (2)	21:31	22:01
23	08:27	15:47 (5)	07:30	16:25 (4)	06:23			06:09	19:31 (2)	05:13	04:55
	16:49	20	16:07 (5)	17:50	18:43			20:41	20:05 (2)	21:33	22:01
24	08:26	15:47 (5)	07:28	16:27 (4)	06:21			06:07	19:31 (2)	05:12	04:55
	16:50	20	16:07 (5)	17:52	18:45			20:43	20:05 (2)	21:34	22:01
25	08:24	15:49 (5)	07:25	16:29 (4)	06:18			06:05	19:31 (2)	05:11	04:55
	16:52	18	16:07 (5)	17:54	18:47			20:44	20:04 (2)	21:36	22:01
26	08:23	15:49 (5)	07:23		06:16			06:03	19:31 (2)	05:09	04:56
	16:54	17	16:06 (5)	17:56	18:49			20:46	20:04 (2)	21:37	22:01
27	08:22	15:50 (5)	07:21		06:13			06:01	19:32 (2)	05:08	04:56
	16:56	15	16:05 (5)	17:58	18:51			20:48	20:03 (2)	21:39	22:01
28	08:20	15:53 (5)	07:18		06:11			05:58	19:32 (2)	05:07	04:57
	16:58	12	16:05 (5)	18:00	18:53			20:50	20:03 (2)	21:40	22:01
29	08:18	15:55 (5)			07:08			05:56	19:33 (2)	05:06	04:57
	17:00	7	16:02 (5)		19:54			20:52	20:02 (2)	21:41	22:01
30	08:17	16:28 (4)			07:06			05:54	19:34 (2)	05:05	04:58
	17:02	2	16:30 (4)		19:56			20:54	20:01 (2)	21:43	22:00
31	08:15	16:26 (4)			07:04				05:04		
	17:04	5	16:31 (4)		19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case		332		717		207		536		90	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.66		0.68		0.65		0.65	
Total reduction		0.16		0.15		0.18		0.23		0.25	
Total, real		53		109		38		123		22	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: R - H18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September		October		November		December		
1	04:59 22:00	05:39 21:25		06:33 20:18	19:45 (2) 19:50 (2)	07:26 19:05	18:08 (3) 18:24 (3)	07:24 16:54	15:48 (4) 16:23 (4)	08:19 16:10	15:26 (5) 15:34 (5)
2	04:59 22:00	05:40 21:23		06:35 20:16		07:28 19:02	18:06 (3) 18:25 (3)	07:26 16:52	15:48 (4) 16:21 (4)	08:21 16:09	15:26 (5) 15:33 (5)
3	05:00 21:59	05:42 21:21		06:36 20:13		07:30 19:00	18:05 (3) 18:26 (3)	07:28 16:50	15:49 (4) 16:19 (4)	08:22 16:08	15:27 (5) 15:32 (5)
4	05:01 21:59	05:44 21:19		06:38 20:11		07:31 18:57	18:04 (3) 18:26 (3)	07:30 16:48	15:49 (4) 16:17 (4)	08:24 16:08	15:29 (5) 15:32 (5)
5	05:02 21:58	05:45 21:17		06:40 20:09		07:33 18:55	18:03 (3) 18:26 (3)	07:32 16:46	15:50 (4) 16:15 (4)	08:25 16:07	15:29 (5) 15:30 (5)
6	05:03 21:58	05:47 21:15		06:42 20:06		07:35 18:52	18:03 (3) 18:24 (3)	07:34 16:44	15:50 (4) 16:12 (4)	08:26 16:07	
7	05:04 21:57	05:49 21:13		06:43 20:04		07:37 18:50	18:02 (3) 18:21 (3)	07:36 16:43	15:51 (4) 16:10 (4)	08:28 16:06	
8	05:05 21:56	05:50 21:12	12	19:50 (2) 20:02 (2)	06:45 20:01	07:39 18:48	18:02 (3) 18:18 (3)	07:38 16:41	15:52 (4) 16:08 (4)	08:29 16:06	
9	05:06 21:55	05:52 21:10	16	19:48 (2) 20:04 (2)	06:47 19:59	07:41 18:45	18:02 (3) 18:16 (3)	07:40 16:39	15:53 (4) 16:06 (4)	08:30 16:05	
10	05:07 21:55	05:54 21:07	20	19:45 (2) 20:05 (2)	06:49 19:56	07:42 18:43	18:02 (3) 18:14 (3)	07:42 16:37	15:56 (4) 16:05 (4)	08:31 16:05	
11	05:08 21:54	05:56 21:05	23	19:44 (2) 20:07 (2)	06:50 19:54	07:44 18:40	18:03 (3) 18:11 (3)	07:44 16:35	15:58 (4) 16:03 (4)	08:33 16:05	
12	05:09 21:53	05:57 21:03	25	19:43 (2) 20:08 (2)	06:52 19:51	07:46 18:38	18:04 (3) 18:09 (3)	07:45 16:34	16:00 (4) 16:01 (4)	08:34 16:05	
13	05:10 21:52	05:59 21:01	28	19:41 (2) 20:09 (2)	06:54 19:49	07:48 18:36	18:06 (3) 18:07 (3)	07:47 16:32	15:57 (5) 15:34 (5)	08:35 16:05	
14	05:12 21:51	06:01 20:59	30	19:40 (2) 20:10 (2)	06:56 19:47	07:50 18:33		07:49 16:31	15:25 (5) 15:37 (5)	08:36 16:04	
15	05:13 21:50	06:03 20:57	30	19:40 (2) 20:10 (2)	06:58 19:44	07:52 18:31		07:51 16:29	15:23 (5) 15:38 (5)	08:37 16:05	
16	05:14 21:49	06:04 20:55	32	19:38 (2) 20:10 (2)	06:59 19:42	07:54 18:29	17:05 (4) 17:12 (4)	07:53 16:27	15:22 (5) 15:39 (5)	08:38 16:05	
17	05:16 21:47	06:06 20:53	33	19:38 (2) 20:11 (2)	07:01 19:39	07:55 18:26	17:00 (4) 17:17 (4)	07:55 16:26	15:22 (5) 15:40 (5)	08:38 16:05	
18	05:17 21:46	06:08 20:51	33	19:38 (2) 20:11 (2)	07:03 19:37	07:57 18:24	16:57 (4) 17:19 (4)	07:57 16:24	15:21 (5) 15:41 (5)	08:39 16:05	
19	05:18 21:45	06:10 20:48	33	19:37 (2) 20:10 (2)	07:05 19:34	07:59 18:22	16:55 (4) 17:21 (4)	07:59 16:23	15:21 (5) 15:41 (5)	08:40 16:05	
20	05:20 21:44	06:12 20:46	34	19:37 (2) 20:11 (2)	07:06 19:32	08:01 18:20	16:54 (4) 17:22 (4)	08:00 16:22	15:21 (5) 15:42 (5)	08:41 16:06	
21	05:21 21:42	06:13 20:44	34	19:37 (2) 20:11 (2)	07:08 19:29	08:03 18:17	16:52 (4) 17:23 (4)	08:02 16:20	15:21 (5) 15:43 (5)	08:41 16:06	
22	05:23 21:41	06:15 20:42	34	19:36 (2) 20:10 (2)	07:10 19:27	08:05 18:15	16:51 (4) 17:23 (4)	08:04 16:19	15:21 (5) 15:43 (5)	08:42 16:06	
23	05:24 21:39	06:17 20:39	34	19:36 (2) 20:10 (2)	07:12 19:24	08:07 18:13	16:50 (4) 17:24 (4)	08:06 16:18	15:21 (5) 15:43 (5)	08:42 16:07	
24	05:26 21:38	06:19 20:37	32	19:37 (2) 20:09 (2)	07:13 19:22	08:09 18:11	16:49 (4) 17:25 (4)	08:08 16:17	15:21 (5) 15:42 (5)	08:43 16:08	
25	05:27 21:36	06:20 20:35	30	19:36 (2) 20:06 (2)	07:15 19:19	07:11 17:09	15:48 (4) 16:25 (4)	08:09 16:16	15:22 (5) 15:41 (5)	08:43 16:08	
26	05:29 21:35	06:22 20:32	27	19:37 (2) 20:04 (2)	07:17 19:17	07:13 17:06	15:48 (4) 16:25 (4)	08:11 16:14	15:23 (5) 15:40 (5)	08:43 16:09	
27	05:30 21:33	06:24 20:30	24	19:38 (2) 20:02 (2)	07:19 19:14	07:15 17:04	15:47 (4) 16:25 (4)	08:13 16:13	15:23 (5) 15:38 (5)	08:44 16:10	
28	05:32 21:32	06:26 20:28	21	19:38 (2) 19:59 (2)	07:21 19:12	07:16 17:02	15:47 (4) 16:25 (4)	08:14 16:12	15:24 (5) 15:37 (5)	08:44 16:11	
29	05:34 21:30	06:27 20:25	18	19:39 (2) 19:57 (2)	07:22 19:09	07:18 17:00	15:47 (4) 16:25 (4)	08:16 16:12	15:24 (5) 15:36 (5)	08:44 16:11	
30	05:35 21:28	06:29 20:23	15	19:40 (2) 19:55 (2)	07:24 19:07	18:10 (3) 18:22 (3)	15:47 (4) 16:25 (4)	08:18 16:11	15:25 (5) 15:35 (5)	08:44 16:12	
31	05:37 21:27	06:31 20:21	10	19:42 (2) 19:52 (2)			07:22 16:56	15:47 (4) 16:25 (4)		08:44 16:13	
Potential sun hours	512	460		382			328	259		233	
Total, worst case		628		17			694	539		24	
Sun reduction		0.34		0.32			0.29	0.27		0.21	
Oper. time red.		1.00		1.00			1.00	1.00		1.00	
Wind dir. red.		0.65		0.67			0.66	0.66		0.66	
Total reduction		0.22		0.21			0.19	0.17		0.14	
Total, real		140		4			134	94		3	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: S - H19

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	08:14	16:09 (3)	07:16	16:41 (2)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
16:15	17:06	16:25 (3)	18:02	17:01 (2)	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54
2 08:44	08:12	16:10 (3)	07:14	16:42 (2)	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26
16:16	17:08	16:24 (3)	18:04	16:58 (2)	20:02	20:57	21:46	22:00	21:23	20:16	19:02	16:52
3 08:44	08:10	16:12 (3)	07:12	16:46 (2)	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
16:17	17:10	16:23 (3)	18:06	16:55 (2)	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50
4 08:43	08:08	16:14 (3)	07:09	16:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	07:28
16:18	17:12	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5 08:43	08:07	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:19	17:14	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
6 08:43	08:05	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:21	17:16	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
7 08:42	08:03	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:22	17:18	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
8 08:42	08:01	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:24	17:20	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
9 08:41	07:59	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:25	17:22	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
10 08:40	07:57	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:26	17:24	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
11 08:40	07:55	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:28	17:26	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
12 08:39	07:53	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:30	17:28	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
13 08:38	07:51	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:31	17:30	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
14 08:37	07:49	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:33	17:32	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
15 08:36	07:47	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:34	17:34	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16 08:35	07:45	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:36	17:36	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
17 08:34	07:43	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:38	17:38	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
18 08:33	07:41	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
16:40	17:40	16:20 (3)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
19 08:32	16:06 (3)	07:39	16:36 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	15:39 (3)
16:41	16:07 (3)	17:42	16:36 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	15:40 (3)
20 08:31	16:05 (3)	07:36	16:36 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	15:40 (3)
16:43	16:08 (3)	17:44	16:36 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	15:40 (3)
21 08:30	16:05 (3)	07:34	16:36 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	15:40 (3)
16:45	16:11 (3)	17:46	16:36 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	15:40 (3)
22 08:29	16:05 (3)	07:32	16:35 (2)	06:26	06:12	05:15	04:55	05:22	06:15	07:10	08:05	15:41 (3)
16:47	16:12 (3)	17:48	16:35 (2)	06:26	06:12	05:15	04:55	05:22	06:15	07:10	08:05	15:41 (3)
23 08:27	16:05 (3)	07:30	16:36 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	15:42 (3)
16:49	16:15 (3)	17:50	16:36 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	15:42 (3)
24 08:26	16:05 (3)	07:28	16:36 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	15:43 (3)
16:50	16:17 (3)	17:52	16:36 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	15:44 (3)
25 08:24	16:05 (3)	07:25	16:36 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	15:44 (3)
16:52	16:19 (3)	17:54	16:36 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	15:44 (3)
26 08:23	16:05 (3)	07:23	16:37 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	15:45 (3)
16:54	16:21 (3)	17:56	16:37 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	15:45 (3)
27 08:22	16:05 (3)	07:21	16:38 (2)	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:14	15:46 (3)
16:56	16:23 (3)	17:58	16:38 (2)	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:14	15:46 (3)
28 08:20	16:06 (3)	07:18	16:39 (2)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	15:47 (3)
16:58	16:26 (3)	18:00	16:39 (2)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	15:47 (3)
29 08:19	16:06 (3)	17:54	16:40 (2)	07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:17	15:48 (3)
17:00	16:26 (3)	17:54	16:40 (2)	07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:17	15:48 (3)
30 08:17	16:07 (3)	17:56	16:41 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:18	15:49 (3)
17:02	16:26 (3)	17:56	16:41 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:18	15:49 (3)
31 08:15	16:07 (3)	17:58	16:42 (2)	07:04	05:52	05:04	04:58	05:36	06:31	07:26	08:20	15:50 (3)
17:04	16:25 (3)	17:58	16:42 (2)	07:04	05:52	05:04	04:58	05:36	06:31	07:26	08:20	15:50 (3)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	218
Total, worst case	164	544	45	420	494	510	512	460	382	328	259	218
Sun reduction	0.24	0.23	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Total reduction	0.16	0.15	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Total, real	26	84	8	420	494	510	512	460	382	328	259	218

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case

Shadow receptor: T - H20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26					07:24				15:52 (2)	08:19		
	16:15		17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05					16:54	29			16:21 (2)	16:10		
2	08:44		08:12		07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28					07:26				15:52 (2)	08:21		
	16:16		17:08		18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02					16:52	28			16:20 (2)	16:09		
3	08:44		08:10		16:33 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30				07:28				15:53 (2)	08:22		
	16:17		17:10	5	16:38 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00				16:51	26			16:19 (2)	16:08		
4	08:43		08:08		16:29 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31				07:30				15:54 (2)	08:24		
	16:18		17:12	12	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57				16:48	23			16:17 (2)	16:08		
5	08:43		08:07		16:27 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33				07:32				15:55 (2)	08:25		
	16:19		17:14	16	16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55				16:46	19			16:14 (2)	16:07		
6	08:43		08:05		16:25 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35				07:34				15:57 (2)	08:26		
	16:21		17:16	20	16:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52				16:44	15			16:12 (2)	16:07		
7	08:42		08:03		16:24 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37				07:36				15:59 (2)	08:28		
	16:22		17:18	23	16:47 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50				16:43	11			16:10 (2)	16:06		
8	08:42		08:01		16:23 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39				07:38				16:04 (2)	08:29		
	16:24		17:20	26	16:49 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48				16:41	3			16:07 (2)	16:06		
9	08:41		07:59		16:23 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41				07:40					08:30		
	16:25		17:22	27	16:50 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45				16:39					16:05		
10	08:40		07:57		16:22 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42				07:42					08:31		
	16:26		17:24	29	16:51 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43				16:37					16:05		
11	08:40		07:55		16:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44				07:44				15:35 (3)	08:33		
	16:28		17:26	30	16:52 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40				16:35	7				16:05		
12	08:39		07:53		16:21 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46				07:45				15:32 (3)	08:34		
	16:30		17:28	31	16:52 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38				16:34	12				16:05		
13	08:38		07:51		16:20 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48				07:47				15:31 (3)	08:35		
	16:31		17:30	32	16:52 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36				16:32	14				16:04		
14	08:37		15:54 (3)	07:49	32	16:20 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50			07:49				15:30 (3)	08:36		
	16:33	3	15:57 (3)	17:32	32	16:52 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33			16:31	17				16:04		
15	08:36		15:54 (3)	07:47	32	16:20 (2)	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52			07:51				15:29 (3)	08:37		
	16:34	5	15:59 (3)	17:34	32	16:52 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31			16:29	18				16:04		
16	08:35		15:53 (3)	07:45	33	16:20 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54			17:04 (2)				07:53	15:29 (3)		
	16:36	7	16:00 (3)	17:36	33	16:53 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	8		17:12 (2)				16:27	19	15:48 (3)	
17	08:34		15:53 (3)	07:43	32	16:21 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55			17:00 (2)				07:55	15:29 (3)		
	16:38	9	16:02 (3)	17:38	32	16:53 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	15		17:15 (2)				16:26	20	15:49 (3)	
18	08:33		15:54 (3)	07:41	31	16:20 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57			16:58 (2)				07:57	15:29 (3)		
	16:40	11	16:05 (3)	17:40	31	16:51 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	19		17:17 (2)				16:24	20	15:49 (3)	
19	08:32		15:54 (3)	07:39	30	16:21 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59			16:56 (2)				07:59	15:29 (3)		
	16:41	13	16:07 (3)	17:42	30	16:51 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	23		17:19 (2)				16:23	20	15:49 (3)	
20	08:31		15:54 (3)	07:36	29	16:22 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01			16:54 (2)				08:00	15:29 (3)		
	16:43	14	16:08 (3)	17:44	29	16:51 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	26		17:20 (2)				16:22	18	15:47 (3)	
21	08:30		15:54 (3)	07:34	27	16:23 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03			16:53 (2)				08:02	15:29 (3)		
	16:45	17	16:11 (3)	17:46	27	16:50 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	28		17:21 (2)				16:20	17	15:46 (3)	
22	08:29		15:54 (3)	07:32	25	16:23 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05			16:52 (2)				08:04	15:30 (3)		
	16:47	18	16:12 (3)	17:48	25	16:48 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	29		17:21 (2)				16:19	14	15:44 (3)	
23	08:27		15:55 (3)	07:30	22	16:25 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07			16:51 (2)				08:06	15:30 (3)		
	16:49	20	16:15 (3)	17:50	22	16:47 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	31		17:22 (2)				16:18	13	15:43 (3)	
24	08:26		15:55 (3)	07:28	19	16:27 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09			16:51 (2)				08:08	15:31 (3)		
	16:50	20	16:15 (3)	17:52	19	16:46 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	31		17:22 (2)				16:17	11	15:42 (3)	
25	08:25		15:56 (3)	07:25	13	16:29 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11			15:50 (2)				08:09	15:32 (3)		
	16:52	20	16:16 (3)	17:54		16:42 (2)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	32		16:22 (2)				16:16	9	15:41 (3)	
26	08:23		15:56 (3)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	07:13			15:50 (2)				08:11	15:32 (3)		
	16:54	19	16:15 (3)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	07:16	32			16:22 (2)				16:14	7	15:39 (3)	
27	08:22		15:57 (3)	07:21		06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	07:15			15:50 (2)				08:13	15:33 (3)		
	16:56	17	16:14 (3)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	32			16:22 (2)				16:13	5	15:38 (3)	
28	08:20		15:58 (3)	07:18		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	07:16			15:50 (2)				08:14	15:34 (3)		
	16:58	17	16:15 (3)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	32			16:22 (2)				16:12	3	15:37 (3)	
29	08:19		15:59 (3)			07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	07:18			15:50 (2)				08:16	15:35 (3)		
	17:00	15	16:14 (3)			19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	31			16:21 (2)				1	15:36 (3)		
30	08:17		16:01 (3)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	07:20			15:50 (2)				08:18	08:44		
	17:02	11	16:12 (3)			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	31			16:21 (2)				16:11		16:12	
31	08:15		16:03 (3)			07:04		05:04		05:37	06:31	07:22	07:22	07:22			15:50 (2)					08:44		
	17:04	7	16:10 (3)			19:58		21:44		21														

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** U - H21

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:49 (2)	08:19	
2	16:15	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	29	16:18 (2)	16:10
3	08:44	08:12	16:30 (2)	07:14	06:59	05:50	05:02	04:59	06:35	07:28	07:26	15:50 (2)	08:21	
4	16:16	17:08	16:36 (2)	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02	27	16:17 (2)	16:09
5	08:44	08:10	16:27 (2)	07:12	06:56	05:48	05:01	05:00	06:36	07:30	07:28	15:50 (2)	08:22	
6	16:17	17:10	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	27	16:17 (2)	16:08
7	08:43	08:08	16:24 (2)	07:09	06:54	05:46	05:00	05:01	06:38	07:31	07:30	15:51 (2)	08:24	
8	16:18	17:12	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	25	16:16 (2)	16:08
9	08:43	08:07	16:23 (2)	07:07	06:51	05:44	04:59	05:02	06:40	07:33	07:32	15:52 (2)	08:25	
10	16:19	17:14	16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	22	16:14 (2)	16:07
11	08:43	08:05	16:22 (2)	07:04	06:49	05:42	04:58	05:03	06:42	07:35	07:34	15:53 (2)	08:26	
12	16:21	17:16	16:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	19	16:12 (2)	16:07
13	08:42	08:03	16:21 (2)	07:02	06:47	05:40	04:58	05:04	06:43	07:37	07:36	15:54 (2)	08:28	
14	16:22	17:18	16:46 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16	16:10 (2)	16:06
15	08:42	08:01	16:20 (2)	07:00	06:44	05:38	04:57	05:05	06:45	07:39	07:38	15:57 (2)	08:29	
16	16:24	17:20	16:47 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	11	16:08 (2)	16:06
17	08:41	07:59	16:20 (2)	06:57	06:42	05:36	04:57	05:06	06:47	07:41	07:40	16:02 (2)	08:30	
18	16:25	17:22	16:48 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	4	16:06 (2)	16:05
19	08:40	07:57	16:19 (2)	06:55	06:39	05:34	04:56	05:07	06:49	07:42	07:42		08:31	
20	16:26	17:24	16:48 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43		16:05	
21	08:40	07:55	16:19 (2)	06:53	06:37	05:32	04:56	05:08	06:50	07:44	07:44		08:33	
22	16:28	17:26	16:49 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40		16:05	
23	08:39	07:53	16:19 (2)	06:50	06:35	05:31	04:55	05:09	06:52	07:46	07:45		08:34	
24	16:30	17:28	16:49 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38		16:05	
25	08:38	07:51	16:18 (2)	06:48	06:32	05:29	04:55	05:10	06:54	07:48	07:47		08:35	
26	16:31	17:30	16:49 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:04	
27	08:37	07:49	16:18 (2)	06:45	06:30	05:27	04:55	05:12	06:01	19:47	18:33		08:36	
28	16:33	17:32	16:49 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:04	
29	08:36	07:47	16:19 (2)	06:43	06:28	05:25	04:54	05:13	06:03	19:44	18:31		08:37	
30	16:34	17:34	16:49 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:04	
31	08:35	07:45	16:19 (2)	06:40	06:25	05:24	04:54	05:14	06:04	19:42	18:29		08:38	
32	16:36	17:36	16:49 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:05	
33	08:34	07:43	16:20 (2)	06:38	06:23	05:22	04:54	05:16	06:06	19:41	18:26		08:38	
34	16:38	17:38	16:49 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26		16:05	
35	08:33	07:41	16:19 (2)	06:35	06:21	05:21	04:54	05:17	06:08	19:37	18:24	8	17:09 (2)	16:24
36	16:40	17:40	16:47 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	15	17:12 (2)	16:23
37	08:32	07:39	16:20 (2)	06:33	06:18	05:19	04:54	05:18	06:10	19:34	18:22	19	17:14 (2)	16:22
38	16:41	17:42	16:47 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	22	17:15 (2)	16:20
39	08:31	07:36	16:22 (2)	06:31	06:16	05:18	04:54	05:20	06:12	19:32	18:20	24	17:16 (2)	16:19
40	16:43	17:44	16:46 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	26	17:17 (2)	16:18
41	08:30	07:34	16:23 (2)	06:28	06:14	05:16	04:54	05:21	06:13	19:29	18:17	28	17:18 (2)	16:17
42	16:45	17:46	16:45 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	30	17:19 (2)	16:16
43	08:29	07:32	16:24 (2)	06:26	06:12	05:15	04:55	05:23	06:15	19:27	18:15	32	17:20 (2)	16:15
44	16:47	17:48	16:42 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	34	17:21 (2)	16:14
45	08:27	07:30	16:27 (2)	06:23	06:09	05:13	04:55	05:24	06:17	19:24	18:13	36	17:22 (2)	16:13
46	16:49	17:50	16:40 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	38	17:23 (2)	16:12
47	08:26	07:28		06:21	06:07	05:12	04:55	05:26	06:19	19:21	18:11	40	17:24 (2)	16:11
48	16:50	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	42	17:25 (2)	16:10
49	08:25	07:25		06:18	06:05	05:11	04:55	05:27	06:20	19:19	18:11	44	17:26 (2)	16:09
50	16:52	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:11	46	17:27 (2)	16:08
51	08:23	07:23		06:16	06:03	05:09	04:56	05:29	06:22	19:17	18:11	48	17:28 (2)	16:07
52	16:54	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:11	50	17:29 (2)	16:06
53	08:22	07:21		06:13	06:00	05:08	04:56	05:30	06:24	19:17	18:11	52	17:30 (2)	16:05
54	16:56	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:11	54	17:31 (2)	16:04
55	08:20	07:18		06:11	05:58	05:07	04:57	05:32	06:26	19:14	18:11	56	17:32 (2)	16:03
56	16:58	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:11	58	17:33 (2)	16:02
57	08:19			07:08	05:56	05:06	04:57	05:34	06:27	19:12	18:11	60	17:34 (2)	16:01
58	17:00			19:54	20:52	21:41	22:01	21:30	20:25	19:09	18:11	62	17:35 (2)	16:00
59	08:17			07:06	05:54	05:05	04:58	05:35	06:29	19:07	18:11	64	17:36 (2)	15:59
60	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:11	66	17:37 (2)	15:58
61	08:15			07:04		05:04		05:37	06:31		18:11	68	17:38 (2)	15:57
62	17:04			19:58		21:44		21:27	20:21		18:11	70	17:39 (2)	15:56
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	180	233	
Total, worst case		530								350		180		
Sun reduction		0.23								0.29		0.27		
Oper. time red.		1.00								1.00		1.00		
Wind dir. red.		0.66								0.66		0.66		
Total reduction		0.15								0.19		0.17		
Total, real		81								67		31		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: V - H22

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March	April	May	June	July	August	September	October	November	December
1	08:44	15:07 (3)	08:14	15:21 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
2	16:15	15:34 (2)	17:06	15:47 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:10
3	08:44	15:08 (3)	08:12	15:23 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	08:21
4	16:16	15:35 (2)	17:08	15:45 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
5	08:44	15:08 (3)	08:10	15:24 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
6	16:17	15:36 (2)	17:10	15:44 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:08
7	08:43	15:09 (3)	08:08	15:27 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	08:24
8	16:18	15:37 (2)	17:12	15:42 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
9	08:43	15:09 (3)	08:07	15:30 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	08:25
10	16:19	15:37 (2)	17:14	15:39 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:07
11	08:43	15:11 (3)	08:05	15:39 (2)	07:16	07:04	06:49	05:42	04:58	05:03	06:42	07:35	08:26
12	16:21	15:39 (2)	17:16	15:41 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:07
13	08:42	15:11 (3)	08:03	15:39 (2)	07:18	07:02	06:47	05:40	04:58	05:04	06:43	07:37	08:28
14	16:22	15:39 (2)	17:18	15:42 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
15	08:42	15:12 (2)	08:01	15:42 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
16	16:24	15:40 (2)	17:20	15:45 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
17	08:41	15:12 (2)	07:59	15:45 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
18	16:25	15:41 (2)	17:22	15:46 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:05
19	08:40	15:12 (2)	07:57	15:46 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:05
20	16:26	15:42 (2)	17:24	15:47 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:42	16:05
21	08:40	15:12 (2)	07:55	15:48 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:42	16:05
22	16:28	15:43 (2)	17:26	15:49 (2)	18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:05
23	08:39	15:12 (2)	07:53	15:50 (2)	18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:05
24	16:30	15:43 (2)	17:28	15:51 (2)	18:22	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:04
25	08:38	15:12 (2)	07:51	15:52 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:04
26	16:31	15:44 (2)	17:30	15:53 (2)	18:24	20:21	21:16	21:57	21:52	21:01	19:49	18:36	16:04
27	08:37	15:12 (2)	07:49	15:54 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:04
28	16:33	15:45 (2)	17:32	15:55 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:04
29	08:36	15:13 (2)	07:47	15:56 (2)	18:28	20:25	21:19	21:59	21:51	20:59	19:47	18:33	16:04
30	16:34	15:46 (2)	17:34	15:57 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:04
31	08:35	15:12 (2)	07:45	15:58 (2)	18:30	20:27	21:21	21:59	21:51	20:57	19:44	18:31	16:04
32	16:36	15:47 (2)	17:36	15:59 (2)	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
33	08:34	15:12 (2)	07:43	16:00 (2)	18:32	20:29	21:23	21:59	21:47	20:53	19:39	18:26	16:05
34	16:38	15:48 (2)	17:38	16:02 (2)	18:33	20:30	21:24	21:59	21:47	20:53	19:39	18:26	16:05
35	08:33	15:13 (2)	07:41	16:03 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:05
36	16:40	15:47 (2)	17:40	16:04 (2)	18:35	20:32	21:26	22:01	21:47	20:52	19:38	18:25	16:05
37	08:32	15:13 (2)	07:39	16:05 (2)	18:36	20:33	21:27	22:00	21:48	20:53	19:39	18:26	16:05
38	16:41	15:48 (2)	17:42	16:06 (2)	18:37	20:34	21:28	22:01	21:49	20:54	19:40	18:27	16:05
39	08:31	15:13 (2)	07:36	16:07 (2)	18:38	20:35	21:29	22:02	21:50	20:55	19:41	18:28	16:05
40	16:43	15:49 (2)	17:44	16:08 (2)	18:39	20:36	21:30	22:03	21:51	20:56	19:42	18:29	16:05
41	08:30	15:13 (2)	07:34	16:09 (2)	18:40	20:37	21:31	22:04	21:52	20:57	19:43	18:30	16:05
42	16:45	15:48 (2)	17:46	16:10 (2)	18:41	20:38	21:32	22:05	21:53	20:58	19:44	18:31	16:05
43	08:29	15:13 (2)	07:32	16:11 (2)	18:42	20:39	21:33	22:06	21:54	20:59	19:45	18:32	16:05
44	16:47	15:48 (2)	17:48	16:12 (2)	18:43	20:40	21:34	22:07	21:55	20:60	19:46	18:33	16:05
45	08:27	15:14 (2)	07:30	16:13 (2)	18:44	20:41	21:35	22:08	21:56	20:61	19:47	18:34	16:05
46	16:49	15:49 (2)	17:50	16:14 (2)	18:45	20:42	21:36	22:09	21:57	20:62	19:48	18:35	16:05
47	08:26	15:14 (2)	07:28	16:15 (2)	18:46	20:43	21:37	22:10	21:58	20:63	19:49	18:36	16:05
48	16:50	15:48 (2)	17:52	16:16 (2)	18:47	20:44	21:38	22:11	21:59	20:64	19:50	18:37	16:05
49	08:25	15:15 (2)	07:25	16:17 (2)	18:48	20:45	21:39	22:12	21:60	20:65	19:51	18:38	16:05
50	16:52	15:49 (2)	17:54	16:18 (2)	18:49	20:46	21:40	22:13	21:61	20:66	19:52	18:39	16:05
51	08:23	15:15 (2)	07:23	16:19 (2)	18:50	20:47	21:41	22:14	21:62	20:67	19:53	18:40	16:05
52	16:54	15:49 (2)	17:56	16:20 (2)	18:51	20:48	21:42	22:15	21:63	20:68	19:54	18:41	16:05
53	08:22	15:16 (2)	07:21	16:21 (2)	18:52	20:49	21:43	22:16	21:64	20:69	19:55	18:42	16:05
54	16:56	15:48 (2)	17:58	16:22 (2)	18:53	20:50	21:44	22:17	21:65	20:70	19:56	18:43	16:05
55	08:20	15:17 (2)	07:19	16:23 (2)	18:54	20:51	21:45	22:18	21:66	20:71	19:57	18:44	16:05
56	16:58	15:49 (2)	18:00	16:24 (2)	18:55	20:52	21:46	22:19	21:67	20:72	19:58	18:45	16:05
57	08:19	15:18 (2)		16:25 (2)	18:56	20:53	21:47	22:20	21:68	20:73	19:59	18:46	16:05
58	17:00	15:48 (2)		16:26 (2)	18:57	20:54	21:48	22:21	21:69	20:74	19:60	18:47	16:05
59	08:17	15:18 (2)		16:27 (2)	18:58	20:55	21:49	22:22	21:70	20:75	19:61	18:48	16:05
60	17:02	15:47 (2)		16:28 (2)	18:59	20:56	21:50	22:23	21:71	20:76	19:62	18:49	16:05
61	08:15	15:19 (2)		16:29 (2)	19:00	20:57	21:51	22:24	21:72	20:77	19:63	18:50	16:05
62	17:04	15:47 (2)		16:30 (2)	19:01	20:58	21:52	22:25	21:73	20:78	19:64	18:51	16:05
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	754	824
Total, worst case	970	92										754	824
Sun reduction	0.24	0.23										0.27	0.21
Oper. time red.	1.00	1.00										1.00	1.00
Wind dir. red.	0.65	0.66										0.66	0.65
Total reduction	0.16	0.15										0.17	0.14
Total, real	154	14										131	111

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: W - H23

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		15:04 (2)	08:14		15:17 (2)	07:16	07:01	05:52		05:03		04:59	05:39		06:33		07:26		07:24			08:19		14:47 (2)
	16:15	27	15:31 (2)	17:06	23	15:40 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		20:18	19:05	16:54		16:10	33	15:20 (2)		14:47 (2)
2	08:44		15:04 (2)	08:12		15:18 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26		06:35	07:28	07:26		16:09	33	15:20 (2)		14:47 (2)
	16:16	28	15:32 (2)	17:08	20	15:38 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		20:16	19:02	16:52		16:09	33	15:20 (2)		14:47 (2)
3	08:44		15:04 (2)	08:10		15:21 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		06:36	07:30	07:28		16:08	32	15:20 (2)		14:48 (2)
	16:17	28	15:32 (2)	17:10	15	15:36 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50		20:13	19:00	16:50		16:08	32	15:20 (2)		14:48 (2)
4	08:43		15:04 (2)	08:08		15:24 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30		06:38	07:31	07:30		16:08	32	15:21 (2)		14:49 (2)
	16:18	29	15:33 (2)	17:12	9	15:33 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48		20:11	18:57	16:48		16:08	32	15:21 (2)		14:49 (2)
5	08:43		15:04 (2)	08:07			07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32		06:40	07:33	07:32		16:07	31	15:20 (2)		14:49 (2)
	16:19	29	15:33 (2)	17:14			18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46		20:09	18:55	16:46		16:07	31	15:20 (2)		14:49 (2)
6	08:43		15:04 (2)	08:05			07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34		06:42	07:35	07:34		16:07	31	15:21 (2)		14:50 (2)
	16:21	31	15:35 (2)	17:16			18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44		20:06	18:52	16:44		16:07	31	15:21 (2)		14:50 (2)
7	08:42		15:04 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36		06:43	07:37	07:36		14:53 (2)		16:08		14:51 (2)
	16:22	31	15:35 (2)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	10	20:04	18:50	16:43	10	15:03 (2)		16:06	30	15:21 (2)
8	08:42		15:04 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38		06:45	07:39	07:38		14:50 (2)		16:08		14:51 (2)
	16:24	32	15:36 (2)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16	20:01	18:48	16:41	16	15:06 (2)		16:06	29	15:20 (2)
9	08:41		15:05 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		06:47	07:41	07:40		14:49 (2)		16:08		14:53 (2)
	16:25	32	15:37 (2)	17:22			18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	20	19:59	18:45	16:39	20	15:09 (2)		16:05	28	15:21 (2)
10	08:40		15:05 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42		06:49	07:42	07:42		14:47 (2)		16:08		14:53 (2)
	16:26	33	15:38 (2)	17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	24	19:56	18:43	16:37	24	15:11 (2)		16:05	28	15:21 (2)
11	08:40		15:05 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44		06:50	07:44	07:44		14:46 (2)		16:08		14:54 (2)
	16:28	33	15:38 (2)	17:26			18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	26	19:54	18:40	16:35	26	15:12 (2)		16:05	27	15:21 (2)
12	08:39		15:05 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46		06:52	07:46	07:46		14:45 (2)		16:08		14:54 (2)
	16:30	34	15:39 (2)	17:28			18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	28	19:51	18:38	16:34	28	15:13 (2)		16:05	27	15:21 (2)
13	08:38		15:05 (2)	07:51			06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47		06:54	07:48	07:47		14:44 (2)		16:08		14:54 (2)
	16:31	34	15:39 (2)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	30	19:49	18:36	16:32	30	15:14 (2)		16:05	27	15:21 (2)
14	08:37		15:05 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49		06:56	07:50	07:49		14:43 (2)		16:08		14:55 (2)
	16:33	35	15:40 (2)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	31	19:47	18:33	16:31	31	15:14 (2)		16:04	27	15:22 (2)
15	08:36		15:06 (2)	07:47			06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51		06:58	07:52	07:51		14:43 (2)		16:08		14:55 (2)
	16:34	35	15:41 (2)	17:34			18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	32	19:44	18:31	16:29	32	15:15 (2)		16:04	26	15:21 (2)
16	08:35		15:05 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53		06:59	07:54	07:53		14:43 (2)		16:08		14:55 (2)
	16:36	35	15:40 (2)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	33	19:42	18:29	16:27	33	15:16 (2)		16:05	27	15:22 (2)
17	08:34		15:06 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55		07:01	07:55	07:55		14:42 (2)		16:08		14:56 (2)
	16:38	35	15:41 (2)	17:38			18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	34	19:39	18:26	16:26	34	15:16 (2)		16:05	26	15:22 (2)
18	08:33		15:06 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57		07:03	07:57	07:57		14:42 (2)		16:08		14:56 (2)
	16:40	36	15:42 (2)	17:40			18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	35	19:37	18:24	16:24	35	15:17 (2)		16:05	27	15:23 (2)
19	08:32		15:07 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59		07:05	07:59	07:59		14:42 (2)		16:08		14:57 (2)
	16:41	35	15:42 (2)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	35	19:34	18:22	16:23	35	15:17 (2)		16:05	26	15:23 (2)
20	08:31		15:06 (2)	07:36			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00		07:06	08:01	08:00		14:42 (2)		16:08		14:57 (2)
	16:43	36	15:42 (2)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	35	19:32	18:20	16:22	35	15:17 (2)		16:06	26	15:23 (2)
21	08:30		15:07 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02		07:08	08:03	08:02		14:42 (2)		16:08		14:58 (2)
	16:45	36	15:43 (2)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	36	19:29	18:17	16:20	36	15:18 (2)		16:06	26	15:24 (2)
22	08:29		15:07 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		07:10	08:05	08:04		14:42 (2)		16:08		14:58 (2)
	16:47	35	15:42 (2)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	36	19:27	18:15	16:19	36	15:18 (2)		16:06	26	15:24 (2)
23	08:27		15:08 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		07:12	08:07	08:06		14:43 (2)		16:08		14:59 (2)
	16:49	35	15:43 (2)	17:50			18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	36	19:24	18:13	16:18	36	15:19 (2)		16:07	26	15:25 (2)
24	08:26		15:08 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08		07:13	08:09	08:08		14:43 (2)		16:08		14:59 (2)
	16:50	35	15:43 (2)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	36	19:22	18:11	16:17	36	15:19 (2)		16:08	26	15:25 (2)
25	08:25		15:09 (2)	07:25			06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09		07:15	08:11	08:09		14:44 (2)		16:08		15:25 (2)
	16:52	34	15:43 (2)	17:54			18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	35	19:19	17:09	16:16	35	15:19 (2)		16:08	26	15:25 (2)
26	08:23		15:10 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11		07:17	08:13	08:11		14:44 (2)		16:08		15:00 (3)
	16:54	33	15:43 (2)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	36	19:17	17:06	16:14	36	15:20 (2)		16:09	26	15:26 (2)
27	08:22		15:																						

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** X - H24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March	April	May	June	July	August	September	October	November	December	
1	08:44		08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19	15:20 (1)
	16:15		17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10	14 15:34 (1)
2	08:44		08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26		08:21	15:21 (1)
	16:16		17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09	12 15:33 (1)
3	08:44		15:38 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	15:21 (1)
	16:17	1	15:39 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	11 15:32 (1)
4	08:43		15:38 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	15:22 (1)
	16:18	3	15:41 (1)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	10 15:32 (1)
5	08:43		15:37 (1)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	15:22 (1)
	16:19	5	15:42 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	8 15:30 (1)
6	08:43		15:38 (1)	08:05	07:05	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	15:24 (1)
	16:21	6	15:44 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	16:07	6 15:30 (1)
7	08:42		15:37 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	15:24 (1)
	16:22	8	15:45 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	5 15:29 (1)
8	08:42		15:37 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	15:26 (1)
	16:24	9	15:46 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	3 15:29 (1)
9	08:41		15:38 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	15:27 (1)
	16:25	11	15:49 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	1 15:28 (1)
10	08:40		15:38 (1)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	
	16:26	12	15:50 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	
11	08:40		15:38 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	
	16:28	14	15:52 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:35	16:05	
12	08:39		15:38 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	
	16:30	15	15:53 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	16:05	
13	08:38		15:38 (1)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	
	16:31	17	15:55 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05	
14	08:37		15:38 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	
	16:33	19	15:57 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:04	
15	08:36		15:38 (1)	07:47	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	15:21 (1)	08:37
	16:34	21	15:59 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	7 15:28 (1)	16:04
16	08:35		15:39 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	15:19 (1)	08:38
	16:36	21	16:00 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	11 15:30 (1)	16:05
17	08:34		15:38 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	15:18 (1)	08:39
	16:38	21	15:59 (1)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	14 15:32 (1)	16:05
18	08:33		15:39 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	15:17 (1)	08:39
	16:40	21	16:00 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16 15:33 (1)	16:05
19	08:32		15:40 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	15:16 (1)	08:40
	16:41	20	16:00 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	18 15:34 (1)	16:05
20	08:31		15:40 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	15:16 (1)	08:41
	16:43	20	16:00 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	19 15:35 (1)	16:06
21	08:30		15:41 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	15:16 (1)	08:41
	16:45	19	16:00 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	19 15:35 (1)	16:06
22	08:29		15:41 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	15:16 (1)	08:42
	16:47	19	16:00 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	20 15:36 (1)	16:06
23	08:27		15:42 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	15:16 (1)	08:42
	16:49	18	16:00 (1)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	20 15:36 (1)	16:07
24	08:26		15:43 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	15:16 (1)	08:43
	16:50	16	15:59 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	21 15:37 (1)	16:08
25	08:25		15:45 (1)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09	15:17 (1)	08:43
	16:52	14	15:59 (1)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	20 15:37 (1)	16:08
26	08:23		15:46 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	15:17 (1)	08:43
	16:54	11	15:57 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	21 15:38 (1)	16:09
27	08:22		15:48 (1)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13	15:18 (1)	08:44
	16:56	7	15:55 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	20 15:38 (1)	16:10
28	08:20			07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14	15:18 (1)	08:44
	16:58		18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	19 15:37 (1)	16:11
29	08:19				07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16	15:18 (1)	08:44
	17:00				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	17 15:35 (1)	16:11
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	15:19 (1)	08:44
	17:02				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16 15:35 (1)	16:12
31	08:15				07:04		05:04		05:37	06:31		07:22		16:12	08:44
	17:04				19:58		21:44		21:27	20:21		16:56		16:13	233
Potential sun hours	250		273	367		420	494	510	512	460	382	328	259		
Total, worst case		348											278		70
Sun reduction		0.24											0.27		0.21
Oper. time red.		1.00											1.00		1.00
Wind dir. red.		0.66											0.66		0.66
Total reduction		0.16											0.18		0.14
Total, real		56											49		10

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: Y - H25

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: Z - H26

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
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12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AA - H27

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	19:50 (5)	05:03	04:59	05:39	20:10 (5)	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:55	28	20:18 (5)	21:45	22:00	21:25	7	20:17 (5)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	19:50 (5)	05:02	05:00	05:40	20:08 (5)	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	28	20:18 (5)	21:46	22:00	21:23	12	20:20 (5)	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48	19:50 (5)	05:01	05:00	05:42	20:05 (5)	06:36	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	27	20:17 (5)	21:48	21:59	21:21	16	20:21 (5)	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	19:50 (5)	05:00	05:01	05:44	20:04 (5)	06:38	07:31	07:30	08:24		
	16:18	17:12	18:07	20:06	21:01	27	20:17 (5)	21:49	21:59	21:19	19	20:23 (5)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	19:51 (5)	04:59	05:02	05:45	20:02 (5)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:03	25	20:16 (5)	21:50	21:58	21:17	22	20:24 (5)	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	19:51 (5)	04:59	05:03	05:47	20:02 (5)	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	24	20:15 (5)	21:51	21:57	21:15	23	20:25 (5)	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	19:52 (5)	04:58	05:04	05:49	20:01 (5)	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	23	20:15 (5)	21:52	21:57	21:13	25	20:26 (5)	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	19:53 (5)	04:57	05:05	05:51	20:00 (5)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	21	20:14 (5)	21:53	21:56	21:11	26	20:26 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	19:54 (5)	04:57	05:06	05:52	20:00 (5)	06:47	07:41	07:40	08:30		
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10	08:40	07:57	06:55	06:39	05:34	19:55 (5)	04:56	05:07	05:54	19:58 (5)	06:49	07:42	07:42	08:31		
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11	08:40	07:55	06:52	06:37	05:33	19:58 (5)	04:56	05:08	05:56	19:58 (5)	06:50	07:44	07:43	08:33		
	16:28	17:26	18:21	20:18	21:13	11	20:09 (5)	21:55	21:54	21:05	28	20:26 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	20:02 (5)	04:55	05:09	05:58	19:58 (5)	06:52	07:46	07:45	08:34		
	16:30	17:28	18:23	20:20	21:15	3	20:05 (5)	21:56	21:53	21:03	29	20:27 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:58 (5)	06:54	07:48	07:47	08:35		
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14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:58 (5)	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	28	20:26 (5)	19:47	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03		19:58 (5)	06:58	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	28	20:26 (5)	19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05		19:58 (5)	06:59	07:54	07:53	08:38	
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	27	20:25 (5)	19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06		19:58 (5)	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	25	20:23 (5)	19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21		04:54	05:17	06:08		19:59 (5)	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	21:25		21:59	21:46	20:50	23	20:22 (5)	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:18	05:19		04:54	05:18	06:10		19:59 (5)	07:05	07:59	07:59	08:40	
	16:41	17:42	18:36	20:33	21:27		22:00	21:45	20:48	20	20:19 (5)	19:34	18:22	16:23	16:05	
20	08:31	07:36	06:31	06:16	05:18	20:01 (5)	04:54	05:20	06:12		20:00 (5)	07:06	08:01	08:00	08:41	
	16:43	17:44	18:38	20:35	21:28	6	20:07 (5)	21:44	20:46	17	20:17 (5)	19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16	19:57 (5)	04:54	05:21	06:13		20:02 (5)	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30	11	22:00	21:42	20:44	13	20:15 (5)	19:29	18:17	16:20	16:06	
22	08:28	07:32	06:26	06:12	05:15	19:56 (5)	04:55	05:23	06:15		20:02 (5)	07:10	08:05	08:04	08:42	
	16:47	17:48	18:42	20:39	21:31	14	22:01	21:41	20:42	10	20:12 (5)	19:27	18:15	16:19	16:07	
23	08:27	07:30	06:23	06:09	05:13	19:54 (5)	04:55	05:24	06:17		20:05 (5)	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	21:33	18	22:01	21:39	20:39	5	20:10 (5)	19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12	19:53 (5)	04:55	05:26	06:19			07:13	08:09	08:07	08:43	
	16:51	17:52	18:45	20:42	21:34	20	22:01	21:38	20:37			19:22	18:11	16:17	16:08	
25	08:24	07:25	06:18	06:05	05:11	19:52 (5)	04:56	05:27	06:20			07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	21:36	23	22:01	21:36	20:35			19:19	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:09	19:52 (5)	04:56	05:29	06:22			07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	21:37	25	22:01	21:35	20:32			19:17	17:07	16:15	16:09	
27	08:21	07:21	06:13	06:01	05:08	19:51 (5)	04:56	05:31	06:24			07:19	07:14	08:13	08:44	
	16:56	17:58	18:51	20:48	21:39	27	22:01	21:33	20:30			19:14	17:04	16:14	16:10	
28	08:20	07:18	06:11	05:58	05:07	19:51 (5)	04:57	05:32	06:26			07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	21:40	28	22:01	21:32	20:28			19:12	17:02	16:13	16:11	
29	08:18		07:09	05:56	05:06	19:50 (5)	04:58	05:34	06:28			07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	21:41	29	22:00	21:30	20:25			19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	05:05	19:50 (5)	04:58	05:35	06:29			07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	21:43	29	22:00	21:28	20:23			19:07	16:58	16:11	16:12	
31	08:15		07:04		05:04			05:37	06:31				07:22		08:44	
	17:04		19:58		21:44			21:26	20:21				16:56		16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328		259	233	
Total, worst case				230	250				485							
Sun reduction				0.35	0.38				0.34							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.65	0.65				0.65							
Total reduction				0.23	0.25				0.22							
Total, real				53	62				107							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AB - H28

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	19:49 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:55	27	20:16 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50		19:49 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	26	20:15 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:43	08:10	07:11	06:56	05:48		19:49 (5)	05:01	05:00	05:42	20:08 (5)	06:36	07:30	08:22		
	16:17	17:10	18:06	20:04	20:59	26	20:15 (5)	21:48	21:59	21:21	8	20:16 (5)	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46		19:50 (5)	05:00	05:01	05:44	20:05 (5)	06:38	07:31	07:30	08:24	
	16:18	17:12	18:07	20:06	21:01	24	20:14 (5)	21:49	21:59	21:19	14	20:19 (5)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44		19:50 (5)	04:59	05:02	05:45	20:03 (5)	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:03	23	20:13 (5)	21:50	21:58	21:17	17	20:20 (5)	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42		19:51 (5)	04:59	05:03	05:47	20:02 (5)	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04	21	20:12 (5)	21:51	21:57	21:15	19	20:21 (5)	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40		19:53 (5)	04:58	05:04	05:49	20:01 (5)	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	18	20:11 (5)	21:52	21:57	21:13	21	20:22 (5)	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38		19:54 (5)	04:57	05:05	05:51	19:59 (5)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	16	20:10 (5)	21:53	21:56	21:11	24	20:23 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36		19:56 (5)	04:57	05:06	05:52	19:59 (5)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	11	20:07 (5)	21:54	21:55	21:09	25	20:24 (5)	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34		19:59 (5)	04:56	05:07	05:54	19:58 (5)	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11	5	20:04 (5)	21:55	21:54	21:07	25	20:23 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	19:57 (5)	06:50	07:44	07:43	08:33		
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	27	20:24 (5)	19:54	18:40	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:58	19:57 (5)	06:52	07:46	07:45	08:34		
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	28	20:25 (5)	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:56 (5)	06:54	07:48	07:47	08:35		
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	28	20:24 (5)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01		19:56 (5)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	28	20:24 (5)	19:47	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03		19:57 (5)	06:58	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	27	20:24 (5)	19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05		19:56 (5)	06:59	07:54	07:53	08:38	
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	27	20:23 (5)	19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06		19:56 (5)	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	27	20:23 (5)	19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21		04:54	05:17	06:08		19:57 (5)	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	21:25		21:59	21:46	20:50	25	20:22 (5)	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:18	5	20:00 (5)	04:54	05:18	06:10		19:57 (5)	07:05	07:59	07:59	08:40	
	16:41	17:42	18:36	20:33	21:27		22:00	21:45	20:48	22	20:19 (5)	19:34	18:22	16:23	16:05	
20	08:31	07:36	06:31	06:16	10	19:57 (5)	04:54	05:20	06:12		19:58 (5)	07:06	08:01	08:00	08:41	
	16:43	17:44	18:38	20:35	21:28		22:00	21:43	20:46	19	20:17 (5)	19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	14	19:54 (5)	04:54	05:21	06:13		19:59 (5)	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30		22:00	21:42	20:44	16	20:15 (5)	19:29	18:17	16:20	16:06	
22	08:28	07:32	06:26	06:12	17	19:53 (5)	04:55	05:23	06:15		19:59 (5)	07:10	08:05	08:04	08:42	
	16:47	17:48	18:42	20:39	21:31		22:01	21:41	20:42	13	20:12 (5)	19:27	18:15	16:19	16:07	
23	08:27	07:30	06:23	06:09	20	19:52 (5)	04:55	05:24	06:17		20:01 (5)	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	21:33		22:01	21:39	20:39	9	20:10 (5)	19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	22	19:51 (5)	04:55	05:26	06:19		20:04 (5)	07:13	08:09	08:07	08:43	
	16:51	17:52	18:45	20:42	21:34		22:01	21:38	20:37	5	20:09 (5)	19:22	18:11	16:17	16:08	
25	08:24	07:25	06:18	06:05	25	19:50 (5)	04:56	05:27	06:20		07:15	07:11	08:09	08:43		
	16:52	17:54	18:47	20:44	21:36		22:01	21:36	20:35		19:19	17:09	16:16	16:08		
26	08:23	07:23	06:16	06:03	27	19:50 (5)	04:56	05:29	06:22		07:17	07:13	08:11	08:43		
	16:54	17:56	18:49	20:46	21:37		22:01	21:35	20:32		19:17	17:07	16:15	16:09		
27	08:21	07:21	06:13	06:01	28	19:49 (5)	04:56	05:30	06:24		07:19	07:14	08:13	08:44		
	16:56	17:58	18:51	20:48	21:39		22:01	21:33	20:30		19:14	17:04	16:14	16:10		
28	08:20	07:18	06:11	05:58	28	19:49 (5)	04:57	05:32	06:26		07:21	07:16	08:14	08:44		
	16:58	18:00	18:53	20:50	21:40		22:01	21:32	20:28		19:12	17:02	16:13	16:11		
29	08:18		07:09	05:56	28	19:49 (5)	04:58	05:34	06:28		07:22	07:18	08:16	08:44		
	17:00		19:54	20:52	21:41		22:00	21:30	20:25		19:09	17:00	16:12	16:11		
30	08:17		07:06	05:54	27	19:49 (5)	04:58	05:35	06:29		07:24	07:20	08:17	08:44		
	17:02		19:56	20:53	21:43		22:00	21:28	20:23		19:07	16:58	16:11	16:12		
31	08:15		07:04		05:04			05:37	06:31			07:22		08:44		
	17:04		19:58		21:44			21:26	20:21			16:56		16:13		
Potential sun hours	250	273	367	420	494		510	512	460		382	328		259	233	
Total, worst case				251	197				454							
Sun reduction				0.35	0.38				0.34							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.65	0.65				0.65							
Total reduction				0.23	0.25				0.22							
Total, real				57	49				100							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AC - H29

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:48 (5) 20:14 (5)	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:49 (5) 20:13 (5)	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:49 (5) 20:12 (5)	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:54 21:01	19:50 (5) 20:11 (5)	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:51 (5) 20:10 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:05 (5) 20:15 (5)	06:40 20:09	07:33 18:55	08:25 16:46
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:52 (5) 20:08 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:03 (5) 20:18 (5)	06:42 20:06	07:35 18:52	07:34 16:44
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:54 (5) 20:08 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:02 (5) 20:19 (5)	06:43 20:04	07:37 18:50	08:28 16:43
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	19:56 (5) 20:05 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:00 (5) 20:20 (5)	06:45 20:01	07:39 18:48	08:29 16:41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10		04:57 21:54	05:06 21:55	05:52 21:09	19:59 (5) 20:21 (5)	06:47 19:59	07:41 18:45	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11		04:56 21:55	05:07 21:54	05:54 21:07	19:57 (5) 20:21 (5)	06:49 19:56	07:42 18:43	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13		04:56 21:55	05:08 21:54	05:56 21:05	19:57 (5) 20:22 (5)	06:50 19:54	07:44 18:40	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15		04:55 21:56	05:09 21:53	05:58 21:03	19:57 (5) 20:22 (5)	06:52 19:51	07:46 18:38	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	19:56 (5) 20:22 (5)	06:54 19:49	07:48 18:36	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	05:12 21:51	06:01 20:59	19:55 (5) 20:22 (5)	06:56 19:47	07:50 18:33	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	05:13 21:50	06:03 20:57	19:56 (5) 20:23 (5)	06:58 19:44	07:52 18:31	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	19:55 (5) 20:22 (5)	06:59 19:42	07:54 18:29	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	19:55 (5) 20:22 (5)	07:01 19:39	07:55 18:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	19:59 (5) 20:03 (5)	04:54 21:59	05:17 21:46	06:08 20:50	19:55 (5) 20:22 (5)	07:03 19:37	07:57 18:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	19:56 (5) 20:05 (5)	04:54 22:00	05:18 21:45	06:10 20:48	19:55 (5) 20:19 (5)	07:05 19:34	07:59 18:22	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	19:54 (5) 20:07 (5)	04:54 22:00	05:20 21:43	06:12 20:46	19:56 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	19:52 (5) 20:08 (5)	04:54 22:00	05:21 21:42	06:13 20:44	19:57 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	19:51 (5) 20:10 (5)	04:55 22:01	05:23 21:41	06:15 20:42	19:57 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	19:50 (5) 20:12 (5)	04:55 22:01	05:24 21:39	06:17 20:39	19:58 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	19:49 (5) 20:13 (5)	04:55 22:01	05:26 21:38	06:19 20:37	20:00 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	19:49 (5) 20:15 (5)	04:56 22:01	05:27 21:36	06:20 20:35	20:03 (5) 20:06 (5)	07:15 19:19	08:09 17:09	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	19:48 (5) 20:15 (5)	04:56 22:01	05:29 21:35	06:22 20:32		07:17 19:17	08:11 17:06	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	19:48 (5) 20:15 (5)	04:56 22:01	05:30 21:33	06:24 20:30		07:19 19:14	08:13 17:04	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	19:48 (5) 20:15 (5)	04:57 22:01	05:32 21:32	06:26 20:28		07:21 19:12	08:14 17:02	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	19:48 (5) 20:15 (5)	04:58 22:00	05:34 21:30	06:28 20:25		07:22 19:09	08:16 17:00	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	19:48 (5) 20:14 (5)	04:58 22:00	05:35 21:28	06:29 20:23		07:24 19:07	08:17 16:58	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44			05:37 21:26	06:31 20:21		07:22 16:56	08:44 16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259
Total, worst case				267	152				421				233
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.65	0.65				0.65				
Total reduction				0.23	0.25				0.22				
Total, real				61	38				93				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AD - H30

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:11 (5) 20:26 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:19 (5) 20:41 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	20:10 (5) 20:27 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:19 (5) 20:42 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	20:09 (5) 20:29 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:18 (5) 20:42 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	20:08 (5) 20:30 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:18 (5) 20:42 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	20:08 (5) 20:32 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:17 (5) 20:42 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:07 (5) 20:32 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:17 (5) 20:42 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:08 (5) 20:33 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:18 (5) 20:42 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:08 (5) 20:32 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:17 (5) 20:41 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:07 (5) 20:32 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:18 (5) 20:39 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:07 (5) 20:31 (5)	04:56 21:54	05:07 21:54	05:54 21:07	20:17 (5) 20:37 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:08 (5) 20:32 (5)	04:56 21:55	05:08 21:54	05:56 21:05	20:18 (5) 20:35 (5)	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:08 (5) 20:31 (5)	04:55 21:56	05:09 21:53	05:58 21:03	20:19 (5) 20:34 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:09 (5) 20:30 (5)	04:55 21:57	05:11 21:52	05:59 21:01	20:20 (5) 20:31 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:10 (5) 20:30 (5)	04:55 21:57	05:12 21:51	06:01 20:59	20:21 (5) 20:29 (5)	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:10 (5) 20:28 (5)	04:55 21:58	05:13 21:50	06:03 20:57	20:24 (5) 20:28 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:12 (5) 20:28 (5)	04:54 21:59	05:14 21:48	06:05 20:55	19:44 20:59	07:54 18:29	07:53 16:27	08:37 16:05	
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:13 (5) 20:26 (5)	04:54 21:59	05:16 21:47	06:06 20:53	19:41 19:39	18:29 18:26	16:26 16:26	08:38 16:05	
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	20:15 (5) 20:24 (5)	04:54 21:59	05:17 21:46	06:08 20:50	19:37 20:50	18:24 18:24	16:25 16:25	08:39 16:05	
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:14 (5) 20:20 (5)	04:54 21:45	05:18 21:45	06:10 20:48	19:36 20:48	18:24 18:22	16:25 16:23	08:40 16:05	
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:14 (5) 20:20 (5)	04:54 21:43	05:20 21:43	06:12 20:46	19:33 20:46	18:20 18:20	16:22 16:22	08:41 16:06	
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:14 (5) 20:20 (5)	04:54 21:42	05:21 21:42	06:13 20:44	19:31 20:44	18:19 18:17	16:20 16:20	08:41 16:06	
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	20:14 (5) 20:20 (5)	04:55 21:41	05:23 21:41	06:15 20:42	19:28 20:42	18:15 18:15	16:19 16:19	08:42 16:07	
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:14 (5) 20:20 (5)	04:55 21:39	05:24 21:39	06:17 20:39	19:26 20:39	18:14 18:13	16:18 16:18	08:42 16:07	
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	20:14 (5) 20:20 (5)	04:55 21:38	05:26 21:38	06:19 20:37	19:23 20:37	18:13 18:11	16:17 16:17	08:43 16:08	
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:14 (5) 20:20 (5)	04:56 21:36	05:27 21:36	20:28 (5) 20:34 (5)	19:20 20:35	18:11 18:09	16:17 16:16	08:43 16:08	
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	20:14 (5) 20:20 (5)	04:56 21:35	05:29 21:35	20:25 (5) 20:36 (5)	19:17 20:32	18:09 18:07	16:16 16:15	08:41 16:09	
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:14 (5) 20:20 (5)	04:56 21:33	05:30 21:33	20:24 (5) 20:30 (5)	19:16 20:30	18:09 18:04	16:15 16:14	08:43 16:10	
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	20:15 (5) 20:21 (5)	20:15 (5) 20:21 (5)	04:57 21:40	05:32 21:32	20:22 (5) 20:28 (5)	19:13 20:28	18:04 18:02	16:14 16:13	08:44 16:11	
29	08:18 17:00		07:08 19:54	05:56 20:52	20:13 (5) 20:22 (5)	20:13 (5) 20:22 (5)	04:58 21:41	05:34 21:30	20:21 (5) 20:30 (5)	19:11 20:25	18:02 18:00	16:13 16:12	08:44 16:11	
30	08:17 17:02		07:06 19:56	05:54 20:53	20:12 (5) 20:24 (5)	20:12 (5) 20:24 (5)	04:58 21:43	05:35 21:30	20:20 (5) 20:40 (5)	19:09 20:23	17:00 17:00	16:12 16:12	08:44 16:12	
31	08:15 17:04		07:04 19:58		05:04 21:44	20:11 (5) 20:20 (5)	05:04 21:26	05:37 21:26	20:20 (5) 20:41 (5)	19:06 20:21	16:58 16:56	16:11 16:11	08:44 16:13	
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233	
Total, worst case					365			108		287				
Sun reduction				0.35	0.38			0.32		0.34				
Oper. time red.				1.00	1.00			1.00		1.00				
Wind dir. red.				0.64	0.64			0.64		0.64				
Total reduction				0.23	0.25			0.21		0.22				
Total, real				6	90		23	63						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AE - H31

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		09:19 (2)	08:14		09:34 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24			06:33	07:26	07:24			08:19	09:03 (2)	
	16:15	64	14:40 (1)	17:06	20	09:54 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54			20:18	19:05	16:54			16:10	63	14:24 (1)
2	08:44		09:20 (2)	08:12		09:36 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26			06:35	07:28	07:26			08:21		09:04 (2)
	16:16	64	14:41 (1)	17:08	16	09:52 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52			20:16	19:02	16:52			16:09	63	14:25 (1)
3	08:44		09:19 (2)	08:10		09:40 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			06:36	07:30	07:28			08:22		09:04 (2)
	16:17	65	14:41 (1)	17:10	8	09:48 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50			20:14	19:00	16:50			16:08	63	14:25 (1)
4	08:43		09:20 (2)	08:09			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30			06:38	07:32	07:30			08:24		09:05 (2)
	16:18	65	14:41 (1)	17:12			18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48			20:11	18:57	16:48			16:08	64	14:26 (1)
5	08:43		09:20 (2)	08:07			07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32			06:40	07:33	07:32			08:25		09:05 (2)
	16:20	64	14:41 (1)	17:14			18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46			20:09	18:55	16:46			16:07	64	14:27 (1)
6	08:43		09:20 (2)	08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34			06:42	07:35	07:34			08:27		09:06 (2)
	16:21	65	14:42 (1)	17:16			18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44			20:06	18:52	16:44			16:07	65	14:28 (1)
7	08:42		09:20 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36			06:43	07:37	07:36			08:28		09:07 (2)
	16:22	65	14:42 (1)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43			20:04	18:50	16:43			16:06	64	14:28 (1)
8	08:42		09:20 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38			06:45	07:39	07:38		09:10 (2)	08:29		09:08 (2)
	16:24	64	14:41 (1)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	10		09:20 (2)	08:29	16:06	64	14:29 (1)			09:08 (2)
9	08:41		09:21 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			06:47	07:41	07:40		09:07 (2)	08:30		09:08 (2)
	16:25	63	14:42 (1)	17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16		09:23 (2)	08:32	16:05	65	14:30 (1)			09:09 (2)
10	08:40		09:21 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42			06:49	07:43	07:42		09:05 (2)	08:32		09:09 (2)
	16:27	64	14:42 (1)	17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	20		09:25 (2)	08:32	16:05	64	14:30 (1)			09:09 (2)
11	08:40		09:21 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44			06:51	07:44	07:44		09:04 (2)	08:33		09:09 (2)
	16:28	63	14:42 (1)	17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	23		09:27 (2)	08:32	16:05	64	14:30 (1)			09:09 (2)
12	08:39		09:21 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46			06:52	07:46	07:46		09:02 (2)	08:34		09:10 (2)
	16:30	62	14:41 (1)	17:28			18:23	20:20	21:15	21:56	21:53	21:04	19:52	18:38	16:34	26		09:28 (2)	08:32	16:05	63	14:31 (1)			09:11 (2)
13	08:38		09:21 (2)	07:51			06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48			06:54	07:48	07:48		09:01 (2)	08:35		09:11 (2)
	16:31	60	14:41 (1)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	28		09:29 (2)	08:32	16:05	63	14:32 (1)			09:12 (2)
14	08:37		09:22 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49			06:56	07:50	07:49		09:01 (2)	08:36		09:12 (2)
	16:33	58	14:40 (1)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	29		09:30 (2)	08:32	16:05	64	14:33 (1)			09:13 (2)
15	08:36		09:22 (2)	07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51			06:58	07:52	07:51		09:00 (2)	08:37		09:13 (2)
	16:34	57	14:40 (1)	17:34			18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	31		09:31 (2)	08:32	16:05	62	14:33 (1)			09:13 (2)
16	08:36		09:23 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53			06:59	07:54	07:53		09:00 (2)	08:38		09:13 (2)
	16:36	53	14:39 (1)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	32		09:32 (2)	08:32	16:05	62	14:33 (1)			09:13 (2)
17	08:34		09:22 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55			07:01	07:56	07:55		08:59 (2)	08:39		09:14 (2)
	16:38	51	14:37 (1)	17:38			18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	33		09:32 (2)	08:32	16:05	62	14:34 (1)			09:14 (2)
18	08:33		09:23 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57			07:03	07:57	07:57		08:59 (2)	08:39		09:15 (2)
	16:40	45	14:35 (1)	17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	34		09:33 (2)	08:32	16:05	62	14:35 (1)			09:15 (2)
19	08:32		09:23 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59			07:05	07:59	07:59		08:59 (2)	08:40		09:16 (2)
	16:41	36	09:59 (2)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	34		09:33 (2)	08:32	16:05	61	14:35 (1)			09:16 (2)
20	08:31		09:23 (2)	07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01			07:06	08:01	08:01		08:59 (2)	08:41		09:16 (2)
	16:43	36	09:59 (2)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	35		09:34 (2)	08:32	16:06	61	14:35 (1)			09:17 (2)
21	08:30		09:24 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02			07:08	08:03	08:02		08:59 (2)	08:41		09:17 (2)
	16:45	35	09:59 (2)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	35		09:34 (2)	08:32	16:06	61	14:36 (1)			09:17 (2)
22	08:29		09:24 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04			07:10	08:05	08:04		08:59 (2)	08:42		09:17 (2)
	16:47	35	09:59 (2)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	36		09:35 (2)	08:32	16:06	61	14:36 (1)			09:18 (2)
23	08:27		09:25 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06			07:12	08:07	08:06		08:59 (2)	08:42		09:18 (2)
	16:49	34	09:59 (2)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	36		09:35 (2)	08:32	16:07	61	14:37 (1)			09:18 (2)
24	08:26		09:25 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08			07:14	08:09	08:08		09:00 (2)	08:43		09:18 (2)
	16:51	34	09:59 (2)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	45		09:36 (2)	08:32	16:08	61	14:37 (1)			09:19 (2)
25	08:25		09:26 (2)	07:25			06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11	08:09			07:15	08:11	08:09		09:00 (2)	08:43		09:18 (2)
	16:52	33	09:59 (2)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	51		09:37 (2)	08:32	16:08	61	14:37 (1)			09:19 (2)
26	08:23		09:27 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11			07:17	08:13	08:11		09:01 (2)	08:44		09:19 (2)
	16:54	32	09:59 (2)	17:55			18:49	20:46	21:37	22:01	21:35	20:32													

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AF - H32

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		09:10 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19		08:54 (2)					
	16:15		17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54					16:10		7	09:01 (2)		
2	08:44		08:12		09:14 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26		08:21		08:56 (2)					
	16:16		17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52					16:09		5	09:01 (2)		
3	08:44		08:10		09:17 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22		08:57 (2)					
	16:17		17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50					16:08		2	08:59 (2)		
4	08:43		08:09		09:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30					16:08					
	16:18		17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48					16:08					
5	08:43		08:07		09:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32					16:08					
	16:20		17:14		18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46					16:07					
6	08:43		08:05		09:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34					16:07					
	16:21		17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44					16:07					
7	08:42		08:03		09:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36					16:07					
	16:22		17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43					16:06					
8	08:42		08:01		09:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38					16:06					
	16:24		17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41					16:06					
9	08:41		09:14 (2)		07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				08:44 (2)					
	16:25	2	09:16 (2)		17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	5			08:49 (2)					
10	08:41		09:13 (2)		07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42				08:41 (2)					
	16:27	4	09:17 (2)		17:24	18:19	20:17	21:12	21:55	21:58	21:08	19:57	18:43	16:37	11			08:52 (2)					
11	08:40		09:12 (2)		07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44				08:39 (2)					
	16:28	6	09:18 (2)		17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	15			08:54 (2)					
12	08:39		09:11 (2)		07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46				08:38 (2)					
	16:30	8	09:19 (2)		17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	18			08:56 (2)					
13	08:38		09:10 (2)		07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48				08:37 (2)					
	16:31	10	09:20 (2)		17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	20			08:57 (2)					
14	08:37		09:09 (2)		07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				08:36 (2)					
	16:33	12	09:21 (2)		17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	22			08:58 (2)					
15	08:37		09:08 (2)		07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51				08:36 (2)					
	16:34	14	09:22 (2)		17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	22			08:58 (2)					
16	08:36		09:07 (2)		07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53				08:36 (2)					
	16:36	16	09:23 (2)		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	23			08:59 (2)					
17	08:35		09:05 (2)		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55				08:35 (2)					
	16:38	18	09:23 (2)		17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	24			08:59 (2)					
18	08:33		09:04 (2)		07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				08:35 (2)					
	16:40	20	09:24 (2)		17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	25			09:00 (2)					
19	08:32		09:03 (2)		07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				08:35 (2)					
	16:41	22	09:25 (2)		17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	25			09:00 (2)					
20	08:31		09:01 (2)		07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01				08:36 (2)					
	16:43	24	09:25 (2)		17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	24			09:00 (2)					
21	08:30		09:01 (2)		07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				08:36 (2)					
	16:45	25	09:26 (2)		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	25			09:01 (2)					
22	08:29		09:02 (2)		07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04				08:37 (2)					
	16:47	24	09:26 (2)		17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	24			09:01 (2)					
23	08:27		09:01 (2)		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				08:39 (2)					
	16:49	25	09:26 (2)		17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	22			09:01 (2)					
24	08:26		09:01 (2)		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08				08:41 (2)					
	16:51	25	09:26 (2)		17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	20			09:01 (2)					
25	08:25		09:02 (2)		07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:09				08:43 (2)					
	16:52	24	09:26 (2)		17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	18			09:01 (2)					
26	08:23		09:03 (2)		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11				08:45 (2)					
	16:54	23	09:26 (2)		17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	16			09:01 (2)					
27	08:22		09:04 (2)		07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13				08:47 (2)					
	16:56	22	09:26 (2)		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:14	14			09:01 (2)					
28	08:20		09:05 (2)		07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:15				08:49 (2)					
	16:58	21	09:26 (2)		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	12			09:01 (2)					
29	08:19		09:05 (2)			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16				08:50 (2)					
	17:00	20	09:25 (2)			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	10			09:00 (2)					
30	08:17		09:06 (2)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18				08:52 (2)					
	17:02	18	09:24 (2)			19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	9			09:01 (2)					
31	08:15		09:08 (2)			07:04		05:04		05:37	06:31		07:22					08:44					

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AG - H33

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	11:18 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	
	16:15	25	11:43 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05
2	08:44	11:19 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	
	16:16	24	11:43 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
3	08:44	11:20 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	
	16:17	22	11:42 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
4	08:43	11:22 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	
	16:18	20	11:42 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
5	08:43	11:23 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	
	16:20	18	11:41 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55
6	08:43	11:25 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	
	16:21	15	11:40 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53
7	08:42	11:27 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	
	16:22	11	11:38 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
8	08:42	11:31 (1)	08:01		06:44	05:38	04:57	05:05	05:51	06:45	07:39	
	16:24	3	11:34 (1)	17:20	08:28 (2)	07:00	06:44	05:38	04:57	05:52	06:47	07:41
9	08:41		07:59	08:31 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48
	16:25		17:22	08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
10	08:41		07:57	08:32 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45
	16:27		17:24	08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43
11	08:40		07:55	08:33 (2)	18:19	20:17	21:12	21:55	21:58	21:08	19:57	18:43
	16:28		17:26	08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
12	08:39		07:53	08:34 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41
	16:30		17:28	08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46
13	08:38		07:51	08:34 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38
	16:31		17:30	08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48
14	08:37		07:49	08:35 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36
	16:33		17:32	08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
15	08:36		07:47	08:34 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34
	16:35		17:34	08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52
16	08:36		07:45	08:34 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31
	16:36		17:36	08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54
17	08:35		07:43	08:34 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29
	16:38		17:38	08:11 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56
18	08:33		07:41	08:34 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27
	16:40		17:40	08:12 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57
19	08:32		07:39	08:34 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24
	16:41		17:42	08:12 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
20	08:31		07:37	08:32 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22
	16:43		17:44	08:13 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
21	08:30		07:34	08:31 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20
	16:45		17:46	08:15 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03
22	08:29		07:32	08:30 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18
	16:47		17:48	08:16 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05
23	08:27		07:30	08:26 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15
	16:49		17:50		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07
24	08:26		07:28		18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13
	16:51		17:52		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09
25	08:25		07:25		18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11
	16:52		17:54		06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11
26	08:23		07:23		18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09
	16:54		17:56		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13
27	08:22		07:21		18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07
	16:56		17:58		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15
28	08:20		07:19		18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04
	16:58		18:00		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17
29	08:19				18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02
	17:00				07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19
30	08:17				19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00
	17:02				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20
31	08:15				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58
	17:04				07:04		05:04		05:37	06:31		07:22
Potential sun hours	250				19:58		21:44		21:27	20:21		16:56
Total, worst case	138											11
Sun reduction	0.24											222
Oper. time red.	1.00											41
Wind dir. red.	0.60											0.29
Total reduction	0.15											1.00
Total, real	20											0.63
												0.18
												0.17
												3
												15
												259
												886
												0.21
												1.00
												0.60
												0.12
												110

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AH - H34

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:13 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:04 20:55	06:59 19:42	07:53 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:27 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:12 17:06	08:11 16:14	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:00	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AI - H35

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	08:01 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	07:14	07:40 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04	08:01 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	07:12	07:39 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06	08:01 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
4	08:43	08:09	07:09	07:39 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08	08:01 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	08:07	07:07	07:39 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
	16:20	17:14	18:10	08:00 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05	07:05	07:39 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12	20	07:59 (1)	20:10	21:05	21:51	21:58	21:16	20:06	16:07
7	08:42	08:03	07:02	07:41 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13	18	07:59 (1)	20:11	21:06	21:52	21:57	21:14	20:04	16:06
8	08:42	08:01	07:00	07:41 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15	16	07:57 (1)	20:13	21:08	21:53	21:56	21:12	20:02	16:06
9	08:41	07:59	06:58	07:43 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
	16:25	17:22	18:17	12	07:55 (1)	20:15	21:10	21:54	21:56	21:10	19:59	16:06
10	08:41	07:57	06:55	07:46 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24	18:19	4	07:50 (1)	20:17	21:12	21:55	21:58	21:08	19:57	16:05
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:35	08:33
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	22	16:05
12	08:39	07:53	06:50	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:35	08:34
	16:30	17:28	18:23	20:21	21:15	21:53	21:04	19:52	18:38	21	16:05	16:05
13	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35	08:35
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	19	16:05
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36	08:36
	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16	16:05
15	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37	08:37
	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	13	16:05
16	08:36	07:45	06:41	06:25	05:24	04:55	05:14	06:05	06:59	07:54	08:38	08:38
	16:36	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	9	16:05
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39	08:39
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	5	16:05
18	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39	08:39
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40	08:40
	16:42	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41	08:41
	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:42	08:41
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:43	08:42
	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:43	08:43
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43	08:43
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:43	08:43
	16:53	17:54	6	07:57 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20	16:09
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:44	08:44
	16:54	17:56	11	07:59 (1)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	16:09
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:44	08:44
	16:56	17:58	14	08:00 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	16:10
28	08:20	07:19	06:11	06:01	05:07	04:57	05:32	06:26	07:21	08:17	08:44	08:44
	16:58	18:00	17	08:00 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	16:11
29	08:19		07:09	07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:16	08:44
	17:00		17:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:19	08:44	08:44
	17:02		19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	16:13
31	08:16		07:04	07:04	05:04	05:04	05:37	06:31	07:22	08:17	08:44	08:44
	17:04		19:58	21:44	21:44	21:27	20:21	16:56				16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		48	176							230		
Sun reduction		0.23	0.27							1.00		
Oper. time red.		1.00	1.00							0.65		
Wind dir. red.		0.65	0.65							0.19		
Total reduction		0.15	0.18							0.44		
Total, real		7	31									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AJ - H36

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:07 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AK - H37

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
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13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
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22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AL - H38

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AM - H39

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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Sun reduction												
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AN - H40

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AO - H41

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AP - H42

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AQ - H43

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AR - H44

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations**Shadow receptor:** AS - H45

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	07:01	07:25 (5)	05:52					05:03		
2	08:44	16:16	08:12	17:08	18:04	07:12	18:04	20:00	07:33 (5)	20:55	8				21:45		
3	08:44	16:17	08:10	17:10	18:06	07:08	18:06	06:59	07:23 (5)	20:50					05:02		
4	08:43	16:18	08:09	17:12	18:08	07:05	18:08	20:02	07:34 (5)	20:57	11				21:47		
5	08:43	16:20	08:07	17:14	18:10	07:02	18:10	06:56	07:20 (5)	20:58					05:01		
6	08:43	16:21	08:05	17:16	18:11	07:00	18:11	20:04	07:34 (5)	20:59	14				21:48		
7	08:42	16:22	08:03	17:18	18:13	06:59	18:13	06:54	07:18 (5)	20:56					05:00		
8	08:42	16:24	08:01	17:20	18:15	06:57	18:15	20:06	07:35 (5)	21:01	17				21:49		
9	08:41	16:25	07:59	17:22	18:17	06:55	18:17	06:52	07:15 (5)	20:54					04:59		
10	08:40	16:27	07:57	17:24	18:19	06:53	18:19	20:08	07:34 (5)	21:03	19				21:50		
11	08:40	16:28	07:55	17:26	18:21	06:50	18:21	06:49	07:13 (5)	21:04					04:59		
12	08:39	16:30	07:53	17:28	18:23	06:48	18:23	20:09	07:35 (5)	21:04	22				21:51		
13	08:38	16:31	07:51	17:30	18:25	06:46	18:25	06:47	07:11 (5)	21:06					04:58		
14	08:37	16:33	07:49	17:32	18:27	06:44	18:27	20:11	07:35 (5)	21:06	24				21:52		
15	08:36	16:35	07:47	17:34	18:29	06:43	18:29	06:44	07:08 (5)	21:08					04:57		
16	08:35	16:36	07:45	17:36	18:30	06:41	18:30	20:13	07:34 (5)	21:08	26				21:53		
17	08:34	16:38	07:43	17:38	18:32	06:39	18:32	06:42	07:06 (5)	21:10					04:57		
18	08:33	16:40	07:41	17:40	18:34	06:37	18:34	20:15	07:34 (5)	21:10	28				21:54		
19	08:32	16:42	07:39	17:42	18:36	06:35	18:36	06:40	07:04 (5)	21:12					04:56		
20	08:31	16:43	07:37	17:44	18:38	06:33	18:38	20:17	07:32 (5)	21:12	28				21:55		
21	08:30	16:45	07:34	17:46	18:40	06:31	18:40	06:37	07:05 (5)	21:13					04:56		
22	08:29	16:47	07:32	17:48	18:42	06:29	18:42	20:19	07:32 (5)	21:13	27				21:55		
23	08:27	16:49	07:30	17:50	18:44	06:28	18:44	06:35	07:06 (5)	21:15					04:56		
24	08:26	16:51	07:28	17:52	18:45	06:26	18:45	20:20	07:31 (5)	21:15	25				21:56		
25	08:25	16:53	07:25	17:54	18:47	06:24	18:47	06:32	07:07 (5)	21:17					04:55		
26	08:23	16:54	07:23	17:56	18:49	06:23	18:49	20:22	07:30 (5)	21:17	23				21:57		
27	08:22	16:56	07:21	17:58	18:51	06:21	18:51	06:30	07:07 (5)	21:17					04:55		
28	08:20	16:58	07:19	18:00	18:53	06:20	18:53	20:24	07:27 (5)	21:18					04:55		
29	08:19	17:00	07:17	18:02	18:55	06:19	18:55	20:26	07:09 (5)	21:20	20				21:58		
30	08:17	17:02	07:15	18:04	18:57	06:18	18:57	06:28	07:25 (5)	21:20	16				04:55		
31	08:15	17:04	07:13	18:06	19:00	06:17	19:00	06:25	07:11 (5)	21:22	12				04:55		
Potential sun hours	250		273		367		420		07:23 (5)	21:22					21:59		
Total, worst case					6		320		05:22						04:54		
Sun reduction					0.27		0.35		21:23						21:59		
Oper. time red.					1.00		1.00		05:21						04:54		
Wind dir. red.					0.67		0.67		21:25						22:00		
Total reduction					0.18		0.24		05:19						04:54		
Total, real					1		76		21:27						22:00		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AS - H45

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	06:09 (4)	06:33	07:04 (5)	07:26	07:24	08:19			
	22:00	21:25	11 06:20 (4)	20:18	27 07:31 (5)	19:05	16:54	16:10			
2	05:00	05:40	06:11 (4)	06:35	07:03 (5)	07:28	07:26	08:21			
	22:00	21:23	10 06:21 (4)	20:16	28 07:31 (5)	19:02	16:52	16:09			
3	05:00	05:42	06:12 (4)	06:37	07:04 (5)	07:30	07:28	08:22			
	21:59	21:21	9 06:21 (4)	20:14	28 07:32 (5)	19:00	16:50	16:09			
4	05:01	05:44	06:14 (4)	06:38	07:05 (5)	07:32	07:30	08:24			
	21:59	21:19	7 06:21 (4)	20:11	26 07:31 (5)	18:57	16:48	16:08			
5	05:02	05:46	06:16 (4)	06:40	07:07 (5)	07:33	07:32	08:25			
	21:58	21:17	6 06:22 (4)	20:09	24 07:31 (5)	18:55	16:46	16:07			
6	05:03	05:47	06:17 (4)	06:42	07:09 (5)	07:35	07:34	08:26			
	21:58	21:16	5 06:22 (4)	20:06	22 07:31 (5)	18:53	16:45	16:07			
7	05:04	05:49	06:19 (4)	06:44	07:10 (5)	07:37	07:36	08:28			
	21:57	21:14	3 06:22 (4)	20:04	20 07:30 (5)	18:50	16:43	16:06			
8	05:05	05:51	06:20 (4)	06:45	07:12 (5)	07:39	07:38	08:29			
	21:56	21:12	1 06:21 (4)	20:01	17 07:29 (5)	18:48	16:41	16:06			
9	05:06	05:52		06:47	07:14 (5)	07:41	07:40	08:30			
	21:55	21:10		19:59	15 07:29 (5)	18:45	16:39	16:06			
10	05:07	05:54		06:49	07:16 (5)	07:43	07:42	08:32			
	21:55	21:08		19:57	12 07:28 (5)	18:43	16:37	16:05			
11	05:08	05:56		06:51	07:17 (5)	07:44	07:44	08:33			
	21:54	21:06		19:54	9 07:26 (5)	18:41	16:36	16:05			
12	05:09	05:58		06:52	07:19 (5)	07:46	07:46	08:34			
	21:53	21:03		19:52	5 07:24 (5)	18:38	16:34	16:05			
13	05:11	05:59		06:54	07:21 (5)	07:48	07:47	08:35			
	21:52	21:01		19:49	2 07:23 (5)	18:36	16:32	16:05			
14	05:12	06:01		06:56		07:50	07:49	08:36			
	21:51	20:59		19:47		18:34	16:31	16:05			
15	05:13	06:03		06:58		07:52	07:51	08:37			
	21:50	20:57		19:44		18:31	16:29	16:05			
16	05:15	06:05		06:59		07:54	07:53	08:38			
	21:49	20:55		19:42		18:29	16:28	16:05			
17	05:16	06:06		07:01		07:56	07:55	08:39			
	21:47	20:53		19:39		18:27	16:26	16:05			
18	05:17	06:08		07:03		07:57	07:57	08:39			
	21:46	20:51		19:37		18:24	16:25	16:05			
19	05:19	06:10		07:05		07:59	07:59	08:40			
	21:45	20:48		19:34		18:22	16:23	16:05			
20	05:20	06:12		07:06		08:01	08:01	08:41			
	21:44	20:46		19:32		18:20	16:22	16:06			
21	05:21	06:13		07:08		08:03	08:02	08:41			
	21:42	20:44		19:29		18:18	16:21	16:06			
22	05:23	06:15		07:10		08:05	08:04	08:42			
	21:41	20:42		19:27		18:15	16:19	16:07			
23	05:24	06:17		07:12		08:07	08:06	08:42			
	21:39	20:39		19:24		18:13	16:18	16:07			
24	05:26	06:19		07:14		08:09	08:08	08:43			
	21:38	20:37		19:22		18:11	16:17	16:08			
25	05:27	06:21		07:15		07:11	08:09	08:43			
	21:36	20:35		19:19		17:09	16:16	16:08			
26	05:29	06:22		07:17		07:13	08:11	08:43			
	21:35	20:32		19:17		17:07	16:15	16:09			
27	05:31	06:24	07:13 (5)	07:19		07:15	08:13	08:44			
	21:33	20:30	12 07:25 (5)	19:15		17:05	16:14	16:10			
28	05:32	06:26	07:11 (5)	07:21		07:17	08:14	08:44			
	21:32	5 06:14 (4)	20:28	19:12		17:02	16:13	16:11			
29	05:34	06:07 (4)	06:28	07:08 (5)	07:23		07:18	08:16	08:44		
	21:30	10 06:17 (4)	20:25	07:28 (5)	19:10		17:00	16:12	16:12		
30	05:35	06:06 (4)	06:29	07:07 (5)	07:24		07:20	08:18	08:44		
	21:28	12 06:18 (4)	20:23	07:30 (5)	19:07		16:58	16:11	16:13		
31	05:37	06:08 (4)	06:31	07:06 (5)			07:22		08:44		
	21:27	11 06:19 (4)	20:21	07:31 (5)			16:56		16:14		
Potential sun hours	512		460		382		328		259		233
Total, worst case		38		148		235					
Sun reduction		0.32		0.34		0.32					
Oper. time red.		1.00		1.00		1.00					
Wind dir. red.		0.67		0.67		0.67					
Total reduction		0.22		0.23		0.22					
Total, real		8		34		51					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AT - H46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	05:52	06:18 (4)
	16:15	17:06	18:02	20:00	20:55	13 06:31 (4)
2	08:44	08:12	07:14	06:59	05:50	06:16 (4)
	16:16	17:08	18:04	20:02	20:57	14 06:30 (4)
3	08:44	08:10	07:12	06:56	05:48	06:14 (4)
	16:17	17:10	18:06	20:04	20:59	15 06:29 (4)
4	08:43	08:09	07:09	06:54	05:46	06:12 (4)
	16:18	17:12	18:08	20:06	21:01	16 06:28 (4)
5	08:43	08:07	07:07	06:52	05:44	06:10 (4)
	16:20	17:14	18:10	20:08	21:03	17 06:27 (4)
6	08:43	08:05	07:05	06:49	05:42	06:10 (4)
	16:21	17:16	18:11	20:09	21:04	17 06:27 (4)
7	08:42	08:03	07:02	06:47	05:40	06:12 (4)
	16:22	17:18	18:13	20:11	21:06	13 06:25 (4)
8	08:42	08:01	07:00	06:44	05:38	06:13 (4)
	16:24	17:20	18:15	20:13	21:08	9 06:22 (4)
9	08:41	07:59	06:57	06:42	05:36	04:57
	16:25	17:22	18:17	20:15	21:10	21:54
10	08:40	07:57	06:55	07:19 (5)	06:40	04:56
	16:27	17:24	18:19	2 07:21 (5)	20:17	21:55
11	08:40	07:55	06:53	07:17 (5)	06:37	04:56
	16:28	17:26	18:21	6 07:23 (5)	20:19	21:55
12	08:39	07:53	06:50	07:14 (5)	06:35	04:56
	16:30	17:28	18:23	10 07:24 (5)	20:20	21:56
13	08:38	07:51	06:48	07:12 (5)	06:32	04:55
	16:31	17:30	18:25	14 07:26 (5)	20:22	21:57
14	08:37	07:49	06:45	07:09 (5)	06:30	04:55
	16:33	17:32	18:27	17 07:26 (5)	20:24	21:58
15	08:36	07:47	06:43	07:07 (5)	06:28	04:55
	16:35	17:34	18:29	20 07:27 (5)	20:26	21:58
16	08:35	07:45	06:40	07:04 (5)	06:25	04:55
	16:36	17:36	18:30	23 07:27 (5)	20:28	21:59
17	08:34	07:43	06:38	07:02 (5)	06:23	04:54
	16:38	17:38	18:32	26 07:28 (5)	20:30	21:59
18	08:33	07:41	06:36	06:59 (5)	06:21	04:54
	16:40	17:40	18:34	28 07:27 (5)	20:32	22:00
19	08:32	07:39	06:33	06:57 (5)	06:18	04:54
	16:41	17:42	18:36	30 07:27 (5)	20:33	22:00
20	08:31	07:37	06:31	06:54 (5)	06:16	04:54
	16:43	17:44	18:38	33 07:27 (5)	20:35	22:00
21	08:30	07:34	06:28	06:52 (5)	06:14	04:55
	16:45	17:46	18:40	35 07:27 (5)	20:37	22:01
22	08:29	07:32	06:26	06:50 (5)	06:12	04:55
	16:47	17:48	18:42	36 07:26 (5)	20:39	22:01
23	08:27	07:30	06:23	06:50 (5)	06:09	04:55
	16:49	17:50	18:43	35 07:25 (5)	20:41	22:01
24	08:26	07:28	06:21	06:51 (5)	06:07	04:55
	16:51	17:52	18:45	34 07:25 (5)	20:43	22:01
25	08:25	07:25	06:18	06:51 (5)	06:05	04:56
	16:53	17:54	18:47	32 07:23 (5)	20:44	22:01
26	08:23	07:23	06:16	06:52 (5)	06:03	04:56
	16:54	17:56	18:49	31 07:23 (5)	20:46	22:01
27	08:22	07:21	06:14	06:52 (5)	06:01	04:57
	16:56	17:58	18:51	29 07:21 (5)	20:48	22:01
28	08:20	07:19	06:11	06:54 (5)	05:59	04:57
	16:58	18:00	18:53	25 07:19 (5)	20:50	22:01
29	08:19		07:09	07:55 (5)	05:56	04:58
	17:00		19:55	22 08:17 (5)	20:52	22:01
30	08:17		07:06	07:57 (5)	05:54	04:58
	17:02		19:56	17 08:14 (5)	20:54	22:00
31	08:15		07:04	08:00 (5)		05:04
	17:04		19:58	10 08:10 (5)		21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case			515		38	114
Sun reduction			0.27		0.35	0.38
Oper. time red.			1.00		1.00	1.00
Wind dir. red.			0.66		0.68	0.68
Total reduction			0.18		0.24	0.26
Total, real			93		9	29

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AT - H46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (5) 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (5) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:56 (5) 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:26 (4) 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:46 21:17	06:23 (4) 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:20 (4) 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57	05:49 21:14	06:19 (4) 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:20 (4) 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:22 (4) 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55	05:54 21:08	06:24 (4) 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:25 (4) 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	05:09 21:53	05:58 21:03	06:27 (4) 19:52	07:46 08:01 (5)	07:46 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	06:28 (4) 19:49	07:48 08:05 (5)	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:30 (4) 19:47	07:45 (5) 08:07 (5)	07:50 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	06:32 (4) 19:44	07:52 08:08 (5)	07:51 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	06:33 (4) 19:42	07:54 08:10 (5)	07:53 16:28	08:38 16:05
17	05:16 21:47	06:06 20:53	06:35 (4) 19:39	07:56 08:11 (5)	07:55 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 08:11 (5)	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 08:11 (5)	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 08:12 (5)	08:01 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 08:12 (5)	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 08:11 (5)	08:04 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 08:11 (5)	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 08:11 (5)	08:08 16:17	08:43 16:08
25	05:27 21:36	06:21 20:35	07:15 19:19	07:11 08:11 (5)	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 08:09 (5)	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 08:09 (5)	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 08:08 (5)	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:18 08:07 (5)	08:16 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 08:06 (5)	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case		157	496	24		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.68	0.66	0.66		
Total reduction		0.23	0.21	0.19		
Total, real		36	106	5		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AU - H47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01	07:25 (5)	05:52				05:03	05:34 (3)	
	16:15	17:06	18:02						20:00	12	07:37 (5)	20:55			21:45	17	05:51 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	20:50			05:02		05:33 (3)
	16:16	17:08	18:04						20:02	14	07:37 (5)	20:57			21:47	17	05:50 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	20:48			05:01		05:33 (3)
	16:17	17:10	18:06						20:04	15	07:35 (5)	20:59			21:48	16	05:49 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	20:46			05:00		05:34 (3)
	16:18	17:12	18:08						20:06	17	07:35 (5)	21:01			21:49	15	05:49 (3)
5	08:43	08:07	07:07						06:52		07:15 (5)	20:44			04:59		05:35 (3)
	16:20	17:14	18:10						20:08	18	07:33 (5)	21:03			21:50	14	05:49 (3)
6	08:43	08:05	07:05						06:49		07:17 (5)	20:42			04:59		05:35 (3)
	16:21	17:16	18:11						20:09	15	07:32 (5)	21:04			21:51	13	05:48 (3)
7	08:42	08:03	07:02						06:47		07:19 (5)	20:40			04:58		05:37 (3)
	16:22	17:18	18:13						20:11	11	07:30 (5)	21:06			21:52	11	05:48 (3)
8	08:42	08:01	07:00						06:44		07:21 (5)	20:38			04:57		05:37 (3)
	16:24	17:20	18:15						20:13	4	07:25 (5)	21:08			21:53	10	05:47 (3)
9	08:41	07:59	06:57						06:42			20:36			04:57		05:39 (3)
	16:25	17:22	18:17						20:15			21:10			21:54	8	05:47 (3)
10	08:40	07:57	06:55						06:40			20:35			04:56		05:39 (3)
	16:27	17:24	18:19						20:17			21:12			21:55	6	05:45 (3)
11	08:40	07:55	06:53						06:37			20:33			04:56		05:42 (3)
	16:28	17:26	18:21						20:19			21:13			21:56	2	05:44 (3)
12	08:39	07:53	06:50						06:35			20:31			04:56		
	16:30	17:28	18:23						20:21			21:15			21:56		
13	08:38	07:51	06:48						06:32			20:29			04:55		
	16:31	17:30	18:25						20:22			21:17			21:57		
14	08:37	07:49	06:45						06:30			20:27			04:55		
	16:33	17:32	18:27						20:24			21:18			21:58		
15	08:36	07:47	06:43						06:28			20:26			04:55		
	16:35	17:34	18:29						20:26			21:20			21:58		
16	08:35	07:45	06:41						06:25			20:24			04:55		
	16:36	17:36	18:30						20:28			21:22			21:59		
17	08:34	07:43	06:38						06:23			20:22			04:54		
	16:38	17:38	18:32						20:30			21:23			21:59		
18	08:33	07:41	06:36						06:21		05:49 (3)	20:21			04:54		
	16:40	17:40	18:34						20:32		1	05:50 (3)			22:00		
19	08:32	07:39	06:33						06:19		05:19	05:48 (3)			04:54		
	16:42	17:42	18:36						20:33		3	05:51 (3)			22:00		
20	08:31	07:37	06:31						06:16		05:18	05:46 (3)			04:55		
	16:43	17:44	18:38						20:35		5	05:51 (3)			22:00		
21	08:30	07:34	06:28						06:14		05:16	05:45 (3)			04:55		
	16:45	17:46	18:40						20:37		6	05:51 (3)			22:01		
22	08:29	07:32	06:26						06:12		05:15	05:44 (3)			04:55		
	16:47	17:48	18:42						20:39		8	05:52 (3)			22:01		
23	08:27	07:30	06:23						06:09		05:13	05:43 (3)			04:55		
	16:49	17:50	18:44						20:41		9	05:52 (3)			22:01		
24	08:26	07:28	06:21						06:07		05:12	05:41 (3)			04:55		
	16:51	17:52	18:45						20:43		10	05:51 (3)			22:01		
25	08:25	07:25	06:18						06:05		05:11	05:40 (3)			04:56		
	16:53	17:54	18:47						20:44		11	05:51 (3)			22:01		
26	08:23	07:23	06:16						06:03		05:10	05:39 (3)			04:56		
	16:54	17:56	18:49						20:46		12	05:51 (3)			22:01		
27	08:22	07:21	06:14						06:01		05:08	05:38 (3)			04:57		
	16:56	17:58	18:51						20:48		13	05:51 (3)			22:01		
28	08:20	07:19	06:11					06:35 (5)	05:59		05:07	05:37 (3)			04:57		
	16:58	18:00	18:53	1	06:36 (5)	20:50			21:40	14	05:51 (3)	22:01					
29	08:19		07:09		07:32 (5)	05:56			05:06		05:36 (3)	04:58					
	17:00		19:55	4	07:36 (5)	20:52			21:41	15	05:51 (3)	22:01					
30	08:17		07:06		07:30 (5)	05:54			05:05		05:35 (3)	04:58					
	17:02		19:56	7	07:37 (5)	20:54			21:43	15	05:50 (3)	22:00					
31	08:15		07:04		07:27 (5)				05:04		05:34 (3)						
	17:04		19:58	10	07:37 (5)				21:44	16	05:50 (3)						
Potential sun hours	250	273	367		420				494		510						
Total, worst case			22		106				138		129						
Sun reduction			0.27		0.35				0.38		0.32						
Oper. time red.			1.00		1.00				1.00		1.00						
Wind dir. red.			0.68		0.68				0.65		0.65						
Total reduction			0.18		0.24				0.25		0.21						
Total, real			4		25				34		27						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AU - H47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00	05:45 (3) 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	05:00 21:59	05:43 (3) 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	05:01 21:59	05:43 (3) 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:42 (3) 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:42 (3) 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57	05:42 (3) 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56	05:41 (3) 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55	05:41 (3) 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55	05:40 (3) 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54	05:41 (3) 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	05:10 21:53	05:42 (3) 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52	05:43 (3) 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	05:44 (3) 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	05:13 21:50	05:45 (3) 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	05:15 21:49	05:47 (3) 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	05:16 21:47	05:48 (3) 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46	05:49 (3) 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	05:51 (3) 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	05:52 (3) 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	05:53 (3) 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	05:55 (3) 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39	05:56 (3) 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	05:57 (3) 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:36	05:59 (3) 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:00 (3) 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:01 (3) 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	270		130			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.65		0.68			
Total reduction	0.21		0.22			
Total, real	57		28			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AV - H48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01	07:25 (5)	05:52				05:03	05:41 (3)	
	16:15	17:06	18:02						20:00	12	07:37 (5)	20:55			21:45	9	05:50 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50			05:02		05:42 (3)
	16:16	17:08	18:04						20:02	14	07:37 (5)	20:57			21:47	7	05:49 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48			05:01		05:44 (3)
	16:17	17:10	18:06						20:04	15	07:35 (5)	20:59			21:48	3	05:47 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46			05:00		
	16:18	17:12	18:08						20:06	17	07:35 (5)	21:01			21:49		
5	08:43	08:07	07:07						06:52		07:17 (5)	05:44			04:59		
	16:20	17:14	18:10						20:08	15	07:32 (5)	21:03			21:50		
6	08:43	08:05	07:05						06:49		07:19 (5)	05:42			04:59		
	16:21	17:16	18:11						20:09	12	07:31 (5)	21:04			21:51		
7	08:42	08:03	07:02						06:47		07:22 (5)	05:40			04:58		
	16:22	17:18	18:13						20:11	5	07:27 (5)	21:06			21:52		
8	08:42	08:01	07:00						06:44			05:38			04:57		
	16:24	17:20	18:15						20:13			21:08			21:53		
9	08:41	07:59	06:57						06:42			05:36			04:57		
	16:25	17:22	18:17						20:15			21:10			21:54		
10	08:40	07:57	06:55						06:40			05:35			04:56		
	16:27	17:24	18:19						20:17			21:12			21:55		
11	08:40	07:55	06:53						06:37			05:33			04:56		
	16:28	17:26	18:21						20:19			21:13			21:56		
12	08:39	07:53	06:50						06:35			05:31			04:56		
	16:30	17:28	18:23						20:21			21:15			21:56		
13	08:38	07:51	06:48						06:32			05:29			04:55		
	16:31	17:30	18:25						20:22			21:17			21:57		
14	08:37	07:49	06:45						06:30			05:27			04:55		
	16:33	17:32	18:27						20:24			21:18			21:58		
15	08:36	07:47	06:43						06:28			05:26		05:54 (3)	04:55		
	16:35	17:34	18:29						20:26			21:20	1	05:55 (3)	21:58		
16	08:35	07:45	06:41						06:25			05:24		05:52 (3)	04:55		
	16:36	17:36	18:30						20:28			21:22	2	05:54 (3)	21:59		
17	08:34	07:43	06:38						06:23			05:22		05:51 (3)	04:54		
	16:38	17:38	18:32						20:30			21:23	4	05:55 (3)	21:59		
18	08:33	07:41	06:36						06:21			05:21		05:49 (3)	04:54		
	16:40	17:40	18:34						20:32			21:25	6	05:55 (3)	22:00		
19	08:32	07:39	06:33						06:19			05:19		05:48 (3)	04:54		
	16:42	17:42	18:36						20:33			21:27	7	05:55 (3)	22:00		
20	08:31	07:37	06:31						06:16			05:18		05:46 (3)	04:55		
	16:43	17:44	18:38						20:35			21:28	9	05:55 (3)	22:00		
21	08:30	07:34	06:28						06:14			05:16		05:45 (3)	04:55		
	16:45	17:46	18:40						20:37			21:30	10	05:55 (3)	22:01		
22	08:29	07:32	06:26						06:12			05:15		05:44 (3)	04:55		
	16:47	17:48	18:42						20:39			21:31	11	05:55 (3)	22:01		
23	08:27	07:30	06:23						06:09			05:13		05:43 (3)	04:55		
	16:49	17:50	18:44						20:41			21:33	12	05:55 (3)	22:01		
24	08:26	07:28	06:21						06:07			05:12		05:41 (3)	04:55		
	16:51	17:52	18:45						20:43			21:34	13	05:54 (3)	22:01		
25	08:25	07:25	06:18						06:05			05:11		05:40 (3)	04:56		
	16:53	17:54	18:47						20:44			21:36	14	05:54 (3)	22:01		
26	08:23	07:23	06:16						06:03			05:10		05:39 (3)	04:56		
	16:54	17:56	18:49						20:46			21:37	15	05:54 (3)	22:01		
27	08:22	07:21	06:14						06:01			05:08		05:38 (3)	04:57		
	16:56	17:58	18:51						20:48			21:39	15	05:53 (3)	22:01		
28	08:20	07:19	06:11					06:35 (5)	05:59			05:07		05:37 (3)	04:57		
	16:58	18:00		2	06:37 (5)	20:50			21:40			05:06	16	05:53 (3)	22:01		
29	08:19		07:09		07:32 (5)	05:56						05:06		05:37 (3)	04:58		
	17:00		19:55	5	07:37 (5)	20:52						21:41	15	05:52 (3)	22:01		
30	08:17		07:06		07:30 (5)	05:54						05:05		05:38 (3)	04:58		
	17:02		19:56	7	07:37 (5)	20:54						21:43	13	05:51 (3)	22:00		
31	08:15		07:04		07:27 (5)							05:04		05:39 (3)			
	17:04		19:58	10	07:37 (5)							21:44	12	05:51 (3)			
Potential sun hours	250	273	367		420				494			510					
Total, worst case			24		90				175			19					
Sun reduction			0.27		0.35				0.38			0.32					
Oper. time red.			1.00		1.00				1.00			1.00					
Wind dir. red.			0.68		0.68				0.66			0.66					
Total reduction			0.18		0.24				0.25			0.21					
Total, real			4		21				44			4					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AV - H48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	06:33			07:26	07:24	08:19			
	22:00	21:25	20:18			19:05	16:54	16:10			
2	05:00	05:40	06:35			07:28	07:26	08:21			
	22:00	21:23	20:16			19:02	16:52	16:09			
3	05:01	05:42	06:37			07:30	07:28	08:22			
	21:59	21:21	20:14			19:00	16:50	16:09			
4	05:01	05:44	06:38			07:32	07:30	08:24			
	21:59	21:19	20:11			18:57	16:48	16:08			
5	05:02	05:46	06:40		07:19 (5)	07:33	07:32	08:25			
	21:58	21:17	20:09	4	07:23 (5)	18:55	16:46	16:07			
6	05:03	05:47	06:42		07:15 (5)	07:35	07:34	08:26			
	21:58	21:16	20:06	12	07:27 (5)	18:53	16:45	16:07			
7	05:04	05:49	06:44		07:12 (5)	07:37	07:36	08:28			
	21:57	21:14	20:04	15	07:27 (5)	18:50	16:43	16:06			
8	05:05	05:51	06:45		07:12 (5)	07:39	07:38	08:29			
	21:56	21:12	20:01	17	07:29 (5)	18:48	16:41	16:06			
9	05:06	05:52	06:47		07:14 (5)	07:41	07:40	08:30			
	21:55	21:10	19:59	15	07:29 (5)	18:45	16:39	16:06			
10	05:07	05:50 (3)	06:49		07:16 (5)	07:43	07:42	08:32			
	21:55	21:08	19:57	14	07:30 (5)	18:43	16:37	16:05			
11	05:08	05:49 (3)	06:51		07:17 (5)	07:44	07:44	08:33			
	21:54	21:06	19:54	12	07:29 (5)	18:41	16:36	16:05			
12	05:10	05:48 (3)	06:52		07:19 (5)	07:46	07:46	08:34			
	21:53	21:04	19:52	10	07:29 (5)	18:38	16:34	16:05			
13	05:11	05:47 (3)	06:54		07:21 (5)	07:48	07:47	08:35			
	21:52	21:01	19:49	8	07:29 (5)	18:36	16:32	16:05			
14	05:12	05:46 (3)	06:56		07:22 (5)	07:50	07:49	08:36			
	21:51	20:59	19:47	5	07:27 (5)	18:34	16:31	16:05			
15	05:13	05:45 (3)	06:58		07:24 (5)	07:52	07:51	08:37			
	21:50	20:57	19:44	3	07:27 (5)	18:31	16:29	16:05			
16	05:15	05:47 (3)	06:59			07:54	07:53	08:38			
	21:49	20:55	19:42			18:29	16:28	16:05			
17	05:16	05:48 (3)	07:01			07:56	07:55	08:39			
	21:47	20:53	19:39			18:27	16:26	16:05			
18	05:17	05:49 (3)	07:03			07:57	07:57	08:39			
	21:46	20:51	19:37			18:24	16:25	16:05			
19	05:19	05:51 (3)	07:05			07:59	07:59	08:40			
	21:45	20:48	19:34			18:22	16:23	16:05			
20	05:20	05:52 (3)	07:07			08:01	08:01	08:41			
	21:44	20:46	19:32			18:20	16:22	16:06			
21	05:21	05:53 (3)	07:08			08:03	08:02	08:41			
	21:42	20:44	19:29			18:18	16:21	16:06			
22	05:23	05:55 (3)	07:10			08:05	08:04	08:42			
	21:41	20:42	19:27			18:15	16:19	16:07			
23	05:24	05:56 (3)	07:12			08:07	08:06	08:42			
	21:39	20:39	19:24			18:13	16:18	16:07			
24	05:26	05:57 (3)	07:14			08:09	08:08	08:43			
	21:38	20:37	19:22			18:11	16:17	16:08			
25	05:28	05:59 (3)	07:15			07:11	08:09	08:43			
	21:37	20:35	19:19			17:09	16:16	16:08			
26	05:29	06:00 (3)	07:17			07:13	08:11	08:43			
	21:35	20:33	19:17			17:07	16:15	16:09			
27	05:31	06:02 (3)	07:19			07:15	08:13	08:44			
	21:33	20:30	19:15			17:05	16:14	16:10			
28	05:32	06:03 (3)	07:21			07:17	08:14	08:44			
	21:32	20:28	19:12			17:02	16:13	16:11			
29	05:34	06:28	07:23			07:19	08:16	08:44			
	21:30	20:25	19:10			17:00	16:12	16:12			
30	05:36	06:29	07:24			07:20	08:18	08:44			
	21:28	20:23	19:07			16:58	16:11	16:13			
31	05:37	06:31				07:22		08:44			
	21:27	20:21				16:56		16:14			
Potential sun hours	512	460	382			328	259	233			
Total, worst case	193		115								
Sun reduction	0.32		0.32								
Oper. time red.	1.00		1.00								
Wind dir. red.	0.66		0.68								
Total reduction	0.21		0.22								
Total, real	41		25								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AW - H49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	18:44 (4)	05:52
	16:15	17:06	18:02	20:00	36	19:29 (3)
2	08:44	08:12	07:14	06:59	18:47 (4)	05:50
	16:16	17:08	18:04	20:02	27	19:28 (3)
3	08:43	08:10	07:11	06:56	19:12 (3)	05:48
	16:17	17:10	18:06	20:04	14	19:26 (3)
4	08:43	08:08	07:09	06:54	19:14 (3)	05:46
	16:18	17:12	18:07	20:06	10	19:24 (3)
5	08:43	08:07	07:07	06:51		05:44
	16:19	17:14	18:09	20:07		21:03
6	08:42	08:05	07:04	06:49		05:42
	16:21	17:16	18:11	20:09		21:04
7	08:42	08:03	07:02	06:47		05:40
	16:22	17:18	18:13	20:11		21:06
8	08:42	08:01	16:49 (5)	07:00		05:38
	16:24	17:20	16:50 (5)	20:13		21:08
9	08:41	07:59	16:47 (5)	06:57		05:36
	16:25	17:22	16:52 (5)	20:15		21:10
10	08:40	07:57	16:46 (5)	06:55		05:34
	16:26	17:24	16:54 (5)	20:17		21:11
11	08:40	07:55	16:45 (5)	06:52		05:33
	16:28	17:26	16:56 (5)	20:19		21:13
12	08:39	07:53	16:43 (5)	06:50		05:31
	16:30	17:28	16:58 (5)	17:53 (4)		21:15
13	08:38	07:51	16:43 (5)	06:48		05:29
	16:31	17:30	17:00 (5)	17:49 (4)		21:17
14	08:37	07:49	16:43 (5)	06:45		05:27
	16:33	17:32	17:02 (5)	17:46 (4)		21:18
15	08:36	07:47	16:43 (5)	06:43		05:26
	16:34	17:34	17:05 (5)	17:45 (4)		21:20
16	08:35	07:45	16:43 (5)	06:40		05:24
	16:36	17:36	17:05 (5)	17:43 (4)		21:22
17	08:34	07:43	16:43 (5)	06:38		05:22
	16:38	17:38	17:05 (5)	18:04 (4)		21:23
18	08:33	07:41	16:43 (5)	06:35		05:21
	16:40	17:40	17:04 (5)	17:40 (4)		21:25
19	08:32	07:39	16:44 (5)	06:33		05:19
	16:41	17:42	17:03 (5)	18:07 (4)		21:27
20	08:31	07:36	16:45 (5)	06:31		05:18
	16:43	17:44	17:02 (5)	18:11 (4)		21:28
21	08:30	07:34	16:46 (5)	06:28		05:16
	16:45	17:46	17:01 (5)	17:38 (4)		21:30
22	08:28	07:32	16:48 (5)	06:26		05:15
	16:47	17:48	16:59 (5)	17:37 (4)		21:31
23	08:27	07:30		06:23		05:13
	16:49	17:50		18:12 (4)		21:33
24	08:26	07:28		06:21		05:12
	16:50	17:52		18:18 (3)		21:34
25	08:24	07:25		06:18		05:11
	16:52	17:54		17:37 (4)		21:36
26	08:23	07:23		06:16		05:09
	16:54	17:56		18:22 (3)		21:37
27	08:22	07:21		06:13		05:08
	16:56	17:58		17:38 (4)		21:39
28	08:20	07:18		06:11		05:07
	16:58	18:00		18:26 (3)		21:40
29	08:18			07:08		05:06
	17:00			18:39 (4)		21:41
30	08:17			07:06		05:05
	17:02			19:56		21:43
31	08:15			07:04		05:04
	17:04			18:42 (4)		21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case		225	625	87	541	45
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.67	0.67	0.64	0.64
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		35	114	21	131	9

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AW - H49

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:34 (2)	06:33		07:26	18:30 (4)	07:24	16:15 (5)	08:19	
	22:00	21:25	19 20:53 (2)	20:18		19:05	6 18:36 (4)	16:54	8 16:23 (5)	16:10	
2	04:59	05:40	20:35 (2)	06:35		07:28		07:26		16:17 (5)	08:21
	22:00	21:23	17 20:52 (2)	20:16		19:02		16:52	4 16:21 (5)	16:09	
3	05:00	05:42	20:35 (2)	06:36		07:30		07:28		08:22	
	21:59	21:21	15 20:50 (2)	20:13		19:00		16:50		16:08	
4	05:01	05:44	20:36 (2)	06:38		07:31		07:30		08:24	
	21:59	21:19	12 20:48 (2)	20:11		18:57		16:48		16:08	
5	05:02	05:45	20:36 (2)	06:40		07:33		07:32		08:25	
	21:58	21:17	10 20:46 (2)	20:09		18:55		16:46		16:07	
6	05:03	05:47	20:38 (2)	06:42		07:35		07:34		08:26	
	21:58	21:15	7 20:45 (2)	20:06		18:52		16:44		16:07	
7	05:04	05:49	20:41 (2)	06:43		07:37		07:36		08:28	
	21:57	21:13	2 20:43 (2)	20:04		18:50		16:43		16:06	
8	05:05	05:50		06:45	19:09 (3)	07:39		07:38		08:29	
	21:56	20:47 (2)	21:11	20:01	9 19:18 (3)	18:48		16:41		16:06	
9	05:06	05:52		06:47	19:06 (3)	07:41		07:40		08:30	
	21:55	20:49 (2)	21:09	19:59	14 19:20 (3)	18:45		16:39		16:05	
10	05:07	05:54		06:49	18:40 (4)	07:42		07:42		08:31	
	21:55	20:51 (2)	21:07	19:56	26 19:21 (3)	18:43		16:37		16:05	
11	05:08	05:56		06:50	18:37 (4)	07:44		07:44		08:33	
	21:54	20:52 (2)	21:05	19:54	35 19:22 (3)	18:40		16:35		16:05	
12	05:09	05:57		06:52	18:34 (4)	07:46		07:45		08:34	
	21:53	20:53 (2)	21:03	19:51	41 19:22 (3)	18:38		16:34		16:05	
13	05:10	05:59		06:54	18:32 (4)	07:48		07:47		08:35	
	21:52	20:53 (2)	21:01	19:49	46 19:22 (3)	18:36		16:32		16:05	
14	05:12	06:01		06:56	18:30 (4)	07:50		07:49		08:36	
	21:51	20:54 (2)	20:59	19:47	45 19:18 (3)	18:33		16:31		16:04	
15	05:13	06:03		06:58	18:28 (4)	07:52		07:51		08:37	
	21:50	20:55 (2)	20:57	19:44	46 19:16 (3)	18:31		16:29		16:05	
16	05:14	06:04		06:59	18:27 (4)	07:54		07:53		08:38	
	21:49	20:55 (2)	20:55	19:42	46 19:14 (3)	18:29		16:27		16:05	
17	05:16	06:06		07:01	18:26 (4)	07:55		07:55		08:38	
	21:47	20:57 (2)	20:53	19:39	43 19:11 (3)	18:26		16:26		16:05	
18	05:17	06:08		07:03	18:25 (4)	07:57		07:57		08:39	
	21:46	20:57 (2)	20:50	19:37	41 19:08 (3)	18:24		16:24		16:05	
19	05:18	06:10		07:05	18:25 (4)	07:59	17:22 (5)	07:59		08:40	
	21:45	20:57 (2)	20:48	19:34	39 19:06 (3)	18:22	6 17:28 (5)	16:23		16:05	
20	05:20	06:12		07:06	18:24 (4)	08:01	17:18 (5)	08:00		08:41	
	21:44	20:58 (2)	20:46	19:32	36 19:04 (3)	18:20	13 17:31 (5)	16:22		16:06	
21	05:21	06:13		07:08	18:23 (4)	08:03	17:16 (5)	08:02		08:41	
	21:42	20:58 (2)	20:44	19:29	35 18:58 (4)	18:17	16 17:32 (5)	16:20		16:06	
22	05:23	06:15		07:10	18:23 (4)	08:05	17:15 (5)	08:04		08:42	
	21:41	20:58 (2)	20:42	19:27	34 18:57 (4)	18:15	18 17:33 (5)	16:19		16:06	
23	05:24	06:17		07:12	18:23 (4)	08:07	17:14 (5)	08:06		08:42	
	21:39	20:59 (2)	20:39	19:24	33 18:56 (4)	18:13	20 17:34 (5)	16:18		16:07	
24	05:26	06:19		07:13	18:23 (4)	08:09	17:13 (5)	08:08		08:43	
	21:38	20:59 (2)	20:37	19:22	31 18:54 (4)	18:11	21 17:34 (5)	16:17		16:08	
25	05:27	06:20		07:15	18:23 (4)	07:11	16:13 (5)	08:09		08:43	
	21:36	21:00 (2)	20:35	19:19	28 18:51 (4)	17:09	21 16:34 (5)	16:16		16:08	
26	05:29	06:22		07:17	18:23 (4)	07:13	16:12 (5)	08:11		08:43	
	21:35	20:59 (2)	20:32	19:17	25 18:48 (4)	17:06	22 16:34 (5)	16:14		16:09	
27	05:30	06:24		07:19	18:24 (4)	07:14	16:12 (5)	08:13		08:44	
	21:33	20:59 (2)	20:30	19:14	22 18:46 (4)	17:04	22 16:34 (5)	16:13		16:10	
28	05:32	06:26		07:21	18:25 (4)	07:16	16:12 (5)	08:14		08:44	
	21:32	20:59 (2)	20:28	19:12	19 18:44 (4)	17:02	19 16:31 (5)	16:12		16:11	
29	05:34	06:27		07:22	18:27 (4)	07:18	16:12 (5)	08:16		08:44	
	21:30	20:57 (2)	20:25	19:09	14 18:41 (4)	17:00	17 16:29 (5)	16:12		16:11	
30	05:35	06:29		07:24	18:27 (4)	07:20	16:13 (5)	08:18		08:44	
	21:28	20:56 (2)	20:23	19:07	11 18:38 (4)	16:58	14 16:27 (5)	16:11		16:12	
31	05:37	06:31				07:22	16:14 (5)			08:44	
	21:26	20:55 (2)	20:21			16:56	11 16:25 (5)			16:13	
Potential sun hours	512		460	382		328		259		233	
Total, worst case		504	82	719		226		12			
Sun reduction	0.32		0.34	0.32		0.29		0.27			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.64		0.64	0.67		0.66		0.66			
Total reduction	0.21		0.22	0.22		0.19		0.18			
Total, real	104		18	155		44		2			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: AX - H50

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	12:52 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	15:58 (1)	08:19	12:41 (2)
2	08:44	12:53 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	16:22 (1)	08:21	13:28 (2)
3	08:44	12:53 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	16:21 (1)	08:22	12:41 (2)
4	08:43	12:54 (2)	08:08	07:10	06:54	05:46	05:00	05:01	05:44	06:38	07:32	16:19 (1)	08:24	13:29 (2)
5	08:43	12:54 (2)	08:07	07:09	06:54	05:44	05:00	05:01	05:44	06:38	07:32	16:00 (1)	08:24	12:41 (2)
6	08:43	12:54 (2)	08:05	07:07	06:51	05:44	05:00	05:02	05:45	06:40	07:33	16:01 (1)	08:25	12:41 (2)
7	08:42	12:56 (2)	08:03	07:05	06:49	05:42	05:03	05:47	06:42	07:35	07:36	16:14 (1)	08:26	13:32 (2)
8	08:42	12:56 (2)	08:01	07:02	06:47	05:40	05:04	05:49	06:43	07:37	07:38	16:12 (1)	08:28	12:41 (2)
9	08:41	12:58 (2)	07:59	07:00	06:44	05:38	05:05	05:51	06:45	07:39	07:40	16:10 (1)	08:29	12:41 (2)
10	08:40	12:58 (2)	07:57	06:57	06:42	05:36	05:06	05:52	06:47	07:41	07:42	16:06	08:30	12:42 (2)
11	08:40	12:59 (2)	07:55	06:55	06:39	05:34	05:07	05:54	06:49	07:42	07:44	16:05	08:31	12:43 (2)
12	08:39	13:00 (2)	07:53	06:53	06:37	05:33	05:09	05:57	06:52	07:46	07:46	16:05	08:32	12:44 (2)
13	08:38	13:01 (2)	07:51	06:48	06:32	05:29	05:10	05:59	06:54	07:48	07:48	16:05	08:33	12:45 (2)
14	08:37	13:02 (2)	07:49	06:45	06:28	05:27	05:12	06:01	06:56	07:50	07:51	16:05	08:34	12:46 (2)
15	08:36	13:03 (2)	07:47	06:43	06:26	05:26	05:13	06:03	06:58	07:52	07:52	16:05	08:35	12:47 (2)
16	08:35	13:04 (2)	07:45	06:40	06:25	05:24	05:14	06:05	06:59	07:54	07:54	16:05	08:36	12:48 (2)
17	08:34	13:05 (2)	07:43	06:38	06:23	05:22	05:16	06:06	07:01	07:56	07:56	16:05	08:37	12:49 (2)
18	08:33	13:06 (2)	07:41	06:36	06:21	05:21	05:17	06:08	07:03	07:57	07:57	16:05	08:38	12:50 (2)
19	08:32	13:08 (2)	07:39	06:33	06:18	05:19	05:18	06:10	07:05	07:59	07:59	16:05	08:39	12:51 (2)
20	08:31	13:09 (2)	07:37	06:31	06:16	05:18	05:20	06:12	07:06	08:01	08:01	16:05	08:40	12:52 (2)
21	08:30	13:11 (2)	07:34	06:28	06:14	05:16	05:21	06:13	07:08	08:03	08:03	16:05	08:41	12:53 (2)
22	08:29	13:12 (2)	07:32	06:26	06:12	05:15	05:23	06:15	07:10	08:05	08:05	16:05	08:42	12:54 (2)
23	08:28	13:13 (2)	07:30	06:23	06:09	05:13	05:24	06:17	07:12	08:07	08:07	16:05	08:43	12:55 (2)
24	08:27	13:14 (2)	07:28	06:21	06:07	05:12	05:26	06:19	07:14	08:09	08:09	16:05	08:44	12:56 (2)
25	08:26	13:15 (2)	07:26	06:18	06:05	05:11	05:27	06:20	07:15	08:11	08:11	16:05	08:45	12:57 (2)
26	08:25	13:16 (2)	07:24	06:16	06:03	05:09	05:29	06:22	07:17	08:13	08:13	16:05	08:46	12:58 (2)
27	08:24	13:17 (2)	07:22	06:13	06:01	05:08	05:30	06:24	07:19	08:15	08:15	16:05	08:47	12:59 (2)
28	08:23	13:18 (2)	07:20	06:11	06:00	05:07	05:32	06:26	07:21	08:17	08:17	16:05	08:48	13:00 (2)
29	08:22	13:19 (2)	07:18	06:09	05:58	05:06	05:34	06:28	07:23	08:19	08:19	16:05	08:49	13:01 (2)
30	08:21	13:20 (2)	07:16	06:07	05:56	05:05	05:36	06:30	07:25	08:21	08:21	16:05	08:50	13:02 (2)
31	08:20	13:21 (2)	07:14	06:05	05:54	05:04	05:38	06:32	07:27	08:23	08:23	16:05	08:51	13:03 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	1595	
Total, worst case	1021	317								210	585		1595	
Sun reduction	0.24	0.23								0.29	0.27		0.21	
Oper. time red.	1.00	1.00								1.00	1.00		1.00	
Wind dir. red.	0.63	0.65								0.65	0.63		0.63	
Total reduction	0.15	0.15								0.19	0.17		0.13	
Total, real	156	48								40	98		208	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** AY - H51

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		08:14		07:16		07:01		05:52		05:03		04:59		05:39		06:33		07:26		07:24		08:19	
	16:15		17:06		18:02		20:00		20:55		21:45		22:00		21:25		20:18		19:05		16:54		16:10	
2	08:44		08:12		07:14		06:59		05:50		05:02		05:00		05:40		06:35		07:28		07:26		08:21	
	16:16		17:08		18:04		20:02		20:57		21:47		22:00		21:23		20:16		19:02		16:52		16:09	
3	08:44		08:10		07:12		06:56		05:48		05:01		05:00		05:42		06:36		07:30		07:28		08:22	
	16:17		17:10		18:06		20:04		20:59		21:48		21:59		21:21		20:14		19:00		16:50		16:08	
4	08:43		08:09		07:09		06:54		05:46		05:00		05:01		05:44		06:38		07:32		07:30		08:24	
	16:18		17:12		18:08		20:06		21:01		21:49		21:59		21:19		20:11		18:57		16:48		16:08	
5	08:43		08:07		07:07		06:52		05:44		04:59		05:02		05:45		06:40		07:33		07:32		08:25	
	16:20		17:14		18:09		20:08		21:03		21:50		21:58		21:18		20:09		18:55		16:46		16:07	
6	08:43		09:16 (2)		08:05		07:05		06:49		05:42		04:59		05:03		05:47		06:42		07:35		08:27	
	16:21	2	09:18 (2)		17:16		18:11		20:09		21:05		21:51		21:16		20:06		18:53		16:44		16:07	
7	08:42		09:15 (2)		08:03		07:02		06:47		05:40		04:58		05:04		05:49		06:44		07:37		08:28	
	16:22	3	09:18 (2)		17:18		18:13		20:11		21:06		21:52		21:14		20:04		18:50		16:43		16:06	
8	08:42		09:14 (2)		08:01		07:00		06:44		05:38		04:57		05:05		05:51		06:45		07:39		08:29	
	16:24	5	09:19 (2)		17:20		18:15		20:13		21:08		21:53		21:12		20:01		18:48		16:41		16:06	
9	08:41		09:14 (2)		07:59		06:57		06:42		05:36		04:57		05:06		05:52		06:47		07:41		08:30	
	16:25	7	09:21 (2)		17:22		18:17		20:15		21:10		21:54		21:10		19:59		18:45		16:39		16:05	
10	08:41		09:13 (2)		07:57		06:55		06:40		05:34		04:56		05:07		05:54		06:49		07:43		08:32	
	16:27	8	09:21 (2)		17:24		18:19		20:17		21:12		21:55		21:08		19:57		18:43		16:37		16:05	
11	08:40		09:12 (2)		07:55		06:53		06:37		05:33		04:56		05:08		05:56		06:51		07:44		08:33	
	16:28	10	09:22 (2)		17:26		18:21		20:19		21:13		21:56		21:06		19:54		18:41		16:36		16:05	
12	08:39		09:11 (2)		07:53		06:50		06:35		05:31		04:55		05:09		05:58		06:52		07:46		08:34	
	16:30	12	09:23 (2)		17:28		18:23		20:21		21:15		21:56		21:04		19:52		18:38		16:34		16:05	
13	08:38		09:10 (2)		07:51		06:48		06:32		05:29		04:55		05:11		05:59		06:54		07:48		08:35	
	16:31	13	09:23 (2)		17:30		18:25		20:22		21:17		21:57		21:01		19:49		18:36		16:32		16:05	
14	08:37		09:09 (2)		07:49		06:45		06:30		05:27		04:55		05:12		06:01		06:56		07:50		08:36	
	16:33	15	09:24 (2)		17:32		18:27		20:24		21:19		21:58		21:01		19:47		18:33		16:31		16:05	
15	08:37		09:08 (2)		07:47		06:43		06:28		05:26		04:55		05:13		06:03		06:58		07:52		08:37	
	16:34	17	09:25 (2)		17:34		18:29		20:26		21:20		21:58		21:00		19:44		18:31		16:29		16:05	
16	08:36		09:07 (2)		07:45		06:40		06:25		05:24		04:54		05:14		06:05		06:59		07:54		08:38	
	16:36	19	09:26 (2)		17:36		18:30		20:28		21:22		21:59		21:49		20:55		19:42		18:29		16:05	
17	08:35		09:05 (2)		07:43		06:38		06:23		05:22		04:54		05:16		06:06		07:01		07:56		08:39	
	16:38	20	09:25 (2)		17:38		18:32		20:30		21:24		21:59		21:48		20:53		19:39		18:27		16:05	
18	08:33		09:04 (2)		07:41		06:36		06:21		05:21		04:54		05:17		06:08		07:03		07:57		08:39	
	16:40	22	09:26 (2)		17:40		18:34		20:32		21:25		22:00		21:46		20:51		19:37		18:24		16:05	
19	08:32		09:03 (2)		07:39		06:33		06:18		05:19		04:54		05:18		06:10		07:05		07:59		08:39	
	16:41	24	09:27 (2)		17:42		18:36		20:33		21:27		22:00		21:45		20:48		19:34		18:22		16:05	
20	08:31		09:03 (2)		07:37		06:31		06:16		05:18		04:54		05:20		06:12		07:06		08:01		08:41	
	16:43	23	09:26 (2)		17:44		18:38		20:35		21:28		22:00		21:44		20:46		19:32		18:20		16:06	
21	08:30		09:04 (2)		07:34		06:28		06:14		05:16		04:54		05:21		06:13		07:08		08:03		08:41	
	16:45	23	09:27 (2)		17:46		18:40		20:37		21:30		22:01		21:42		20:44		19:29		18:17		16:06	
22	08:29		09:05 (2)		07:32		06:26		06:12		05:15		04:55		05:23		06:15		07:10		08:05		08:42	
	16:47	22	09:27 (2)		17:48		18:42		20:39		21:31		22:01		21:41		20:42		19:27		18:15		16:07	
23	08:27		09:05 (2)		07:30		06:23		06:09		05:13		04:55		05:24		06:17		07:12		08:07		08:42	
	16:49	22	09:27 (2)		17:50		18:43		20:41		21:33		22:01		21:40		20:39		19:24		18:13		16:07	
24	08:26		09:05 (2)		07:28		06:21		06:07		05:12		04:55		05:26		06:19		07:14		08:09		08:43	
	16:51	21	09:26 (2)		17:52		18:45		20:43		21:35		22:01		21:38		20:37		19:22		18:11		16:08	
25	08:25		09:06 (2)		07:25		06:18		06:05		05:11		04:56		05:27		06:21		07:15		08:11		08:43	
	16:52	20	09:26 (2)		17:54		18:47		20:45		21:36		22:01		21:37		20:35		19:19		17:09		16:08	
26	08:23		09:07 (2)		07:23		06:16		06:03		05:09		04:56		05:29		06:22		07:17		08:13		08:44	
	16:54	19	09:26 (2)		17:56		18:49		20:46		21:37		22:01		21:35		20:33		19:17		17:07		16:09	
27	08:22		09:09 (2)		07:21		06:14		06:01		05:08		04:56		05:31		06:24		07:19		08:15		08:44	
	16:56	16	09:25 (2)		17:58		18:51		20:48		21:39		22:01		21:33		20:30		19:15		17:04		16:10	
28	08:20		09:10 (2)		07:19		06:11		05:58		05:07		04:57		05:32		06:26		07:21		08:17		08:44	
	16:58	14	09:24 (2)		18:00		18:53		20:50		21:40		22:01		21:32		20:28		19:12		17:02		16:11	
29	08:19		09:12 (2)				07:09		05:56		05:06		04:58		05:34		06:28		07:23		08:19		08:44	
	17:00	10	09:22 (2)				19:55		20:52		21:42		22:01		21:30		20:25		19:10		17:00		16:11	
30	08:17		09:16 (2)				07:06		05:54		05:05		04:58		05:35		06:29		07:24		08:20		08:44	
	17:02	2	09:18 (2)				19:56		20:54		21:43		22:01											

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: AZ - H52

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		09:18 (2)	08:14	07:16		07:01		05:52		05:03		04:59		05:39		06:33		07:26		07:24		08:19		09:00 (2)
2	16:15	19	09:37 (2)	17:06	18:02		20:00		20:55		21:45		22:00		21:25		20:18		19:05		16:54		16:10	23	09:23 (2)
3	08:44		09:18 (2)	08:12	07:14		06:59		05:50		05:02		05:00		05:40		06:35		07:28		07:26		08:21		09:01 (2)
4	16:16	20	09:38 (2)	17:08	18:04		20:02		20:57		21:47		22:00		21:23		20:16		19:02		16:52		16:09	23	09:24 (2)
5	08:44		09:17 (2)	08:10	07:12		06:56		05:48		05:01		05:00		05:42		06:36		07:30		07:28		08:22		09:01 (2)
6	16:17	21	09:38 (2)	17:10	18:06		20:04		20:59		21:48		21:59		21:21		20:14		19:00		16:50		16:08	23	09:24 (2)
7	08:43		09:17 (2)	08:09	07:09		06:54		05:46		05:00		05:01		05:44		06:38		07:32		07:30		08:24		09:01 (2)
8	16:18	22	09:39 (2)	17:12	18:08		20:06		21:01		21:49		21:59		21:19		20:11		18:57		16:48		16:08	24	09:25 (2)
9	08:43		09:16 (2)	08:07	07:07		06:52		05:44		04:59		05:02		05:45		06:40		07:33		07:32		08:25		09:01 (2)
10	16:20	23	09:39 (2)	17:14	18:09		20:08		21:03		21:50		21:58		21:18		20:09		18:55		16:46		16:07	24	09:25 (2)
11	08:43		09:16 (2)	08:05	07:05		06:49		05:42		04:59		05:03		05:47		06:42		07:35		07:34		08:27		09:02 (2)
12	16:21	24	09:40 (2)	17:16	18:11		20:09		21:05		21:51		21:58		21:16		20:06		18:53		16:44		16:07	24	09:26 (2)
13	08:42		09:16 (2)	08:03	07:02		06:47		05:40		04:58		05:04		05:49		06:44		07:37		07:36		08:28		09:03 (2)
14	16:22	24	09:40 (2)	17:18	18:13		20:11		21:06		21:52		21:57		21:14		20:04		18:50		16:43		16:06	23	09:26 (2)
15	08:42		09:17 (2)	08:01	07:00		06:44		05:38		04:57		05:05		05:51		06:45		07:39		07:38		08:29		09:05 (2)
16	16:24	24	09:41 (2)	17:20	18:15		20:13		21:08		21:53		21:56		21:12		20:01		18:48		16:41		16:06	22	09:27 (2)
17	08:41		09:18 (2)	07:59	06:57		06:42		05:36		04:57		05:06		05:52		06:47		07:41		07:40		08:30		09:06 (2)
18	16:25	23	09:41 (2)	17:22	18:17		20:15		21:10		21:54		21:56		21:10		19:59		18:45		16:39		16:05	21	09:27 (2)
19	08:41		09:18 (2)	07:57	06:55		06:40		05:34		04:56		05:07		05:54		06:49		07:43		07:42		08:32		09:07 (2)
20	16:27	23	09:41 (2)	17:24	18:19		20:17		21:12		21:55		21:55		21:08		19:57		18:43		16:37		16:05	20	09:27 (2)
21	08:40		09:18 (2)	07:55	06:53		06:37		05:33		04:56		05:08		05:56		06:51		07:44		07:44		08:33		09:08 (2)
22	16:28	23	09:41 (2)	17:26	18:21		20:19		21:13		21:56		21:54		21:06		19:54		18:41		16:36		16:05	19	09:27 (2)
23	08:39		09:19 (2)	07:53	06:50		06:35		05:31		04:55		05:09		05:58		06:52		07:46		07:46		08:34		09:10 (2)
24	16:30	23	09:42 (2)	17:28	18:23		20:21		21:15		21:56		21:53		21:04		19:52		18:38		16:34		16:05	18	09:28 (2)
25	08:38		09:19 (2)	07:51	06:48		06:32		05:29		04:55		05:11		05:59		06:54		07:48		07:48		08:35		09:11 (2)
26	16:31	23	09:42 (2)	17:30	18:25		20:22		21:17		21:57		21:52		21:01		19:49		18:36		16:32		16:05	17	09:28 (2)
27	08:37		09:20 (2)	07:49	06:45		06:30		05:27		04:55		05:12		06:01		06:56		07:50		07:49		08:36		09:12 (2)
28	16:33	22	09:42 (2)	17:32	18:27		20:24		21:19		21:58		21:51		20:59		19:47		18:33		16:31		16:05	17	09:29 (2)
29	08:37		09:21 (2)	07:47	06:43		06:28		05:26		04:55		05:13		06:03		06:58		07:52		07:51		08:37		09:13 (2)
30	16:34	21	09:42 (2)	17:34	18:29		20:26		21:20		21:58		21:50		20:57		19:44		18:31		16:29		16:05	16	09:29 (2)
31	08:36		09:22 (2)	07:45	06:40		06:25		05:24		04:54		05:14		06:05		06:59		07:54		07:53		08:38		09:13 (2)
32	16:36	20	09:42 (2)	17:36	18:30		20:28		21:22		21:59		21:49		20:55		19:42		18:29		16:28		16:05	16	09:29 (2)
33	08:35		09:22 (2)	07:43	06:38		06:23		05:22		04:54		05:16		06:06		07:01		07:56		07:55		08:39		09:14 (2)
34	16:38	19	09:41 (2)	17:38	18:32		20:30		21:24		21:59		21:48		20:53		19:39		18:27		16:26		16:05	15	09:29 (2)
35	08:33		09:23 (2)	07:41	06:36		06:21		05:21		04:54		05:17		06:08		07:03		07:57		07:57		08:39		09:15 (2)
36	16:40	18	09:41 (2)	17:40	18:34		20:32		21:25		22:00		21:46		20:51		19:37		18:24		16:25		16:05	15	09:30 (2)
37	08:32		09:25 (2)	07:39	06:33		06:18		05:19		04:54		05:18		06:10		07:05		07:59		07:59		08:40		09:16 (2)
38	16:41	16	09:41 (2)	17:42	18:36		20:33		21:27		22:00		21:45		20:48		19:34		18:22		16:23		16:05	15	09:31 (2)
39	08:31		09:26 (2)	07:37	06:31		06:16		05:18		04:54		05:20		06:12		07:06		08:01		08:01		09:05 (2)		08:41
40	16:43	13	09:39 (2)	17:44	18:38		20:35		21:28		22:00		21:44		20:46		19:32		18:20		16:22	6	09:11 (2)	14	09:30 (2)
41	08:30		09:28 (2)	07:34	06:28		06:14		05:16		04:54		05:21		06:13		07:08		08:03		08:02		09:03 (2)		08:41
42	16:45	10	09:38 (2)	17:46	18:40		20:37		21:30		22:01		21:42		20:44		19:29		18:17		16:20	10	09:13 (2)	14	09:31 (2)
43	08:29		09:31 (2)	07:32	06:26		06:12		05:15		04:55		05:23		06:15		07:10		08:05		08:04		09:02 (2)		08:42
44	16:47	6	09:37 (2)	17:48	18:42		20:39		21:31		22:01		21:41		20:42		19:27		18:15		16:19	13	09:15 (2)	14	09:31 (2)
45	08:27			07:30	06:23		06:09		05:13		04:55		05:24		06:17		07:12		08:07		08:06		09:01 (2)		08:42
46	16:49			17:50	18:43		20:41		21:33		22:01		21:40		20:39		19:24		18:13		16:18	16	09:17 (2)	14	09:32 (2)
47	08:26			07:28	06:21		06:07		05:12		04:55		05:26		06:19		07:14		08:09		08:08		09:00 (2)		08:43
48	16:51			17:52	18:45		20:43		21:35		22:01		21:38		20:37		19:22		18:11		16:17	18	09:18 (2)	14	09:32 (2)
49	08:25			07:25	06:18		06:05		05:11		04:56		05:27		06:20		07:15		08:11		08:09		09:00 (2)		08:43
50	16:52			17:54	18:47		20:45		21:36		22:01		21:37		20:35		19:19		18:09		16:16	19	09:19 (2)	15	09:33 (2)
51	08:23			07:23	06:16		06:03		05:09		04:56		05:29		06:22		07:17		08:13		08:11		09:00 (2)		08:44
52	16:54			17:56	18:49		20:46		21:37		22:01		21:35		20:33		19:17		18:07		16:15	20	09:20 (2)	15	09:34 (2)
53	08:22			07:21	06:14		06:01		05:08		04:56		05:30		06:24		07:19		08:15		08:13		09:00 (2)		08:44
54	16:56			17:58	18:51		20:48		21:39		22:01		21:33												

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BA - H53

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:18 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BB - H54

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	08:12 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	5 08:17 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12		06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:09	
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07		06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10		20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07	
6	08:43	08:05	07:05		06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12		20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02		06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13		20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00		06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:58		06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17		20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	
10	08:41	07:57	06:55		06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42	08:32	
	16:27	17:24	18:19		20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53		06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	
	16:28	17:26	18:21		20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50		06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	
	16:30	17:28	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48	08:18 (1)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35	
	16:31	17:30	3 08:21 (1)	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	9 08:52 (1)	16:32	16:05
14	08:37	07:49	06:45	08:15 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36	
	16:33	17:32	8 08:23 (1)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	15 08:55 (1)	16:31	16:05
15	08:37	07:47	06:43	08:13 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37	
	16:35	17:34	12 08:25 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	17 08:56 (1)	16:29	16:05
16	08:36	07:45	06:41	08:11 (1)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38	
	16:36	17:36	15 08:26 (1)	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	20 08:57 (1)	16:28	16:05
17	08:35	07:43	06:38	08:09 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39	
	16:38	17:38	18 08:27 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	22 08:58 (1)	16:26	16:05
18	08:34	07:41	06:36	08:07 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39	
	16:40	17:40	21 08:28 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	24 08:59 (1)	16:25	16:05
19	08:32	07:39	06:33	08:04 (1)	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40	
	16:41	17:42	24 08:28 (1)	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	24 08:59 (1)	16:23	16:05
20	08:31	07:37	06:31	08:04 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41	
	16:43	17:44	24 08:28 (1)	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	25 08:59 (1)	16:22	16:06
21	08:30	07:34	06:28	08:04 (1)	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41	
	16:45	17:46	24 08:28 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	25 08:59 (1)	16:21	16:06
22	08:29	07:32	06:26	08:03 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42	
	16:47	17:48	25 08:28 (1)	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	24 08:58 (1)	16:19	16:07
23	08:27	07:30	06:23	08:04 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42	
	16:49	17:50	23 08:27 (1)	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	23 08:58 (1)	16:18	16:07
24	08:26	07:28	06:21	08:04 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43	
	16:51	17:52	23 08:27 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	20 08:57 (1)	16:17	16:08
25	08:25	07:26	06:19	08:04 (1)	06:19	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:43	
	16:53	17:54	22 08:26 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	17 07:56 (1)	16:16	16:08
26	08:23	07:23	06:16	08:05 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:44	
	16:54	17:56	20 08:25 (1)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	14 07:55 (1)	16:15	16:09
27	08:22	07:21	06:14	08:07 (1)	06:14	06:01	05:08	04:57	05:31	06:24	07:19	07:15	08:44	
	16:56	17:58	17 08:24 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	11 07:54 (1)	16:14	16:10
28	08:20	07:19	06:11	08:08 (1)	06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17	08:44	
	16:58	18:00	13 08:21 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	7 07:52 (1)	16:13	16:11
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	07:19	07:47 (1)	08:16	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17:00	2 07:49 (1)	16:12	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	07:21		08:18	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	16:58		16:11	16:13
31	08:15		07:04			05:04		05:37	06:31		07:22		08:44	
	17:04		19:58			21:44		21:27	20:21		16:56		16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382	328	259	233	
Total, worst case		292		5								299		
Sun reduction		0.23		0.27								0.29		
Oper. time red.		1.00		1.00								1.00		
Wind dir. red.		0.64		0.64								0.64		
Total reduction		0.15		0.17								0.19		
Total, real		43		1							56			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BC - H55

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		09:21 (3)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		06:33	07:26		07:24		06:33	07:26	08:19	09:12 (3)
	16:15	68	11:16 (1)	17:06		18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05		16:54		20:18	19:05		16:54		20:18	19:05	16:10	10:59 (1)
2	08:44		09:22 (3)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		06:35	07:28		07:26		06:35	07:28	08:21	09:12 (3)
	16:16	67	11:16 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52		20:16	19:02		16:52		20:16	19:02	16:09	11:00 (1)
3	08:44		09:22 (3)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		06:36	07:30		07:28		06:36	07:30	08:22	09:11 (3)
	16:17	66	11:16 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50		20:14	19:00		16:50		20:14	19:00	16:08	11:00 (1)
4	08:43		09:23 (3)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		06:38	07:32		07:30		06:38	07:32	08:24	09:11 (3)
	16:18	66	11:17 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48		20:11	18:57		16:48		20:11	18:57	16:08	11:02 (1)
5	08:43		09:24 (3)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32		06:40	07:33		07:32		06:40	07:33	08:25	09:11 (3)
	16:20	64	11:16 (1)	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46		20:09	18:55		16:46		20:09	18:55	16:07	11:02 (1)
6	08:43		09:25 (3)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34		06:42	07:35		07:34		06:42	07:35	08:27	09:11 (3)
	16:21	63	11:17 (1)	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:45		20:06	18:53		16:45		20:06	18:53	16:07	11:03 (1)
7	08:42		09:25 (3)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36		06:44	07:37		07:36		06:44	07:37	08:28	09:11 (3)
	16:22	62	11:17 (1)	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43		20:04	18:50		16:43		20:04	18:50	16:06	11:04 (1)
8	08:42		09:26 (3)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38		06:45	07:39		07:38		06:45	07:39	08:29	09:12 (3)
	16:24	61	11:17 (1)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41		20:01	18:48		16:41		20:01	18:48	16:06	11:05 (1)
9	08:41		09:28 (3)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		06:47	07:41		07:40		06:47	07:41	08:30	09:11 (3)
	16:25	57	11:17 (1)	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39		19:59	18:45		16:39		19:59	18:45	16:05	11:05 (1)
10	08:41		09:29 (3)	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42		06:49	07:43		07:42		06:49	07:43	08:32	09:11 (3)
	16:27	56	11:17 (1)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37		19:57	18:43		16:37		19:57	18:43	16:05	11:06 (1)
11	08:40		09:30 (3)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44		06:51	07:44		07:44		06:51	07:44	08:33	09:12 (3)
	16:28	53	11:17 (1)	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36		21:06	19:54		16:36		21:06	19:54	16:05	11:06 (1)
12	08:39		09:31 (3)	07:53		06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46		06:52	07:46		07:46		06:52	07:46	08:34	09:13 (3)
	16:30	51	11:17 (1)	17:28		18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34		21:04	19:52		16:34		21:04	19:52	16:05	11:07 (1)
13	08:38		09:33 (3)	07:51		06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48		06:54	07:48		07:48		06:54	07:48	08:35	09:13 (3)
	16:31	46	11:16 (1)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32		21:01	19:49		16:32		21:01	19:49	16:05	11:08 (1)
14	08:37		09:35 (3)	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:50		06:56	07:50		07:50		06:56	07:50	08:36	09:13 (3)
	16:33	41	11:16 (1)	17:32		18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34		16:31		20:59	19:47		16:31		20:59	19:47	16:05	11:08 (1)
15	08:37		10:43 (1)	07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:52		06:58	07:52		07:52		06:58	07:52	08:37	09:14 (3)
	16:35	33	11:16 (1)	17:34		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29		20:57	19:44		16:29		20:57	19:44	16:05	11:09 (1)
16	08:36		10:44 (1)	07:45		08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59		06:59		06:59	06:54		06:59		06:59	06:54	08:38	09:13 (3)
	16:36	31	11:15 (1)	17:36		18:15 (2)	06:40	06:24	05:23	04:54	05:14	06:05	06:59		06:59		06:59	06:54		06:59		06:59	06:54	16:05	11:09 (1)
17	08:35		10:45 (1)	07:43		08:09 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01		07:01		06:06	07:01		07:01		06:06	07:01	08:39	09:14 (3)
	16:38	28	11:13 (1)	17:38		18:16 (2)	06:32	06:17	05:16	04:54	05:16	06:06	07:01		07:01		06:06	07:01		07:01		06:06	07:01	16:05	11:09 (1)
18	08:33		10:47 (1)	07:41		08:07 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03		07:03		06:08	07:03		07:03		06:08	07:03	08:39	09:15 (3)
	16:40	26	11:13 (1)	17:40		18:17 (2)	06:34	06:19	05:19	04:54	05:18	06:09	07:04		07:04		06:09	07:04		07:04		06:09	07:04	16:05	11:10 (1)
19	08:32		10:49 (1)	07:39		08:04 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05		07:05		06:10	07:05		07:05		06:10	07:05	08:40	09:16 (3)
	16:41	23	11:12 (1)	17:42		18:17 (2)	06:36	06:21	05:21	04:54	05:18	06:11	07:06		07:06		06:11	07:06		07:06		06:11	07:06	16:05	11:11 (1)
20	08:31		10:51 (1)	07:37		08:02 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:07		07:07		06:12	07:07		07:07		06:12	07:07	08:41	09:16 (3)
	16:43	18	11:09 (1)	17:44		18:18 (2)	06:38	06:23	05:23	04:54	05:21	06:13	07:08		07:08		06:13	07:08		07:08		06:13	07:08	16:06	11:11 (1)
21	08:30		10:55 (1)	07:34		08:00 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08		07:08		06:13	07:08		07:08		06:13	07:08	08:41	09:17 (3)
	16:45	12	11:07 (1)	17:46		18:18 (2)	06:30	06:15	05:15	04:55	05:23	06:15	07:10		07:10		06:15	07:10		07:10		06:15	07:10	16:06	11:12 (1)
22	08:29		10:56 (1)	07:32		07:57 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10		07:10		06:15	07:10		07:10		06:15	07:10	08:42	09:17 (3)
	16:47		17:48			18:17 (2)	06:28	06:13	05:15	04:55	05:23	06:15	07:10		07:10		06:15	07:10		07:10		06:15	07:10	16:07	11:12 (1)
23	08:27		10:57 (2)	07:30		07:55 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12		07:12		06:17	07:12		07:12		06:17	07:12	08:42	09:18 (3)
	16:49		17:50			18:17 (2)	06:24	06:10	05:13	04:55	05:24	06:17	07:12		07:12		06:17	07:12		07:12		06:17	07:12	16:07	11:13 (1)
24	08:26		10:58 (2)	07:28		07:55 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14		07:14		06:19	07:14							

6918 Kellystown

5 no. turbine Wind Farm, Co. Louth

Jennings O'Donovan

F91 RHH9 Sligo

+353719161416

Kathryn Feeney

Calculated:

28/03/

VER

Calculation: Kellystown N149 Worst Case Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BE - H57

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	08:00 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04	08:01 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	07:12	07:37 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06	08:00 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
4	08:43	08:09	07:09	07:37 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08	08:01 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	08:07	07:07	07:36 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
	16:20	17:14	18:10	08:00 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05	07:05	07:37 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12	08:00 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03	07:02	07:37 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13	08:00 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01	07:00	07:37 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15	07:59 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:06
9	08:41	07:59	06:58	07:38 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
	16:25	17:22	18:17	07:58 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06
10	08:41	07:57	06:55	07:39 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24	18:19	07:56 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55	06:53	07:41 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
	16:28	17:26	18:21	07:54 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
12	08:39	07:53	06:50	07:43 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:34
	16:30	17:28	18:23	07:50 (1)	20:21	21:15	21:55	21:53	21:04	19:52	18:38	16:05
13	08:38	07:51	06:48		06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
	16:31	17:30	18:25		20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:05
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	06:59	07:54	08:38
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:07
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:08
25	08:25	07:26	06:19		06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:43
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	18:09	16:08
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:44
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:09
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:44
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	18:05	16:10
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:44
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:11
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:44
	17:00		17:55		20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:44
	17:02		17:57		20:54	21:43	22:01	21:28	20:23	19:07	18:00	16:13
31	08:16		07:04		05:50	05:04		05:37	06:31	07:22	08:18	08:44
	17:04		17:58		21:44			21:27	20:21	16:56		16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		34	237							269		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		5	42							51		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BF - H58

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	07:55 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	07:55 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	07:36 (1)	06:57	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	07:55 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:09	
4	08:43	08:09	07:09	07:35 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:16 (1)	07:30	08:24
	16:18	17:12	18:08	07:55 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	08:26 (1)	16:48	16:08
5	08:43	08:07	07:07	07:34 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:14 (1)	07:32	08:25
	16:20	17:14	18:10	07:54 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	08:28 (1)	16:46	16:07
6	08:43	08:05	07:05	07:35 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:12 (1)	07:34	08:27
	16:21	17:16	18:12	07:54 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	08:29 (1)	16:45	16:07
7	08:42	08:03	07:02	07:36 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:11 (1)	07:36	08:28
	16:22	17:18	18:13	07:53 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	08:30 (1)	16:43	16:06
8	08:42	08:01	07:00	07:36 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:10 (1)	07:38	08:29
	16:24	17:20	18:15	07:52 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	08:30 (1)	16:41	16:06
9	08:41	07:59	06:58	07:38 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:09 (1)	07:40	08:31
	16:25	17:22	18:17	07:50 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	08:29 (1)	16:39	16:06
10	08:41	07:57	06:55	07:40 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:09 (1)	07:42	08:32
	16:27	17:24	18:19	07:46 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	08:29 (1)	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:11 (1)	07:44	08:33	
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	17:28	08:29 (1)	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:13 (1)	07:46	08:34	
	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	17:24	08:28 (1)	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:15 (1)	07:48	08:35	
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	17:22	08:27 (1)	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:17 (1)	07:50	08:36	
	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	17:20	08:26 (1)	16:31	16:05
15	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:19 (1)	07:51	08:37	
	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	17:18	08:25 (1)	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:21 (1)	07:53	08:38	
	16:36	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	17:15	08:22 (1)	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:23 (1)	07:55	08:39	
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	17:13	16:26	16:05	
18	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:25 (1)	07:57	08:39	
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	17:10	16:25	16:05	
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:26 (1)	07:59	08:40	
	16:42	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	17:08	16:23	16:05	
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:23 (1)	08:01	08:41	
	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	17:06	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:25 (1)	08:03	08:41	
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	17:04	16:21	16:06	
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:24 (1)	08:04	08:42	
	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	17:02	16:19	16:07	
23	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:22 (1)	08:06	08:43	
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	17:00	16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:21 (1)	08:08	08:43	
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	17:00	16:17	16:08	
25	08:25	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:20 (1)	08:10	08:43	
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09	17:00	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:20 (1)	08:11	08:44	
	16:54	17:56	3	07:51 (1)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:20 (1)	08:13	08:44	
	16:56	17:58	7	07:53 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	16:14	16:10	
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:22 (1)	08:15	08:44	
	16:58	18:00	10	07:53 (1)	18:53	20:50	22:01	21:32	20:28	19:12	18:00	16:13	16:11	
29	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:24 (1)	08:16	08:44	
	17:00		17:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:26 (1)	08:18	08:44	
	17:02		17:57	20:54	21:43	22:01	21:28	20:23	19:07	18:00	17:00	16:11	16:13	
31	08:16		07:04	05:54	05:04	04:57	05:37	06:31	07:26	08:23	08:28 (1)	08:19	08:44	
	17:04		17:58	20:56	21:44	22:01	21:27	20:21	19:00	18:00	17:00	16:14	16:14	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case		20	159							181				
Sun reduction		0.23	0.27							0.29				
Oper. time red.		1.00	1.00							1.00				
Wind dir. red.		0.65	0.65							0.65				
Total reduction		0.15	0.18							0.19				
Total, real		3	28							34				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BG - H59

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** BH - H60

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March		April	May	June	July	August	September		October		November	December		
1	08:44	08:14	07:16			07:01	05:52	05:03	04:59	05:39	06:33		07:26	07:59 (1)	07:24	08:19		
	16:15	17:06	18:02			20:00	20:56	21:45	22:00	21:25	20:18		19:05	18	08:17 (1)	16:54	16:10	
2	08:44	08:12	07:14			06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:57 (1)	07:26	08:21	
	16:16	17:08	18:04			20:02	20:57	21:47	22:00	21:23	20:16		19:02	19	08:16 (1)	16:52	16:09	
3	08:44	08:10	07:12			06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:57 (1)	07:28	08:22	
	16:17	17:10	18:06			20:04	20:59	21:48	21:59	21:21	20:14		19:00	20	08:17 (1)	16:50	16:09	
4	08:43	08:09	07:09		07:34 (1)	06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24	
	16:18	17:12	18:08	2	07:36 (1)	20:06	21:01	21:49	21:59	21:19	20:11		18:57	19	08:17 (1)	16:48	16:08	
5	08:43	08:07	07:07		07:31 (1)	06:52	05:44	04:59	05:02	05:46	06:40		07:33		08:00 (1)	07:32	08:25	
	16:20	17:14	18:10	6	07:37 (1)	20:08	21:03	21:50	21:58	21:18	20:09		18:55	16	08:16 (1)	16:46	16:07	
6	08:43	08:05	07:05		07:29 (1)	06:49	05:42	04:59	05:03	05:47	06:42		07:35		08:02 (1)	07:34	08:27	
	16:21	17:16	18:12	9	07:38 (1)	20:10	21:05	21:51	21:58	21:16	20:06		18:53	14	08:16 (1)	16:45	16:07	
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	05:49	06:44		07:37		08:04 (1)	07:36	08:28	
	16:22	17:18	18:13	12	07:39 (1)	20:11	21:06	21:52	21:57	21:14	20:04		18:50	11	08:15 (1)	16:43	16:06	
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	05:51	06:45		07:39		08:06 (1)	07:38	08:29	
	16:24	17:20	18:15	15	07:39 (1)	20:13	21:08	21:53	21:56	21:12	20:02		18:48	8	08:14 (1)	16:41	16:06	
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52	06:47		07:41		08:07 (1)	07:40	08:31	
	16:25	17:22	18:17	18	07:40 (1)	20:15	21:10	21:54	21:56	21:10	19:59		18:45	4	08:11 (1)	16:39	16:06	
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49		07:43		07:42	08:32		
	16:27	17:24	18:19	20	07:39 (1)	20:17	21:12	21:55	21:55	21:08	19:57		18:43		16:37	16:05		
11	08:40	07:55	06:53		07:19 (1)	06:37	05:33	04:56	05:08	05:56	06:51		07:45		07:44	08:33		
	16:28	17:26	18:21	20	07:39 (1)	20:19	21:13	21:56	21:54	21:06	19:54		18:41		16:36	16:05		
12	08:39	07:53	06:50		07:19 (1)	06:35	05:31	04:56	05:09	05:58	06:52		07:46		07:46	08:34		
	16:30	17:28	18:23	18	07:37 (1)	20:21	21:15	21:56	21:53	21:04	19:52		18:38		16:34	16:05		
13	08:38	07:51	06:48		07:20 (1)	06:33	05:29	04:55	05:11	05:59	06:54		07:48		07:48	08:35		
	16:31	17:30	18:25	17	07:37 (1)	20:22	21:17	21:57	21:52	21:02	19:49		18:36		16:32	16:05		
14	08:37	07:49	06:45		07:21 (1)	06:30	05:27	04:55	05:12	06:01	06:56		07:50		07:50	08:36		
	16:33	17:32	18:27	13	07:34 (1)	20:24	21:19	21:58	21:51	20:59	19:47		18:34		16:31	16:05		
15	08:37	07:47	06:43		07:23 (1)	06:28	05:26	04:55	05:13	06:03	06:58		07:52		07:51	08:37		
	16:35	17:34	18:29	9	07:32 (1)	20:26	21:20	21:58	21:50	20:57	19:44		18:31		16:29	16:05		
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	07:00	07:54		07:54		07:53	08:38		
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29		18:29		16:28	16:05		
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:56		07:55	08:39		
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27		18:27		16:26	16:05		
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:58		07:57	08:39		
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24		18:24		16:25	16:05		
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59		07:59		07:59	08:40		
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22		18:22		16:23	16:05		
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01		08:01		08:01	08:41		
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20		18:20		16:22	16:06		
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03		08:03		08:02	08:41		
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18		18:18		16:21	16:06		
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:05		08:04	08:42		
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15		18:15		16:19	16:07		
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12	08:07		08:07		08:06	08:43		
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13		18:13		16:18	16:07		
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:09		08:08	08:43		
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11		18:11		16:17	16:08		
25	08:25	07:26	06:19		06:05	05:11	04:56	05:27	06:21	07:15	08:10		07:11		08:10	08:43		
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	17:09		17:09		16:16	16:08		
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17	08:13		07:13		08:11	08:44		
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	17:07		17:07		16:15	16:09		
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19	08:15		07:15		08:13	08:44		
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	17:05		17:05		16:14	16:10		
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21	08:17		07:17		08:15	08:44		
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	7	08:12 (1)	17:02		16:13	16:11		
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	08:19		08:02 (1)	17:09		08:16	08:44	
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	12	08:14 (1)	17:00		16:12	16:12		
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	08:20		08:00 (1)	07:21		08:18	08:44	
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	16	08:16 (1)	16:58		16:11	16:13		
31	08:16		07:04			05:04		05:37	06:31		07:23		07:23			08:44		
	17:04		19:58			21:44		21:27	20:21		16:56		16:56			16:14		
Potential sun hours	250	273	367			420	494	510	512	460	382		328		259	233		
Total, worst case				159								35		129				
Sun reduction				0.27								0.32		0.29				
Oper. time red.				1.00								1.00		1.00				
Wind dir. red.				0.65								0.65		0.65				
Total reduction				0.18								0.21		0.19				
Total, real				28								7		24				

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** BI - H61

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March		April	May	June	July	August	September		October		November	December
1	08:44	08:14	07:16			07:01	05:52	05:03	04:59	05:39	06:33		07:26	07:53 (1)	07:24	08:19
	16:15	17:06	18:02			20:00	20:56	21:45	22:00	21:25	20:18		19:05	13 08:06 (1)	16:54	16:10
2	08:44	08:12	07:14			06:59	05:50	05:02	05:00	05:40	06:35		07:28	07:54 (1)	07:26	08:21
	16:16	17:08	18:04			20:02	20:57	21:47	22:00	21:23	20:16		19:02	11 08:05 (1)	16:52	16:09
3	08:44	08:10	07:12			06:57	05:48	05:01	05:00	05:42	06:37		07:30	07:56 (1)	07:28	08:22
	16:17	17:10	18:06			20:04	20:59	21:48	21:59	21:21	20:14		19:00	8 08:04 (1)	16:50	16:09
4	08:43	08:09	07:09			06:54	05:46	05:00	05:01	05:44	06:38		07:32	07:58 (1)	07:30	08:24
	16:18	17:12	18:08			20:06	21:01	21:49	21:59	21:19	20:11		18:57	5 08:03 (1)	16:48	16:08
5	08:43	08:07	07:07			06:52	05:44	04:59	05:02	05:46	06:40		07:33	08:00 (1)	07:32	08:25
	16:20	17:14	18:10			20:08	21:03	21:50	21:58	21:18	20:09		18:55	1 08:01 (1)	16:46	16:07
6	08:43	08:05	07:05			06:49	05:42	04:59	05:03	05:47	06:42		07:35		07:34	08:27
	16:21	17:16	18:12			20:10	21:05	21:51	21:58	21:16	20:06		18:53		16:45	16:07
7	08:42	08:03	07:02			06:47	05:40	04:58	05:04	05:49	06:44		07:37		07:36	08:28
	16:22	17:18	18:13			20:11	21:06	21:52	21:57	21:14	20:04		18:50		16:43	16:06
8	08:42	08:01	07:00			06:44	05:38	04:57	05:05	05:51	06:45		07:39		07:38	08:29
	16:24	17:20	18:15			20:13	21:08	21:53	21:56	21:12	20:02		18:48		16:41	16:06
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52	06:47		07:41		07:40	08:31
	16:25	17:22	18:17	3	07:25 (1)	20:15	21:10	21:54	21:56	21:10	19:59		18:45		16:39	16:06
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49		07:43		07:42	08:32
	16:27	17:24	18:19	7	07:26 (1)	20:17	21:12	21:55	21:55	21:08	19:57		18:43		16:37	16:05
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56	06:51		07:45		07:44	08:33
	16:28	17:26	18:21	10	07:27 (1)	20:19	21:13	21:56	21:54	21:06	19:54		18:41		16:36	16:05
12	08:39	07:53	06:50		07:14 (1)	06:35	05:31	04:56	05:09	05:58	06:52		07:46		07:46	08:34
	16:30	17:28	18:23	12	07:26 (1)	20:21	21:15	21:56	21:53	21:04	19:52		18:38		16:34	16:05
13	08:38	07:51	06:48		07:12 (1)	06:33	05:29	04:55	05:11	05:59	06:54		07:48		07:48	08:35
	16:31	17:30	18:25	15	07:27 (1)	20:22	21:17	21:57	21:52	21:02	19:49		18:36		16:32	16:05
14	08:37	07:49	06:45		07:09 (1)	06:30	05:27	04:55	05:12	06:01	06:56		07:50		07:50	08:36
	16:33	17:32	18:27	17	07:26 (1)	20:24	21:19	21:58	21:51	20:59	19:47		18:34		16:31	16:05
15	08:37	07:47	06:43		07:07 (1)	06:28	05:26	04:55	05:13	06:03	06:58		07:52		07:51	08:37
	16:35	17:34	18:29	19	07:26 (1)	20:26	21:20	21:58	21:50	20:57	19:44		18:31		16:29	16:05
16	08:36	07:45	06:41		07:06 (1)	06:25	05:24	04:55	05:15	06:05	07:00		07:54		07:53	08:38
	16:36	17:36	18:31	19	07:25 (1)	20:28	21:22	21:59	21:49	20:55	19:42		18:29		16:28	16:05
17	08:35	07:43	06:38		07:07 (1)	06:23	05:22	04:54	05:16	06:06	07:01		07:56		07:55	08:39
	16:38	17:38	18:32	17	07:24 (1)	20:30	21:24	21:59	21:48	20:53	19:39		18:27		16:26	16:05
18	08:34	07:41	06:36		07:08 (1)	06:21	05:21	04:54	05:17	06:08	07:03		07:58		07:57	08:39
	16:40	17:40	18:34	14	07:22 (1)	20:32	21:25	22:00	21:46	20:51	19:37		18:24		16:25	16:05
19	08:32	07:39	06:33		07:10 (1)	06:19	05:19	04:54	05:19	06:10	07:05		07:59		07:59	08:40
	16:42	17:42	18:36	10	07:20 (1)	20:34	21:27	22:00	21:45	20:49	19:34		18:22		16:23	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07			08:01		08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32			18:20		16:22	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08			08:03		08:02	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29			18:18		16:21	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10			08:05		08:04	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27			18:15		16:19	16:07
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12			08:07		08:06	08:43
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24			18:13		16:18	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14			07:55 (1)	08:09	08:08	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22		8 08:03 (1)	18:11		16:17	16:08
25	08:25	07:26	06:19		06:05	05:11	04:56	05:28	06:21	07:15		07:52 (1)	07:11		08:10	08:43
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	13 08:05 (1)	17:09			16:16	16:08
26	08:23	07:23	06:16		06:03	05:10	04:56	05:29	06:22	07:17		07:50 (1)	07:13		08:11	08:44
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	15 08:05 (1)	17:07			16:15	16:09
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:48 (1)	07:15		08:13	08:44
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	18 08:06 (1)	17:05			16:14	16:10
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:48 (1)	07:17		08:15	08:44
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	19 08:07 (1)	17:02			16:13	16:11
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:49 (1)	07:19		08:16	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	18 08:07 (1)	17:00			16:12	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		07:51 (1)	07:21		08:18	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	16 08:07 (1)	16:58			16:11	16:13
31	08:16		07:04			05:04		05:37	06:31			07:23				08:44
	17:04		19:58			21:44		21:27	20:21			16:56				16:14
Potential sun hours	250	273	367			420	494	510	512	460	382		328		259	233
Total, worst case				143							107		38			
Sun reduction				0.27							0.32		0.29			
Oper. time red.				1.00							1.00		1.00			
Wind dir. red.				0.66							0.66		0.66			
Total reduction				0.18							0.21		0.19			
Total, real				26							23		7			

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: BJ - H62

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14		07:16		07:41 (3)	07:01	05:52		07:04 (1)	05:03
	16:15	17:06		18:02	8	07:49 (3)	20:00	20:56	35	07:39 (1)	21:45
2	08:44	08:12		07:14		07:39 (3)	06:59	05:50		07:05 (1)	05:02
	16:16	17:08		18:04	11	07:50 (3)	20:02	20:57	32	07:37 (1)	21:47
3	08:44	08:10		07:12		07:36 (3)	06:56	05:48		07:06 (1)	05:01
	16:17	17:10		18:06	13	07:49 (3)	20:04	20:59	29	07:35 (1)	21:48
4	08:43	08:09		07:09		07:34 (3)	06:54	05:46		07:07 (1)	05:00
	16:18	17:12		18:08	16	07:50 (3)	20:06	21:01	26	07:33 (1)	21:49
5	08:43	08:07		07:07		07:31 (3)	06:52	07:16 (1)		07:09 (1)	04:59
	16:20	17:14		18:10	18	07:49 (3)	20:08	23 07:39 (1)	22	07:31 (1)	21:50
6	08:43	08:05		07:05		07:29 (3)	06:49	07:14 (1)		07:12 (1)	04:59
	16:21	17:16		18:11	20	07:49 (3)	20:09	28 07:42 (1)	17	07:29 (1)	21:51
7	08:42	08:03		07:02		07:26 (3)	06:47	07:12 (1)		07:16 (1)	04:58
	16:22	17:18		18:13	22	07:48 (3)	20:11	32 07:44 (1)	9	07:25 (1)	21:52
8	08:42	08:01		07:00		07:27 (3)	06:44	07:09 (1)			04:57
	16:24	17:20		18:15	20	07:47 (3)	20:13	35 07:44 (1)			21:53
9	08:41	07:59		06:57		07:28 (3)	06:42	07:08 (1)			04:57
	16:25	17:22		18:17	19	07:47 (3)	20:15	37 07:45 (1)			21:54
10	08:41	07:57		06:55		07:29 (3)	06:40	07:06 (1)			04:56
	16:27	17:24		18:19	15	07:44 (3)	20:17	40 07:46 (1)			21:55
11	08:40	07:55		06:53		07:31 (3)	06:37	07:05 (1)			04:56
	16:28	17:26		18:21	11	07:42 (3)	20:19	42 07:47 (1)			21:56
12	08:39	07:53		06:50			06:35	07:04 (1)			04:55
	16:30	17:28		18:23			20:21	43 07:47 (1)			21:56
13	08:38	07:51		06:48			06:32	07:04 (1)			04:55
	16:31	17:30		18:25			20:22	44 07:48 (1)			21:57
14	08:37	07:49		06:45			06:30	07:02 (1)			04:55
	16:33	17:32		18:27			20:24	46 07:48 (1)			21:58
15	08:36	07:47		06:43			06:28	07:02 (1)			04:55
	16:35	17:34		18:29			20:26	46 07:48 (1)			21:58
16	08:36	07:45		06:41			06:25	07:02 (1)			04:55
	16:36	17:36		18:30			20:28	46 07:48 (1)			21:59
17	08:35	07:43		06:38			06:23	07:00 (1)			04:54
	16:38	17:38		18:32			20:30	48 07:48 (1)			21:59
18	08:33	07:41		06:36			06:21	07:00 (1)			04:54
	16:40	17:40		18:34			20:32	48 07:48 (1)			22:00
19	08:32	07:39		06:33			06:18	07:00 (1)			04:54
	16:41	17:42		18:36			20:33	48 07:48 (1)			22:00
20	08:31	07:37		06:31			06:16	07:00 (1)			04:54
	16:43	17:44		18:38			20:35	48 07:48 (1)			22:00
21	08:30	07:34		06:28			06:14	07:00 (1)			04:55
	16:45	17:46		18:40			20:37	47 07:47 (1)			22:01
22	08:29	07:32		06:26			06:12	06:59 (1)			04:55
	16:47	17:48		18:42			20:39	47 07:46 (1)			22:01
23	08:27	07:30		06:23			06:09	07:00 (1)			04:55
	16:49	17:50		18:44			20:41	46 07:46 (1)			22:01
24	08:26	07:28		06:21			06:07	07:00 (1)			04:55
	16:51	17:52		18:45			20:43	45 07:45 (1)			22:01
25	08:25	07:25		06:18			06:05	07:00 (1)			04:56
	16:53	17:54		18:47			20:45	45 07:45 (1)			22:01
26	08:23	07:23		06:16			06:03	07:01 (1)			04:56
	16:54	17:56		18:49			20:46	43 07:44 (1)			22:01
27	08:22	07:21	07:46 (3)	06:14			06:01	07:01 (1)			04:57
	16:56	17:58	1 07:47 (3)	18:51			20:48	42 07:43 (1)			22:01
28	08:20	07:19	07:43 (3)	06:11			05:59	07:02 (1)			04:57
	16:58	18:00	5 07:48 (3)	18:53			20:50	40 07:42 (1)			22:01
29	08:19			07:09			05:56	07:02 (1)			04:58
	17:00			19:55			20:52	39 07:41 (1)			22:01
30	08:17			07:06			05:54	07:03 (1)			04:58
	17:02			19:57			20:54	37 07:40 (1)			22:00
31	08:15			07:04							
	17:04			19:58				21:44			
Potential sun hours	250	273		367			420		494		510
Total, worst case			6		173		1102		170		
Sun reduction			0.23		0.27		0.35		0.38		
Oper. time red.			1.00		1.00		1.00		1.00		
Wind dir. red.			0.65		0.65		0.67		0.67		
Total reduction			0.15		0.18		0.24		0.26		
Total, real			1		30		262		44		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: BJ - H62

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:04 (1) 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:05 (1) 19:02	07:26 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:37 20:14	07:06 (1) 19:00	07:28 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:38 20:11	07:07 (1) 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:46 21:18	06:40 20:09	07:08 (1) 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:10 (1) 18:53	07:34 16:45	08:27 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:11 (1) 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:14 (1) 18:48	07:38 16:41	08:29 16:06
9	05:06 21:56	05:52 21:10	06:47 19:59	07:20 (1) 18:45	07:40 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:57	07:25 (1) 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21	07:26 19:05	07:22 16:56	08:19 16:10	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case		1027		259	187	
Sun reduction		0.34		0.32	0.29	
Oper. time red.		1.00		1.00	1.00	
Wind dir. red.		0.67		0.67	0.65	
Total reduction		0.23		0.22	0.19	
Total, real		236		56	35	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BK - H63

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	05:51 (1) 05:56 (1)	04:59 22:00	05:39 21:25	06:09 (1) 06:10 (1)	06:33 07:26	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	06:10 (1) 20:16	06:35 07:28	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	06:10 (1) 20:14	06:37 07:30	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	06:10 (1) 20:11	06:38 07:32	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	06:10 (1) 20:09	06:40 07:33	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	06:10 (1) 20:06	06:42 07:35	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	06:10 (1) 20:04	06:44 07:37	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	06:10 (1) 20:01	06:45 07:39	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	06:10 (1) 19:59	06:47 07:41	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	06:10 (1) 19:57	06:49 07:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 (1) 06:03 (1)	06:49 19:54	06:10 (1) 19:54	06:49 07:44	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:57 (1) 06:05 (1)	06:49 19:52	06:10 (1) 19:52	06:49 07:46	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:56 (1) 06:06 (1)	06:49 19:49	06:10 (1) 19:49	06:49 07:48	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	05:55 (1) 06:07 (1)	06:49 19:47	06:10 (1) 19:47	06:49 07:50	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	05:55 (1) 06:09 (1)	06:49 19:44	06:10 (1) 19:44	06:49 07:52	07:51 16:29	08:37 16:05
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17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	05:54 (1) 06:10 (1)	06:49 19:39	06:10 (1) 19:39	06:49 07:56	07:55 16:25	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	05:53 (1) 06:11 (1)	06:49 19:37	06:10 (1) 19:37	06:49 07:58	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	05:53 (1) 06:12 (1)	06:49 19:34	06:10 (1) 19:34	06:49 07:59	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	05:53 (1) 06:12 (1)	06:49 19:32	06:10 (1) 19:32	06:49 08:01	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	05:53 (1) 06:12 (1)	06:49 19:29	06:10 (1) 19:29	06:49 08:03	08:02 16:21	08:41 16:06
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31	08:15 17:04	07:04 19:58	05:54 20:58	05:04 21:44	05:04 21:44	04:58 21:57	05:37 21:27	06:08 (1) 06:11 (1)	06:49 19:04	06:10 (1) 19:04	06:49 07:22	08:18 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case					256	5	265	1					
Sun reduction					0.38	0.32	0.32	0.34					
Oper. time red.					1.00	1.00	1.00	1.00					
Wind dir. red.					0.66	0.66	0.66	0.66					
Total reduction					0.25	0.21	0.21	0.23					
Total, real					64	1	57	0					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BL - H64

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BM - H65

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58	05:04 21:44			05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Assumptions for shadow calculations

Shadow receptor: BN - H66

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:08 (1) 07:42 (1)	07:26 19:05	07:59 (3) 08:13 (3)	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (1) 20:57	05:50 21:47	05:02 22:00	05:00 21:23	06:35 20:16	07:08 (1) 07:42 (1)	07:28 19:02	07:57 (3) 08:14 (3)	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (1) 20:59	05:48 21:48	05:01 21:59	05:00 21:21	06:37 20:14	07:08 (1) 07:42 (1)	07:30 19:00	07:56 (3) 08:15 (3)	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	07:34 (3) 20:06	06:54 20:06	07:18 (1) 21:01	05:46 21:49	05:00 21:59	06:38 20:11	07:08 (1) 07:40 (1)	07:32 18:57	07:58 (3) 08:15 (3)	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:31 (3) 20:08	06:52 20:08	07:15 (1) 21:03	04:59 21:50	05:02 21:58	06:40 20:09	07:09 (1) 07:39 (1)	07:33 18:55	08:00 (3) 08:15 (3)	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	07:29 (3) 20:09	06:49 20:09	07:13 (1) 21:05	04:59 21:51	05:03 21:58	06:42 20:06	07:09 (1) 07:38 (1)	07:35 18:53	08:02 (3) 08:15 (3)	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:27 (3) 20:11	06:47 20:11	07:13 (1) 21:06	04:58 21:52	05:04 21:57	06:44 20:04	07:10 (1) 07:36 (1)	07:37 18:50	08:04 (3) 08:14 (3)	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:24 (3) 20:13	06:44 20:13	07:11 (1) 21:08	04:57 21:53	05:05 21:56	06:45 20:01	07:12 (1) 07:35 (1)	07:39 18:48	08:06 (3) 08:14 (3)	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	07:22 (3) 20:15	06:42 20:15	07:10 (1) 21:10	04:57 21:54	05:06 21:56	06:47 19:59	07:14 (1) 07:33 (1)	07:41 18:45	08:07 (3) 08:12 (3)	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:19 (3) 20:17	06:40 20:17	07:10 (1) 21:12	04:56 21:55	05:07 21:08	06:49 19:57	07:16 (1) 07:30 (1)	07:43 18:43	08:09 (3) 08:11 (3)	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:19 (3) 20:19	06:37 20:19	07:09 (1) 21:13	04:56 21:56	05:08 21:06	06:56 19:54	07:20 (1) 07:23 (1)	07:44 18:41	08:07 (3) 08:13 (3)	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:19 (3) 20:21	06:35 20:21	07:09 (1) 21:15	04:56 21:56	05:09 21:53	06:52 21:04	07:23 (1) 07:35 (1)	07:46 18:38	08:10 (3) 08:13 (3)	07:47 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:21 (3) 20:22	06:32 20:22	07:09 (1) 21:17	04:55 21:57	05:11 21:52	06:54 19:49	07:36 (1) 07:38 (1)	07:59 18:36	08:08 (3) 08:13 (3)	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	07:24 (3) 20:24	06:30 20:24	07:08 (1) 21:19	04:55 21:58	05:12 21:51	06:01 20:59	07:39 (1) 07:42 (1)	07:07 18:34	08:09 (3) 08:13 (3)	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	07:28 (3) 20:26	06:28 20:26	07:08 (1) 21:20	04:55 21:58	05:13 20:57	06:03 20:57	07:40 (1) 07:42 (1)	07:03 18:31	08:10 (3) 08:13 (3)	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	07:25 (3) 20:28	06:25 20:28	07:08 (1) 21:22	04:55 21:59	05:14 20:55	06:05 20:55	07:43 (1) 07:45 (1)	07:05 18:29	08:11 (3) 08:14 (3)	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	07:23 (3) 20:30	06:23 20:30	07:08 (1) 21:24	04:54 21:59	05:16 20:53	06:06 20:53	07:44 (1) 07:46 (1)	07:06 18:27	08:12 (3) 08:15 (3)	07:56 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	07:21 (3) 20:32	06:21 20:32	07:09 (1) 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:26 (1) 07:32 (1)	07:03 19:37	08:13 (3) 08:16 (3)	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	07:19 (3) 20:33	06:19 20:33	07:09 (1) 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:27 (1) 07:35 (1)	07:05 19:34	08:14 (3) 08:17 (3)	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	07:16 (3) 20:35	06:16 20:35	07:10 (1) 21:28	04:54 22:00	05:18 21:44	06:12 20:46	07:36 (1) 07:38 (1)	07:07 19:32	08:15 (3) 08:18 (3)	07:59 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	07:14 (3) 20:37	06:14 20:37	07:11 (1) 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:17 (1) 07:19 (1)	07:08 19:29	08:16 (3) 08:19 (3)	07:59 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	07:12 (3) 20:39	06:12 20:39	07:12 (1) 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:15 (1) 07:17 (1)	07:10 19:27	08:20 (3) 08:23 (3)	07:59 16:20	08:43 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	07:11 (3) 20:41	06:09 20:41	07:14 (1) 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:14 (1) 07:16 (1)	07:12 19:24	08:24 (3) 08:27 (3)	07:59 16:18	08:44 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	07:10 (3) 20:43	06:07 20:43	07:16 (1) 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:13 (1) 07:15 (1)	07:14 19:22	08:25 (3) 08:28 (3)	07:59 16:17	08:45 16:08
25	08:25 16:53	07:26 17:54	06:18 18:47	07:09 (3) 20:45	06:05 20:45	07:15 (1) 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:12 (1) 07:14 (1)	07:15 19:19	08:29 (3) 08:32 (3)	07:59 16:16	08:46 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	07:08 (3) 20:46	06:03 20:46	07:16 (1) 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:11 (1) 07:13 (1)	07:17 19:17	08:33 (3) 08:36 (3)	07:59 16:15	08:47 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	07:07 (3) 20:48	06:01 20:48	07:17 (1) 21:39	04:57 22:01	05:31 21:40	06:24 20:30	07:10 (1) 07:12 (1)	07:19 19:15	08:37 (3) 08:40 (3)	07:59 16:14	08:48 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	07:06 (3) 20:50	06:00 20:50	07:18 (1) 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:11 (1) 07:13 (1)	07:21 19:12	08:41 (3) 08:44 (3)	07:59 16:13	08:49 16:11
29	08:19 17:00		07:09 19:55	07:05 (3) 20:52	05:56 20:52	07:19 (1) 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:12 (1) 07:14 (1)	07:23 19:10	08:45 (3) 08:48 (3)	07:59 16:12	08:50 16:12
30	08:17 17:02		07:06 19:57	07:04 (3) 20:54	05:54 20:54	07:20 (1) 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:13 (1) 07:15 (1)	07:24 19:07	08:49 (3) 08:52 (3)	07:59 16:11	08:51 16:13
31	08:15 17:04		07:04 19:58	07:03 (3) 21:44	05:04 21:44	07:21 (1) 21:47	04:58 22:21	05:37 20:21	06:31 20:21	07:14 (1) 07:16 (1)	07:25 19:07	08:53 (3) 08:56 (3)	07:59 16:14	08:54 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	288	120	259	233	
Total, worst case			126	644					381	288	120			
Sun reduction			0.27	0.35					0.34	0.32	0.29			
Oper. time red.			1.00	1.00					1.00	1.00	1.00			
Wind dir. red.			0.65	0.68					0.68	0.67	0.65			
Total reduction			0.18	0.24					0.23	0.22	0.19			
Total, real			22	153					88	62	23			

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BO - H67

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
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8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
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26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BP - H68

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44			05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: BQ - H69

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		10:50 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24				06:33	07:26	07:24		08:19		10:46 (2)		
	16:15	55	15:36 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54				19:05	16:54			16:10	39	15:24 (1)		
2	08:44		10:51 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26				06:35	07:28	07:26		08:21		10:45 (2)		
	16:16	54	15:37 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				19:02	16:52			16:09	43	15:25 (1)		
3	08:44		10:52 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28				06:36	07:30	07:28		08:22		10:43 (2)		
	16:17	54	15:37 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50				19:00	16:50			16:08	47	15:25 (1)		
4	08:43		10:53 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30				06:38	07:32	07:30		08:24		10:42 (2)		
	16:18	53	15:38 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48				18:57	16:48			16:08	49	15:25 (1)		
5	08:43		10:54 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32				06:40	07:33	07:32		08:25		10:41 (2)		
	16:20	51	15:38 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46				18:55	16:46			16:07	50	15:25 (1)		
6	08:43		10:55 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34				06:42	07:35	07:34		08:27		10:41 (2)		
	16:21	51	15:39 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44				18:52	16:44			16:07	52	15:26 (1)		
7	08:42		10:56 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				06:43	07:37	07:36		08:28		10:41 (2)		
	16:22	51	15:40 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				18:50	16:43			16:06	51	15:25 (1)		
8	08:42		10:57 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38				06:45	07:39	07:38		08:29		10:41 (2)		
	16:24	49	15:40 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41				18:48	16:41			16:06	53	15:26 (1)		
9	08:41		11:00 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				06:47	07:41	07:40		08:30		10:41 (2)		
	16:25	46	15:41 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39				18:45	16:39			16:05	53	15:26 (1)		
10	08:40		11:01 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42				06:49	07:43	07:42		08:32		10:40 (2)		
	16:26	45	15:42 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37				18:43	16:37			16:05	54	15:26 (1)		
11	08:40		11:04 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44				06:51	07:44	07:44		08:33		10:40 (2)		
	16:28	39	15:42 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36				18:40	16:36			16:05	55	15:26 (1)		
12	08:39		11:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46				06:52	07:46		15:04 (1)	08:34		10:40 (2)		
	16:30	30	15:43 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34				18:38	16:34		3	15:07 (1)	16:05	55	15:26 (1)	
13	08:38		15:14 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47				06:54	07:48	07:47		15:00 (1)	08:35		10:41 (2)	
	16:31	29	15:43 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32				18:36	16:32		11	15:11 (1)	16:05	55	15:27 (1)	
14	08:37		15:14 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				06:56	07:50	07:49		14:57 (1)	08:36		10:41 (2)	
	16:33	30	15:44 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31				18:33	16:31		16	15:13 (1)	16:05	55	15:27 (1)	
15	08:36		15:15 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51				06:58	07:52	07:51		14:56 (1)	08:37		10:42 (2)	
	16:34	29	15:44 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				18:31	16:29		19	15:15 (1)	16:05	54	15:27 (1)	
16	08:35		15:15 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53				06:59	07:54	07:53		14:55 (1)	08:38		10:41 (2)	
	16:36	30	15:45 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27				18:29	16:27		21	15:16 (1)	16:05	54	15:26 (1)	
17	08:34		15:15 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55				07:01	07:56	07:55		14:54 (1)	08:39		10:42 (2)	
	16:38	29	15:44 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26				18:27	16:26		23	15:17 (1)	16:05	54	15:27 (1)	
18	08:33		15:16 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				07:03	07:57	07:57		14:54 (1)	08:39		10:42 (2)	
	16:40	29	15:45 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25				18:24	16:25		24	15:18 (1)	16:05	54	15:27 (1)	
19	08:32		15:17 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				07:05	07:59	07:59		14:53 (1)	08:40		10:43 (2)	
	16:41	28	15:45 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23				18:22	16:23		26	15:19 (1)	16:05	54	15:28 (1)	
20	08:31		15:17 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01				07:06	08:01	08:01		14:53 (1)	08:41		10:43 (2)	
	16:43	28	15:45 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22				18:20	16:22		27	15:20 (1)	16:06	53	15:27 (1)	
21	08:30		15:18 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				07:08	08:03	08:02		14:53 (1)	08:41		10:43 (2)	
	16:45	27	15:45 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20				18:17	16:20		27	15:20 (1)	16:06	54	15:28 (1)	
22	08:29		15:18 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04				07:10	08:05	08:04		14:53 (1)	08:42		10:43 (2)	
	16:47	27	15:45 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19				18:15	16:19		28	15:21 (1)	16:06	54	15:28 (1)	
23	08:27		15:19 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				07:12	08:07	08:06		14:53 (1)	08:42		10:45 (2)	
	16:49	26	15:45 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18				18:13	16:18		28	15:21 (1)	16:07	53	15:29 (1)	
24	08:26		15:20 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08				07:14	08:09	08:08		14:53 (1)	08:43		10:45 (2)	
	16:51	24	15:44 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17				18:11	16:17		29	15:22 (1)	16:08	53	15:29 (1)	
25	08:25		15:21 (1)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09				07:15	08:11	08:09		14:53 (1)	08:43		10:45 (2)	
	16:52	23	15:44 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16				17:09	16:16		29	15:22 (1)	16:08	54	15:30 (1)	
26	08:23		15:22 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11				07:17	08:13	08:11		14:54 (1)	08:43		10:46 (2)	
	16:54	21	15:43 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15				19:17	17:07		29	15:23 (1)	16:09	54	15:31 (1)	
27	08:22		15:24 (1)	07:21	06:13	06																			

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Assumptions for shadow calculations

Shadow receptor: BR - H70

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	12:24 (2) 08:14	16:25 (1) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:50 (1) 08:19	12:14 (2)
2	08:44	12:25 (2) 08:12	16:24 (1) 07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	15:50 (1) 08:21	12:14 (2)
3	08:44	12:25 (2) 08:10	16:23 (1) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	15:50 (1) 08:22	12:13 (2)
4	08:43	12:26 (2) 08:08	16:22 (1) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	15:50 (1) 08:24	12:13 (2)
5	08:43	12:26 (2) 08:07	16:21 (1) 07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	15:50 (1) 08:25	12:13 (2)
6	08:43	12:27 (2) 08:05	16:21 (1) 07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	15:51 (1) 08:26	12:14 (2)
7	08:42	12:28 (2) 08:03	16:20 (1) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	15:52 (1) 08:28	12:13 (2)
8	08:42	12:28 (2) 08:01	16:20 (1) 07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	15:53 (1) 08:29	12:13 (2)
9	08:41	12:30 (2) 07:59	16:20 (1) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	15:55 (1) 08:30	12:14 (2)
10	08:40	12:31 (2) 07:57	16:20 (1) 06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	15:56 (1) 08:32	12:14 (2)
11	08:40	12:32 (2) 07:55	16:21 (1) 06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	15:59 (1) 08:33	12:14 (2)
12	08:39	12:32 (2) 07:53	16:21 (1) 06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	16:03 (1) 08:34	12:14 (2)
13	08:38	12:34 (2) 07:51	16:21 (1) 06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	16:05 (1) 08:35	12:15 (2)
14	08:37	12:35 (2) 07:49	16:21 (1) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	16:06 (1) 08:36	12:15 (2)
15	08:36	12:36 (2) 07:47	16:23 (1) 06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	16:07 (1) 08:37	12:15 (2)
16	08:35	12:38 (2) 07:45	16:24 (1) 06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	16:08 (1) 08:38	12:15 (2)
17	08:34	12:38 (2) 07:43	16:26 (1) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	16:09 (1) 08:39	12:16 (2)
18	08:33	12:40 (2) 07:41	16:28 (1) 06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	16:10 (1) 08:40	12:16 (2)
19	08:32	12:43 (2) 07:39	16:33 (1) 06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	16:12 (1) 08:41	12:17 (2)
20	08:31	12:44 (2) 07:37	16:36 (1) 06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	16:13 (1) 08:42	12:17 (2)
21	08:30	12:47 (2) 07:34	16:38 (1) 06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	16:14 (1) 08:43	12:18 (2)
22	08:29	12:51 (2) 07:32	16:40 (1) 06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	16:15 (1) 08:44	12:18 (2)
23	08:27	13:02 (2) 07:30	16:42 (1) 06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	16:16 (1) 08:45	12:19 (2)
24	08:26	13:02 (2) 07:28	16:44 (1) 06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	16:17 (1) 08:46	12:19 (2)
25	08:25	13:02 (2) 07:25	16:46 (1) 06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:11	16:18 (1) 08:47	12:20 (2)
26	08:23	13:02 (2) 07:23	16:48 (1) 06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:13	16:19 (1) 08:48	12:21 (2)
27	08:22	13:02 (2) 07:21	16:50 (1) 06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:15	16:20 (1) 08:49	12:22 (2)
28	08:20	13:02 (2) 07:19	16:52 (1) 06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:17	16:21 (1) 08:50	12:23 (2)
29	08:19	13:02 (2) 07:17	16:54 (1) 06:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:18	16:22 (1) 08:51	12:24 (2)
30	08:17	13:02 (2) 07:15	16:56 (1) 06:07	05:54	05:05	04:58	05:35	06:29	07:24	08:19	08:19	16:23 (1) 08:52	12:25 (2)
31	08:15	13:02 (2) 07:13	16:58 (1) 06:05	05:52	05:04	04:59	05:37	06:31	07:26	08:21	08:21	16:24 (1) 08:53	12:26 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	1531
Total, worst case	855	359											1531
Sun reduction	0.24	0.23											0.21
Oper. time red.	1.00	1.00											1.00
Wind dir. red.	0.63	0.66											0.63
Total reduction	0.15	0.15											0.13
Total, real	131	55											199

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations**Shadow receptor:** BS - H71

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	13:35 (2) 08:14	13:54 (2) 07:16	14:37 (2) 07:01	15:52 05:03	14:59 05:39	16:33 07:26	17:24 08:19	18:19 13:21 (2)	19:15 14:20 (2)	20:00 15:05	20:55 16:10	21:45 16:59
2 08:44	13:36 (2) 08:12	13:56 (2) 07:14	14:38 (2) 07:03	15:53 05:04	14:59 05:40	16:34 07:27	17:25 08:20	18:20 13:22 (2)	19:16 14:21 (2)	20:01 15:11	20:56 16:00	21:46 16:59
3 08:44	13:37 (2) 08:10	13:57 (2) 07:12	14:39 (2) 07:01	15:54 05:05	14:59 05:41	16:35 07:28	17:26 08:21	18:21 13:23 (2)	19:17 14:22 (2)	20:02 15:12	20:57 16:01	21:47 16:59
4 08:43	13:36 (2) 08:10	13:58 (2) 07:12	14:40 (2) 07:02	15:55 05:06	14:59 05:42	16:36 07:29	17:27 08:22	18:22 13:24 (2)	19:18 14:23 (2)	20:03 15:13	20:58 16:02	21:48 16:59
5 08:43	13:36 (2) 08:07	14:02 (2) 07:07	14:42 (2) 07:00	15:56 05:07	14:59 05:43	16:37 07:30	17:28 08:23	18:23 13:25 (2)	19:19 14:24 (2)	20:04 15:14	20:59 16:03	21:49 16:59
6 08:43	13:37 (2) 08:05	14:05 (2) 07:05	14:44 (2) 07:01	15:57 05:08	14:59 05:44	16:38 07:31	17:29 08:24	18:24 13:26 (2)	19:20 14:25 (2)	20:05 15:15	21:00 16:04	21:50 16:59
7 08:42	13:37 (2) 08:03	14:10 (2) 07:02	14:47 (2) 07:02	15:58 05:09	14:59 05:45	16:39 07:32	17:30 08:25	18:25 13:27 (2)	19:21 14:26 (2)	20:06 15:16	21:01 16:05	21:51 16:59
8 08:42	13:37 (2) 08:01	14:23 (2) 07:00	14:51 (2) 07:00	15:59 05:10	14:59 05:46	16:40 07:33	17:31 08:26	18:26 13:28 (2)	19:22 14:27 (2)	20:07 15:17	21:02 16:06	21:52 16:59
9 08:41	13:39 (2) 07:59	14:28 (2) 06:59	14:59 (2) 06:59	16:00 05:11	14:59 05:47	16:41 07:34	17:32 08:27	18:27 13:29 (2)	19:23 14:28 (2)	20:08 15:18	21:03 16:07	21:53 16:59
10 08:40	13:39 (2) 07:57	14:30 (2) 06:57	15:01 (2) 06:57	16:02 05:12	14:59 05:48	16:42 07:35	17:33 08:28	18:28 13:30 (2)	19:24 14:29 (2)	20:09 15:19	21:04 16:08	21:54 16:59
11 08:40	13:39 (2) 07:55	14:31 (2) 06:55	15:02 (2) 06:55	16:03 05:13	14:59 05:49	16:43 07:36	17:34 08:29	18:29 13:31 (2)	19:25 14:30 (2)	20:10 15:20	21:05 16:09	21:55 16:59
12 08:39	13:40 (2) 07:53	14:32 (2) 06:53	15:03 (2) 06:53	16:04 05:14	14:59 05:50	16:44 07:37	17:35 08:30	18:30 13:32 (2)	19:26 14:31 (2)	20:11 15:21	21:06 16:10	21:56 16:59
13 08:38	13:40 (2) 07:51	14:33 (2) 06:51	15:04 (2) 06:51	16:05 05:15	14:59 05:51	16:45 07:38	17:36 08:31	18:31 13:33 (2)	19:27 14:32 (2)	20:12 15:22	21:07 16:11	21:57 16:59
14 08:37	13:40 (2) 07:49	14:34 (2) 06:49	15:05 (2) 06:49	16:06 05:16	14:59 05:52	16:46 07:39	17:37 08:32	18:32 13:34 (2)	19:28 14:33 (2)	20:13 15:23	21:08 16:12	21:58 16:59
15 08:36	13:41 (2) 07:47	14:35 (2) 06:47	15:06 (2) 06:47	16:07 05:17	14:59 05:53	16:47 07:40	17:38 08:33	18:33 13:35 (2)	19:29 14:34 (2)	20:14 15:24	21:09 16:13	21:59 16:59
16 08:35	13:41 (2) 07:45	14:36 (2) 06:45	15:07 (2) 06:45	16:08 05:18	14:59 05:54	16:48 07:41	17:39 08:34	18:34 13:36 (2)	19:30 14:35 (2)	20:15 15:25	21:10 16:14	22:00 16:59
17 08:34	13:41 (2) 07:43	14:37 (2) 06:43	15:08 (2) 06:43	16:09 05:19	14:59 05:55	16:49 07:42	17:40 08:35	18:35 13:37 (2)	19:31 14:36 (2)	20:16 15:26	21:11 16:15	22:01 16:59
18 08:33	13:42 (2) 07:41	14:38 (2) 06:41	15:09 (2) 06:41	16:10 05:20	14:59 05:56	16:50 07:43	17:41 08:36	18:36 13:38 (2)	19:32 14:37 (2)	20:17 15:27	21:12 16:16	22:02 16:59
19 08:32	13:43 (2) 07:39	14:39 (2) 06:39	15:10 (2) 06:39	16:11 05:21	14:59 05:57	16:51 07:44	17:42 08:37	18:37 13:39 (2)	19:33 14:38 (2)	20:18 15:28	21:13 16:17	22:03 16:59
20 08:31	13:43 (2) 07:36	14:40 (2) 06:36	15:11 (2) 06:36	16:12 05:22	14:59 05:58	16:52 07:45	17:43 08:38	18:38 13:40 (2)	19:34 14:39 (2)	20:19 15:29	21:14 16:18	22:04 16:59
21 08:30	13:44 (2) 07:34	14:41 (2) 06:34	15:12 (2) 06:34	16:13 05:23	14:59 05:59	16:53 07:46	17:44 08:39	18:39 13:41 (2)	19:35 14:40 (2)	20:20 15:30	21:15 16:19	22:05 16:59
22 08:29	13:44 (2) 07:32	14:42 (2) 06:32	15:13 (2) 06:32	16:14 05:24	14:59 06:00	16:54 07:47	17:45 08:40	18:40 13:42 (2)	19:36 14:41 (2)	20:21 15:31	21:16 16:20	22:06 16:59
23 08:27	13:45 (2) 07:30	14:43 (2) 06:30	15:14 (2) 06:30	16:15 05:25	14:59 06:01	16:55 07:48	17:46 08:41	18:41 13:43 (2)	19:37 14:42 (2)	20:22 15:32	21:17 16:21	22:07 16:59
24 08:26	13:45 (2) 07:28	14:44 (2) 06:28	15:15 (2) 06:28	16:16 05:26	14:59 06:02	16:56 07:49	17:47 08:42	18:42 13:44 (2)	19:38 14:43 (2)	20:23 15:33	21:18 16:22	22:08 16:59
25 08:25	13:47 (2) 07:25	14:46 (2) 06:25	15:17 (2) 06:25	16:18 05:27	14:59 06:03	16:57 07:50	17:48 08:43	18:43 13:45 (2)	19:39 14:44 (2)	20:24 15:34	21:19 16:23	22:09 16:59
26 08:23	13:47 (2) 07:23	14:47 (2) 06:23	15:18 (2) 06:23	16:19 05:28	14:59 06:04	16:58 07:51	17:49 08:44	18:44 13:46 (2)	19:40 14:45 (2)	20:25 15:35	21:20 16:24	22:10 16:59
27 08:22	13:48 (2) 07:21	14:48 (2) 06:21	15:19 (2) 06:21	16:20 05:29	14:59 06:05	16:59 07:52	17:50 08:45	18:45 13:47 (2)	19:41 14:46 (2)	20:26 15:36	21:21 16:25	22:11 16:59
28 08:20	13:49 (2) 07:19	14:49 (2) 06:19	15:20 (2) 06:19	16:21 05:30	14:59 06:06	17:00 07:53	17:51 08:46	18:46 13:48 (2)	19:42 14:47 (2)	20:27 15:37	21:22 16:26	22:12 16:59
29 08:19	13:50 (2) 07:17	14:50 (2) 06:17	15:21 (2) 06:17	16:22 05:31	14:59 06:07	17:01 07:54	17:52 08:47	18:47 13:49 (2)	19:43 14:48 (2)	20:28 15:38	21:23 16:27	22:13 16:59
30 08:17	13:51 (2) 07:15	14:51 (2) 06:15	15:22 (2) 06:15	16:23 05:32	14:59 06:08	17:02 07:55	17:53 08:48	18:48 13:50 (2)	19:44 14:49 (2)	20:29 15:39	21:24 16:28	22:14 16:59
31 08:15	13:52 (2) 07:13	14:52 (2) 06:13	15:23 (2) 06:13	16:24 05:33	14:59 06:09	17:03 07:56	17:54 08:49	18:49 13:51 (2)	19:45 14:50 (2)	20:30 15:40	21:25 16:29	22:15 16:59
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	1742	485										
Sun reduction	0.24	0.23										
Oper. time red.	1.00	1.00										
Wind dir. red.	0.65	0.66										
Total reduction	0.16	0.15										
Total, real	274	74										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BT - H72

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		16:12 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		15:37 (2)	08:19		15:26 (3)				
	16:15		17:06	22	16:34 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	34	16:11 (2)	16:10	8	15:34 (3)				
2	08:44		08:12		16:11 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28		07:26		15:37 (2)	08:21		15:26 (3)				
	16:16		17:08	25	16:36 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	33	16:10 (2)	16:09	6	15:32 (3)				
3	08:44		08:10		16:10 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		15:37 (2)	08:22		15:27 (3)				
	16:17		17:10	27	16:37 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00		16:50	33	16:10 (2)	16:08	5	15:32 (3)				
4	08:43		08:08		16:09 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31		07:30		15:38 (2)	08:24		15:28 (3)				
	16:18		17:12	29	16:38 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	31	16:09 (2)	16:08	4	15:32 (3)				
5	08:43		08:07		16:09 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33		07:32		15:38 (2)	08:25		15:28 (3)				
	16:19		17:14	30	16:39 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55		16:46	31	16:09 (2)	16:07	2	15:30 (3)				
6	08:43		08:05		16:08 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35		07:34		15:39 (2)	08:26						
	16:21		17:16	31	16:39 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52		16:44	29	16:08 (2)	16:07						
7	08:42		08:03		16:08 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37		07:36		15:39 (2)	08:28						
	16:22	2	15:45 (3)	17:18	32	16:40 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	29	16:08 (2)	16:06						
8	08:42		15:43 (3)	08:01	16:08 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39		07:38		15:40 (2)	08:29						
	16:24	3	15:46 (3)	17:20	32	16:40 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	27	16:07 (2)	16:06						
9	08:41		15:44 (3)	07:59	16:08 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		15:42 (2)	08:30						
	16:25	5	15:49 (3)	17:22	33	16:41 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	25	16:07 (2)	16:05						
10	08:40		15:44 (3)	07:57	16:08 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42		07:42		15:43 (2)	08:31						
	16:26	6	15:50 (3)	17:24	33	16:41 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	22	16:05 (2)	16:05						
11	08:40		15:43 (3)	07:55	16:08 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44		07:44		15:44 (2)	08:33						
	16:28	9	15:52 (3)	17:26	33	16:41 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	19	16:03 (2)	16:05						
12	08:39		15:43 (3)	07:53	16:08 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46		07:46		15:46 (2)	08:34						
	16:30	11	15:54 (3)	17:28	33	16:41 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	15	16:01 (2)	16:05						
13	08:38		15:53 (3)	07:51	16:07 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:47		07:47		15:49 (2)	08:35						
	16:31	11	15:55 (3)	17:30	33	16:40 (2)	18:24	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	10	15:59 (2)	16:04						
14	08:37		15:44 (3)	07:49	16:08 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49		15:58 (3)	08:36						
	16:33	13	15:57 (3)	17:32	32	16:40 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	4	15:52 (3)	16:04						
15	08:36		15:44 (3)	07:47	16:09 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52		07:51		15:52 (3)	08:37						
	16:34	15	15:59 (3)	17:34	31	16:40 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	10	15:35 (3)	16:04						
16	08:35		15:43 (3)	07:45	16:10 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54		07:53		15:24 (3)	08:38						
	16:36	17	16:00 (3)	17:36	29	16:39 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	13	15:37 (3)	16:05						
17	08:34		15:44 (3)	07:43	16:11 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55		07:55		15:23 (3)	08:38						
	16:38	18	16:02 (3)	17:38	27	16:38 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	15	15:38 (3)	16:05						
18	08:33		15:45 (3)	07:41	16:11 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57		15:22 (3)	08:39						
	16:40	20	16:05 (3)	17:40	26	16:37 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	17	15:39 (3)	16:05						
19	08:32		15:45 (3)	07:39	16:12 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		07:59		15:21 (3)	08:40						
	16:41	21	16:06 (3)	17:42	24	16:36 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	19	15:40 (3)	16:05						
20	08:31		15:46 (3)	07:36	16:14 (2)	06:31	06:16	05:18	04:51	05:20	06:12	07:06	08:00			16:50 (2)	15:41 (3)	16:05						
	16:43	21	16:06 (3)	17:44	20	16:34 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	20	15:40 (2)	16:06						
21	08:30		15:46 (3)	07:34	16:17 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		16:47 (2)	08:02	15:21 (3)	08:41						
	16:45	20	16:06 (3)	17:46	15	16:32 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16	17:03 (2)	16:20	20	15:41 (3)	16:06				
22	08:29		15:46 (3)	07:32	16:21 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		16:44 (2)	08:04	15:21 (3)	08:42						
	16:47	20	16:06 (3)	17:48	6	16:27 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	21	17:05 (2)	16:19	21	15:42 (3)	16:06				
23	08:27		15:47 (3)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		16:42 (2)	08:06	15:21 (3)	08:42						
	16:49	19	16:06 (3)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	24	17:06 (2)	16:18	21	15:42 (3)	16:07					
24	08:26		15:48 (3)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09		16:41 (2)	08:08	15:22 (3)	08:43						
	16:50	17	16:05 (3)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	26	17:07 (2)	16:17	20	15:42 (3)	16:08					
25	08:25		15:50 (3)	07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11		15:40 (2)	08:09	15:22 (3)	08:43						
	16:52	15	16:05 (3)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	28	16:08 (2)	16:16	19	15:41 (3)	16:08					
26	08:23		15:51 (3)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13		15:39 (2)	08:11	15:23 (3)	08:43						
	16:54	13	16:04 (3)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	30	16:09 (2)	16:14	16	15:39 (3)	16:09					
27	08:22		15:52 (3)	07:21		06:13	06:00	05:06	04:56	05:30	06:24	07:19	07:15		15:38 (2)	08:13	15:23 (3)	08:44						
	16:56	10	16:02 (3)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	31	16:09 (2)	16:13	15	15:38 (3)	16:10					
28	08:20		15:56 (3)	07:18		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16		15:37 (2)	08:14	15:24 (3)	08:44						
	16:58	4	16:00 (3)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	32	16:09 (2)	16:12								

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BU - H73

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	08:14	15:58 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26			06:33	07:26			07:24		15:29 (2)	08:19		
2	08:44	08:12	15:58 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28			06:35	07:28			07:26	29	15:58 (2)	08:19		
3	08:44	08:10	15:58 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30			06:36	07:30			07:28	30	15:58 (2)	08:19		
4	08:43	08:08	15:57 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31			06:38	07:31			07:30	31	15:57 (2)	08:24		
5	08:43	08:07	15:57 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33			06:40	07:33			07:32	32	15:57 (2)	08:25		
6	08:43	08:05	15:57 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35			06:42	07:35			07:34	32	15:57 (2)	08:26		
7	08:42	08:03	15:58 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37			06:43	07:37			07:36	32	15:57 (2)	08:28		
8	08:42	08:01	15:58 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39			06:45	07:39			07:38	32	15:57 (2)	08:29		
9	08:41	07:59	15:59 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41			06:47	07:41			07:40	30	15:59 (2)	08:30		
10	08:40	07:57	15:59 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42			06:49	07:42			07:42	30	15:59 (2)	08:32		
11	08:40	07:55	16:00 (2)	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44			06:50	07:44			07:44	28	15:58 (2)	08:35		
12	08:39	07:53	16:01 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46			06:52	07:46			07:46	27	15:57 (2)	08:36		
13	08:38	07:51	16:02 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48			06:54	07:48			07:47	26	15:57 (2)	08:37		
14	08:37	07:49	16:03 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50			06:56	07:50			07:49	24	15:56 (2)	08:38		
15	08:36	07:47	16:05 (2)	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52			06:58	07:52			07:51	22	15:55 (2)	08:39		
16	08:35	07:45	16:08 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54			06:59	07:54			07:53	20	15:54 (2)	08:40		
17	08:34	07:43	16:20 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55			07:01	07:55			07:55	18	15:52 (2)	08:41		
18	08:33	07:41	16:21 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57			07:03	07:57			07:57	16	15:52 (2)	08:42		
19	08:32	07:39	16:22 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59			07:05	07:59			07:59	14	15:50 (2)	08:43		
20	08:31	07:36	16:23 (2)	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01			07:06	08:01			08:00	12	15:48 (2)	08:44		
21	08:30	07:34	16:24 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03			07:08	08:03			08:02	10	15:47 (2)	08:45		
22	08:29	07:32	16:25 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05			07:10	08:05			08:04	8	15:46 (2)	08:46		
23	08:27	16:07 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07			07:12	08:07			08:06	6	15:45 (2)	08:47		
24	08:26	16:14 (2)	07:50	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09			07:13	08:09			08:08	4	15:44 (2)	08:48		
25	08:25	16:16 (2)	07:52	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11			07:15	08:11			08:10	2	15:43 (2)	08:49		
26	08:23	16:19 (2)	07:54	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13			07:17	08:13			08:12	1	15:42 (2)	08:50		
27	08:22	16:21 (2)	07:56	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15			07:19	08:15			08:14	1	15:41 (2)	08:51		
28	08:20	16:22 (2)	07:58	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16			07:21	08:16			08:15	1	15:40 (2)	08:52		
29	08:19	16:24 (2)	08:00	06:08	05:56	05:06	04:57	05:34	06:27	07:22	08:17			07:22	08:17			08:16	1	15:39 (2)	08:53		
30	08:17	16:25 (2)		06:06	05:54	05:05	04:58	05:35	06:29	07:24	08:18			07:24	08:18			08:17	1	15:38 (2)	08:54		
31	08:15	16:26 (2)		06:04	05:52	05:04	04:59	05:37	06:31	07:27	08:22			07:27	08:22			08:21	1	15:37 (2)	08:55		
Potential sun hours	250	273	367	420	494	510	512	460	382	29	15:57 (2)	259	491	0.27	1.00	0.66	0.19	0.18	0.18	0.18	0.18	0.18	0.18
Total, worst case	183	437												143				491					
Sun reduction	0.24	0.23												0.29				0.27					
Oper. time red.	1.00	1.00												1.00				1.00					
Wind dir. red.	0.66	0.66												0.66				0.66					
Total reduction	0.16	0.15												0.19				0.18					
Total, real	29	67												28				86					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BV - H74

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BW - H75

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BX - H76

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: BY - H77

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	09:03 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	09:19 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	09:04 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	09:17 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	09:07 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
	16:17	17:10	09:15 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:08
4	08:43	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25
	16:20	17:14		18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
9	08:41	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
	16:25	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:05
10	08:41	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
	16:28	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
12	08:39	07:53		06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34
	16:30	17:28		18:23	20:21	21:15	21:58	21:53	21:04	19:52	18:38	16:05
13	08:38	09:10 (2)		06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
	16:31	09:13 (2)		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:05
14	08:37	09:09 (2)		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33	09:14 (2)		18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:05
15	08:37	09:08 (2)		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
	16:34	09:15 (2)		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
16	08:36	09:07 (2)		06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38
	16:36	09:16 (2)		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
17	08:35	09:05 (2)		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
	16:38	09:17 (2)		18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
18	08:33	09:04 (2)		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39
	16:40	09:18 (2)		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
19	08:32	09:03 (2)		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:40
	16:41	09:19 (2)		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:05
20	08:31	09:01 (2)		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:41
	16:43	09:19 (2)		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:06
21	08:30	09:00 (2)		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:41
	16:45	09:20 (2)		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:06
22	08:29	08:59 (2)		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
	16:47	09:21 (2)		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:07
23	08:27	08:57 (2)		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
	16:49	09:21 (2)		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:07
24	08:26	08:56 (2)		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
	16:51	09:21 (2)		18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:07
25	08:25	08:57 (2)		06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:43
	16:52	09:21 (2)		18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:09	16:08
26	08:23	08:57 (2)		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:44
	16:54	09:21 (2)		18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:09
27	08:22	08:58 (2)		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:44
	16:56	09:22 (2)		18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	16:10
28	08:20	08:59 (2)		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:44
	16:58	09:21 (2)		18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:11
29	08:19	08:59 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:44
	17:00	09:21 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:12
30	08:17	09:00 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:44
	17:02	09:20 (2)		19:56	20:54	21:43	22:01	21:28	20:23	19:07	18:58	16:11
31	08:15	09:02 (2)		07:04		05:04		05:37	06:31		07:22	08:44
	17:04	09:20 (2)		19:58		21:44		21:27	20:21		18:56	16:12
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	329	37									371	
Sun reduction	0.24	0.23									0.27	
Oper. time red.	1.00	1.00									1.00	
Wind dir. red.	0.61	0.61									0.61	
Total reduction	0.15	0.14									0.16	
Total, real	49	5									60	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Assumptions for shadow calculations

Shadow receptor: BZ - H78

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	12:22 (1)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	16:15	24 12:46 (1)	17:06	08:49 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05
3	08:44	12:24 (1)	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28
4	16:16	22 12:46 (1)	17:08	08:50 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
5	08:44	12:25 (1)	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
6	16:17	20 12:45 (1)	17:10	08:51 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
7	08:43	12:27 (1)	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32
8	16:18	17 12:44 (1)	17:12	08:52 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
9	08:43	12:28 (1)	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33
10	16:20	15 12:43 (1)	17:14	08:53 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55
11	08:43	12:31 (1)	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35
12	16:21	11 12:42 (1)	17:16	08:53 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53
13	08:42	12:36 (1)	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37
14	16:22	2 12:38 (1)	17:18	08:54 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
15	08:42		08:01	08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
16	16:24		17:20	08:54 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48
17	08:41		07:59	08:27 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
18	16:25		17:22	08:54 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45
19	08:40		07:57	08:27 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43
20	16:27		17:24	08:54 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43
21	08:40		07:55	08:27 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
22	16:28		17:26	08:54 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41
23	08:39		07:53	08:28 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46
24	16:30		17:28	08:54 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38
25	08:38		07:51	08:28 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48
26	16:31		17:30	08:54 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36
27	08:37		07:49	08:28 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
28	16:33		17:32	08:53 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33
29	08:36		07:47	08:29 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52
30	16:34		17:34	08:52 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31
31	08:36		07:45	08:30 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54
32	16:36		17:36	08:51 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29
33	08:35		07:43	08:32 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56
34	16:38		17:38	08:50 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27
35	08:33		07:41	08:33 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57
36	16:40		17:40	08:47 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24
37	08:32		07:39	08:37 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
38	16:41		17:42	6 08:43 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22
39	08:31		07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
40	16:43		17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20
41	08:30		07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03
42	16:45		17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18
43	08:29		07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05
44	16:47		17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15
45	08:27		07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07
46	16:49		17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13
47	08:26		07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09
48	16:51		17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11
49	08:25		07:25		06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11
50	16:52		17:54		18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09
51	08:23		07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13
52	16:54		17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07
53	08:22		07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15
54	16:56		17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04
55	08:20		07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17
56	16:58		18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02
57	08:19				07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19
58	17:00				19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00
59	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20
60	17:02				19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00
61	08:15		08:44 (2)		07:04		05:04		05:37	06:31		07:22
62	17:04	3 08:47 (2)			19:58		21:44		21:27	20:21		16:56
Potential sun hours	250		273		367		420		494		510	
Total, worst case		114										
Sun reduction		0.24										
Oper. time red.		1.00										
Wind dir. red.		0.62										
Total reduction		0.15										
Total, real		17										

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CA - H79

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		12:03 (1)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		07:54 (2)	08:19		11:59 (1)				
	16:15	35	12:38 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	19	08:13 (2)	16:10	17	12:16 (1)				
2	08:44		12:04 (1)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		07:56 (2)	08:21		11:58 (1)				
	16:16	35	12:39 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	16	08:12 (2)	16:09	20	12:18 (1)				
3	08:44		12:05 (1)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		07:58 (2)	08:22		11:56 (1)				
	16:17	33	12:38 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	13	08:11 (2)	16:08	24	12:20 (1)				
4	08:43		12:06 (1)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		08:00 (2)	08:24		11:56 (1)				
	16:18	32	12:38 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	10	08:10 (2)	16:08	26	12:22 (1)				
5	08:43		12:07 (1)	08:07		08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32		08:02 (2)	08:25		11:55 (1)			
	16:20	31	12:38 (1)	17:14	3	08:37 (2)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	6	08:08 (2)	16:07	27	12:22 (1)			
6	08:43		12:09 (1)	08:05		08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34		08:04 (2)	08:27		11:55 (1)			
	16:21	29	12:38 (1)	17:16	7	08:39 (2)	18:11	20:08	21:05	21:51	21:58	21:16	20:06	18:53		16:44	2	08:06 (2)	16:07	29	12:24 (1)			
7	08:42		12:09 (1)	08:03		08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36		08:06 (2)	08:28		11:54 (1)			
	16:22	28	12:37 (1)	17:18	10	08:40 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43		08:06	16:06	31	12:25 (1)			
8	08:42		12:11 (1)	08:01		08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38		08:08	08:29		11:54 (1)			
	16:24	26	12:37 (1)	17:20	13	08:41 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41		08:06	16:06	32	12:26 (1)			
9	08:41		12:13 (1)	07:59		08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		08:03	11:54 (1)		12:27 (1)			
	16:25	24	12:37 (1)	17:22	16	08:42 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39		08:05	16:05	33	12:27 (1)			
10	08:40		12:14 (1)	07:57		08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42		08:02	11:54 (1)		12:28 (1)			
	16:27	21	12:35 (1)	17:24	19	08:43 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37		08:04	16:05	34	12:28 (1)			
11	08:40		12:17 (1)	07:55		08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44		08:03	11:53 (1)		12:29 (1)			
	16:28	17	12:34 (1)	17:26	22	08:44 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36		08:05	16:05	35	12:28 (1)			
12	08:39		12:19 (1)	07:53		08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46		08:02	11:53 (1)		12:29 (1)			
	16:30	13	12:32 (1)	17:28	24	08:44 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34		08:06	16:05	36	12:29 (1)			
13	08:38		12:20 (1)	07:51		08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48		08:03	11:54 (1)		12:30 (1)			
	16:31	27	12:30	17:30	27	08:45 (2)	18:27	20:25	21:17	21:57	21:52	21:01	19:49	18:36		16:32		08:04	16:05	37	12:31 (1)			
14	08:37		12:29	07:49		08:17 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49		08:05	11:54 (1)		12:32 (1)			
	16:33	27	12:32	17:32	27	08:44 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31		08:06	16:05	37	12:31 (1)			
15	08:36		12:28	07:47		08:17 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51		08:07	11:55 (1)		12:32 (1)			
	16:35	27	12:34	17:34	27	08:44 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29		08:08	16:05	37	12:32 (1)			
16	08:36		12:27	07:45		08:17 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54		07:53		08:08	11:54 (1)		12:33 (1)			
	16:36	27	12:36	17:36	27	08:44 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28		08:09	16:05	38	12:32 (1)			
17	08:35		12:26	07:43		08:18 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55		08:09	11:55 (1)		12:33 (1)			
	16:38	26	12:38	17:38	26	08:44 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26		08:10	16:05	38	12:33 (1)			
18	08:33		12:25	07:41		08:19 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57		08:11	11:55 (1)		12:34 (1)			
	16:40	24	12:40	17:40	24	08:43 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25		08:12	16:05	39	12:34 (1)			
19	08:32		12:24	07:39		08:19 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		07:59		08:13	11:56 (1)		12:35 (1)			
	16:41	23	12:41	17:42	23	08:42 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	10	08:56 (2)	07:59	09:06 (2)	16:23	16:05	38	12:34 (1)		
20	08:31		12:23	07:37		08:17 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		07:58		08:14	11:57 (1)		12:35 (1)			
	16:43	21	12:43	17:44	21	08:44 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	15	09:08 (2)	07:59	09:08 (2)	16:22	16:06	38	12:34 (1)		
21	08:30		12:22	07:34		08:22 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		08:51 (2)	08:02	09:09 (2)	16:21	16:07	38	12:35 (1)		
	16:45	17	12:45	17:46	17	08:39 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	19	09:10 (2)	08:02	09:10 (2)	16:20	16:06	39	12:35 (1)		
22	08:29		12:21	07:32		08:23 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:50 (2)	08:04	09:11 (2)	16:19	16:05	38	12:34 (1)		
	16:47	13	12:47	17:48	13	08:36 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	21	09:11 (2)	08:05	09:11 (2)	16:19	16:07	39	12:35 (1)		
23	08:27		12:20	07:30		08:27 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:49 (2)	08:06	09:12 (2)	16:18	16:02	38	12:36 (1)		
	16:49	6	12:49	17:50	6	08:33 (2)	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	23	09:12 (2)	08:07	09:12 (2)	16:18	16:07	38	12:36 (1)		
24	08:26		12:19	07:28		08:24 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:48 (2)	08:08	09:13 (2)	16:17	16:03	38	12:37 (1)		
	16:51		12:51	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	25	09:13 (2)	08:08	09:13 (2)	16:17	16:04	38	12:36 (1)			
25	08:25		12:18	07:25		08:18	20:40	21:31	22:01	21:36	20:35	19:19	17:09	26	09:14 (2)	08:09	09:14 (2)	16:16	16:04	39	12:37 (1)			
	16:52		12:52	17:54		18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	26	09:14 (2)	08:09	09:14 (2)	16:16	16:04	39	12:37 (1)			
26	08:23		12:17	07:23		08:16	20:40	21:31	22:01	21:36	20:35	19:19	17:09	26	09:14 (2)	08:09	09:14 (2)	16:16	16:04	39	12:37 (1)			
	16:54		12:54	17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	26	09:14 (2)	08:09	09:14 (2)	16:16	16:04	39	12:37 (1)			
27	08:22		12:16	07:21		08:14	20:41	21:32	22:01	21:36	20:34	19:18	17:07	26	09:14 (2)	08:09	09:14 (2)	16:16	16:04	39	12:37 (1)			
	16:56		12:56	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	27	09:15 (2)	08:10	09:15 (2)	16:17	16:05	39	12:38 (1)			
28	08:20		12:14	07:19		08:11	20:45	21:36	22:01	21:34	20:31	19:16	17:06	27	09:15 (2)	08:10	09:15 (2)	16:17	16:05	39	12:38 (1)			
	16:58		12:58	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	27	09:0									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CB - H80

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	11:46 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	12:22 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	16:54	11
3	08:44	11:47 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26
4	16:16	12:23 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	16:52	8
5	08:44	11:47 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
6	16:17	12:22 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	16:50	4
7	08:43	11:48 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30
8	16:18	12:23 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	16:57	16:48
9	08:43	11:49 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32
10	16:20	12:22 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	16:55	16:46
11	08:43	11:51 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34
12	16:21	12:22 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	16:53	16:44
13	08:42	11:52 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36
14	16:22	12:22 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	16:50	16:43
15	08:42	11:53 (1)	08:01	08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
16	16:24	12:21 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	16:48	16:41
17	08:41	11:55 (1)	07:59	08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
18	16:25	12:21 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	16:45	16:39
19	08:41	11:56 (1)	07:57	08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43
20	16:27	12:20 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	16:43	16:37
21	08:40	11:58 (1)	07:55	08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
22	16:28	12:19 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	16:41	16:36
23	08:39	12:00 (1)	07:53	08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46
24	16:30	12:17 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	16:38	16:34
25	08:38	12:03 (1)	07:51	08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48
26	16:31	12:15 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	16:36	16:32
27	08:37	17:32	07:49	08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
28	16:33	17:32	07:49	08:16 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
29	08:36	17:34	07:47	08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52
30	16:35	17:34	07:45	08:12 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54
31	08:36	17:36	07:45	08:12 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54
32	16:36	17:36	07:45	08:12 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54
33	08:35	17:36	07:43	08:12 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56
34	16:38	17:38	07:43	08:12 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56
35	08:33	17:41	07:41	08:13 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57
36	16:40	17:40	07:39	08:13 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57
37	08:32	17:42	07:39	08:12 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
38	16:41	17:42	07:39	08:12 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
39	08:31	17:42	07:37	08:13 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
40	16:43	17:44	07:37	08:13 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
41	08:30	17:44	07:34	08:14 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03
42	16:45	17:46	07:34	08:15 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03
43	08:29	17:46	07:32	08:15 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05
44	16:47	17:48	07:30	08:17 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07
45	08:27	17:50	07:30	08:17 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07
46	16:49	17:52	07:28	08:20 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09
47	08:26	17:52	07:28	08:20 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09
48	16:51	17:52	07:25	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
49	08:25	17:54	07:25	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
50	16:52	17:54	07:25	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
51	08:23	17:54	07:23	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
52	16:54	17:56	07:23	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
53	08:22	17:56	07:21	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
54	16:56	17:58	07:21	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
55	08:20	17:59	07:19	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
56	16:58	18:00	07:19	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
57	08:19	18:00	07:19	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
58	17:00	18:00	07:19	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
59	08:17	18:00	07:19	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
60	17:02	18:00	07:19	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
61	08:15	18:00	07:19	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
62	17:04	18:00	07:19	08:29 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09
Potential sun hours	250	273	367	420	494	510	512	460	382	328	295	259
Total, worst case	364	316	367	420	494	510	512	460	382	328	295	259
Sun reduction	0.24	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.61	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Total reduction	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Total, real	54	46	46	46	46	46	46	46	46	46	46	46

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CC - H81

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	14:52 (4)	08:14	16:27 (3)	07:16	17:11 (2)	07:01	05:52	05:03		
	16:15	26	15:18 (4)	17:06	7	16:34 (3)	18:02	23	17:34 (2)	20:00	21:45
2	08:44	14:53 (4)	08:12	16:27 (3)	07:14	17:09 (2)	06:59		05:50	05:02	
	16:16	26	15:19 (4)	17:08	10	16:37 (3)	18:04	27	17:36 (2)	20:02	21:46
3	08:44	14:53 (4)	08:10	16:26 (3)	07:12	17:08 (2)	06:56		05:48	05:01	
	16:17	25	15:18 (4)	17:10	13	16:39 (3)	18:06	30	17:38 (2)	20:04	21:48
4	08:43	14:54 (4)	08:08	16:26 (3)	07:09	17:08 (2)	06:54		05:46	05:00	
	16:18	25	15:19 (4)	17:12	15	16:41 (3)	18:07	33	17:41 (2)	20:06	21:49
5	08:43	14:54 (4)	08:07	16:26 (3)	07:07	17:07 (2)	06:51		05:44	04:59	
	16:19	25	15:19 (4)	17:14	17	16:43 (3)	18:09	33	17:40 (2)	20:07	21:50
6	08:43	14:56 (4)	08:05	16:26 (3)	07:04	17:07 (2)	06:49		05:42	04:58	
	16:21	23	15:19 (4)	17:16	19	16:45 (3)	18:11	34	17:41 (2)	20:09	21:51
7	08:42	14:56 (4)	08:03	16:27 (3)	07:02	17:06 (2)	06:47		05:40	04:58	
	16:22	23	15:19 (4)	17:18	20	16:47 (3)	18:13	34	17:40 (2)	20:11	21:52
8	08:42	14:57 (4)	08:01	16:27 (3)	07:00	17:06 (2)	06:44		05:38	04:57	
	16:24	21	15:18 (4)	17:20	21	16:48 (3)	18:15	34	17:40 (2)	20:13	21:53
9	08:41	14:59 (4)	07:59	16:28 (3)	06:57	17:05 (2)	06:42		05:36	04:57	
	16:25	20	15:19 (4)	17:22	19	16:47 (3)	18:17	35	17:40 (2)	20:15	21:54
10	08:40	15:00 (4)	07:57	16:29 (3)	06:55	17:06 (2)	06:39		05:34	04:56	
	16:26	19	15:19 (4)	17:24	18	16:47 (3)	18:19	33	17:39 (2)	20:17	21:55
11	08:40	15:01 (4)	07:55	16:30 (3)	06:53	17:06 (2)	06:37		05:33	04:56	
	16:28	17	15:18 (4)	17:26	16	16:46 (3)	18:21	33	17:39 (2)	20:19	21:55
12	08:39	15:02 (4)	07:53	16:32 (3)	06:50	17:06 (2)	06:35		05:31	04:55	
	16:30	15	15:17 (4)	17:28	12	16:44 (3)	18:23	32	17:38 (2)	20:20	21:56
13	08:38	15:04 (4)	07:51	16:34 (3)	06:48	17:07 (2)	06:32		05:29	04:55	
	16:31	12	15:16 (4)	17:30	7	16:41 (3)	18:25	30	17:37 (2)	20:22	21:57
14	08:37	15:07 (4)	07:49	16:45	06:45	17:08 (2)	06:30		05:27	04:55	
	16:33	8	15:15 (4)	17:32		18:27	27	17:35 (2)	20:24	21:18	21:58
15	08:36		07:47	16:43	06:43	17:09 (2)	06:28		05:26	04:54	
	16:34		17:34	18:28	25	17:34 (2)	20:26		21:20	21:58	
16	08:35		07:45	16:40	06:40	17:10 (2)	06:25		05:24	04:54	
	16:36		17:36	18:30	22	17:32 (2)	20:28		21:22	21:59	
17	08:34		07:43	16:38	06:38	17:12 (2)	06:23		05:22	04:54	
	16:38		17:38	18:32	18	17:30 (2)	20:30		21:23	21:59	
18	08:33		07:41	16:35	06:35	17:15 (2)	06:21		05:21	04:54	
	16:40		17:40	18:34	11	17:26 (2)	20:31		21:25	22:00	
19	08:32		07:39	16:33	06:33		06:18		05:19	04:54	
	16:41		17:42	18:36		20:33	21:27		22:00		
20	08:31		07:36	16:31	06:31		06:16		05:18	04:54	
	16:43		17:44	18:38		20:35	21:28		22:00		
21	08:30		07:34	16:28	06:28		06:14		05:16	04:54	
	16:45		17:46	18:40		20:37	21:30		22:01		
22	08:29		07:32	16:26	06:26		06:12		05:15	04:55	
	16:47		17:48	18:42		20:39	21:31		22:01		
23	08:27		07:30	16:23	06:23		06:09		05:13	04:55	
	16:49		17:50	18:43		20:41	21:33		22:01		
24	08:26		07:28	16:21	06:21		06:07		05:12	04:55	
	16:50		17:52	18:45		20:43	21:34		22:01		
25	08:24		07:25	17:19 (2)	06:18		06:05		05:11	04:55	
	16:52		17:54	7	17:26 (2)		20:44		21:36	22:01	
26	08:23		07:23	17:16 (2)	06:16		06:03		05:09	04:56	
	16:54		17:56	12	17:28 (2)		20:46		21:37	22:01	
27	08:22		07:21	17:14 (2)	06:13		06:00		05:08	04:56	
	16:56		17:58	17	17:31 (2)		20:48		21:39	22:01	
28	08:20		07:18	17:12 (2)	06:11		05:58		05:07	04:57	
	16:58		18:00	20	17:32 (2)		20:50		21:40	22:01	
29	08:19			07:08			05:56		05:06	04:57	
	17:00			19:54			20:52		21:41	22:01	
30	08:17	16:28 (3)		07:06			05:54		05:05	04:58	
	17:02	1	16:29 (3)	19:56			20:54		21:43	22:00	
31	08:15	16:27 (3)		07:04					05:04		
	17:04	4	16:31 (3)	19:58					21:44		
Potential sun hours	250		273	367		420	494	510			
Total, worst case	290		250	514							
Sun reduction	0.24		0.23	0.27							
Oper. time red.	1.00		1.00	1.00							
Wind dir. red.	0.65		0.66	0.68							
Total reduction	0.16		0.15	0.18							
Total, real	45		38	94							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CC - H81

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		July	August	September		October		November		December	
	1	04:59	05:39	06:33		07:26	17:45 (2)	07:24	15:58 (3)	08:19	14:43 (4)
		22:00	21:25	20:18		19:05	31 18:16 (2)	16:54	19 16:17 (3)	16:10	17 15:00 (4)
	2	04:59	05:40	06:35		07:28	17:45 (2)	07:26	15:57 (3)	08:21	14:42 (4)
		22:00	21:23	20:16		19:02	32 18:17 (2)	16:52	20 16:17 (3)	16:09	19 15:01 (4)
	3	05:00	05:42	06:36		07:30	17:44 (2)	07:28	15:57 (3)	08:22	14:42 (4)
		21:59	21:21	20:13		19:00	33 18:17 (2)	16:50	21 16:18 (3)	16:08	20 15:02 (4)
	4	05:01	05:44	06:38		07:31	17:43 (2)	07:30	15:56 (3)	08:24	14:42 (4)
		21:59	21:19	20:11		18:57	34 18:17 (2)	16:48	21 16:17 (3)	16:08	22 15:04 (4)
	5	05:02	05:45	06:40		07:33	17:43 (2)	07:32	15:56 (3)	08:25	14:41 (4)
		21:58	21:17	20:09		18:55	34 18:17 (2)	16:46	19 16:15 (3)	16:07	23 15:04 (4)
	6	05:03	05:47	06:42		07:35	17:43 (2)	07:34	15:56 (3)	08:26	14:42 (4)
		21:58	21:15	20:06		18:52	34 18:17 (2)	16:44	16 16:12 (3)	16:07	23 15:05 (4)
	7	05:04	05:49	06:43		07:37	17:42 (2)	07:36	15:56 (3)	08:28	14:41 (4)
		21:57	21:14	20:04		18:50	34 18:16 (2)	16:43	14 16:10 (3)	16:06	25 15:06 (4)
	8	05:05	05:50	06:45		07:39	17:42 (2)	07:38	15:56 (3)	08:29	14:41 (4)
		21:56	21:12	20:01		18:48	34 18:16 (2)	16:41	12 16:08 (3)	16:06	25 15:06 (4)
	9	05:06	05:52	06:47		07:41	17:42 (2)	07:40	15:57 (3)	08:30	14:42 (4)
		21:55	21:10	19:59		18:45	33 18:15 (2)	16:39	10 16:07 (3)	16:05	25 15:07 (4)
	10	05:07	05:54	06:49		07:42	17:42 (2)	07:42	15:58 (3)	08:31	14:42 (4)
		21:55	21:08	19:56		18:43	32 18:14 (2)	16:37	7 16:05 (3)	16:05	26 15:08 (4)
	11	05:08	05:56	06:50		07:44	17:43 (2)	07:44	15:59 (3)	08:33	14:42 (4)
		21:54	21:05	19:54		18:40	28 18:11 (2)	16:35	4 16:03 (3)	16:05	26 15:08 (4)
	12	05:09	05:57	06:52		07:46	17:44 (2)	07:45	16:00 (3)	08:34	14:42 (4)
		21:53	21:03	19:51		18:38	25 18:09 (2)	16:34	1 16:01 (3)	16:05	27 15:09 (4)
	13	05:10	05:59	06:54		07:48	17:44 (2)	07:47		08:35	14:42 (4)
		21:52	21:01	19:49		18:36	23 18:07 (2)	16:32		16:05	27 15:09 (4)
	14	05:12	06:01	06:56		07:50	17:46 (2)	07:49		08:36	14:42 (4)
		21:51	20:59	19:47		18:33	18 18:04 (2)	16:31		16:04	28 15:10 (4)
	15	05:13	06:03	06:58		07:52	17:47 (2)	07:51		08:37	14:43 (4)
		21:50	20:57	19:44		18:31	15 18:02 (2)	16:29		16:04	27 15:10 (4)
	16	05:14	06:04	06:59		07:54	17:50 (2)	07:53		08:38	14:43 (4)
		21:49	20:55	19:42		18:29	9 17:59 (2)	16:27		16:05	28 15:11 (4)
	17	05:16	06:06	07:01		07:55	17:54 (2)	07:55		08:38	14:44 (4)
		21:47	20:53	19:39		18:26	3 17:57 (2)	16:26		16:05	28 15:12 (4)
	18	05:17	06:08	07:03		07:57		07:57		08:39	14:44 (4)
		21:46	20:51	19:37		18:24		16:24		16:05	28 15:12 (4)
	19	05:18	06:10	07:05		07:59		07:59		08:40	14:45 (4)
		21:45	20:48	19:34		18:22		16:23		16:05	28 15:13 (4)
	20	05:20	06:12	07:06		08:01		08:00		08:41	14:45 (4)
		21:44	20:46	19:32		18:20		16:22		16:06	28 15:13 (4)
	21	05:21	06:13	07:08		08:03		08:02		08:41	14:46 (4)
		21:42	20:44	19:29		18:17		16:20		16:06	28 15:14 (4)
	22	05:23	06:15	07:10		08:05		08:04		08:42	14:46 (4)
		21:41	20:42	19:27		18:15		16:19		16:06	28 15:14 (4)
	23	05:24	06:17	07:12		08:07		08:06		08:42	14:47 (4)
		21:39	20:39	19:24		18:13		16:18		16:07	28 15:15 (4)
	24	05:26	06:19	07:13		08:09		08:08		08:43	14:47 (4)
		21:38	20:37	19:22		18:11		16:17		16:08	28 15:15 (4)
	25	05:27	06:20	07:15	7	18:00 (2)	07:11	08:09		08:43	14:47 (4)
		21:36	20:35	19:19		18:07 (2)	17:09	16:16		16:08	28 15:15 (4)
	26	05:29	06:22	07:17		17:55 (2)	07:13	08:11		08:43	14:47 (4)
		21:35	20:32	19:17	16	18:11 (2)	17:06	16:14		16:09	29 15:16 (4)
	27	05:30	06:24	07:19		17:52 (2)	07:15	08:13		08:44	14:49 (4)
		21:33	20:30	19:14	21	18:13 (2)	17:04	16:13		16:10	28 15:17 (4)
	28	05:32	06:26	07:21		17:50 (2)	07:16	08:14		14:47 (4)	08:44 14:49 (4)
		21:32	20:28	19:12	25	18:15 (2)	17:02	16:12	8	14:55 (4)	16:10 28 15:17 (4)
	29	05:34	06:27	07:22		17:49 (2)	07:18	08:16		14:44 (4)	08:44 14:50 (4)
		21:30	20:25	19:09	27	18:16 (2)	17:00	16:11	12	14:56 (4)	16:11 28 15:18 (4)
	30	05:35	06:29	07:24		17:47 (2)	07:20	16:00 (3)	08:18	14:43 (4)	08:44 14:50 (4)
		21:28	20:23	19:07	29	18:16 (2)	16:58	13 16:13 (3)	15 14:58 (4)	16:12	27 15:17 (4)
	31	05:37	06:31			07:22	15:58 (3)			08:44	14:50 (4)
		21:27	20:21			16:56	17 16:15 (3)			16:13	27 15:17 (4)
Potential sun hours		512	460	382		328		259		233	
Total, worst case				125		491		199		807	
Sun reduction				0.32		0.29		0.27		0.21	
Oper. time red.				1.00		1.00		1.00		1.00	
Wind dir. red.				0.68		0.68		0.65		0.65	
Total reduction				0.22		0.20		0.17		0.13	
Total, real				27		97		35		108	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CD - H82

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:04 (5)	07:16	16:43 (4)	07:01	05:52	19:39 (2)	05:03		
	16:15	17:06	5 16:09 (5)	18:02	9 16:52 (4)	20:00	20:55	26 20:05 (2)	21:45		
2	08:44	08:12		07:14		06:59	05:50		05:02		
	16:16	17:08		18:04		20:02	20:57	24 20:04 (2)	21:46		
3	08:44	08:10		07:12		06:56	05:48		05:01		
	16:17	17:10		18:06		20:04	20:59	21 20:02 (2)	21:48		
4	08:43	08:08		07:09		06:54	05:46		05:00		
	16:18	17:12		18:07	5 17:41 (3)	20:06	21:01	19 20:01 (2)	21:49		
5	08:43	08:07	16:38 (4)	07:07	17:34 (3)	06:51	05:44		04:59		
	16:19	17:14	5 16:43 (4)	18:09	8 17:42 (3)	20:07	21:03	14 19:58 (2)	21:50		
6	08:43	08:05	16:37 (4)	07:04	17:34 (3)	06:49	05:42		04:59		
	16:21	17:16	8 16:45 (4)	18:11	11 17:45 (3)	20:09	21:04	8 19:55 (2)	21:51		
7	08:42	08:03	16:35 (4)	07:02	17:32 (3)	06:47	05:40		04:58		
	16:22	17:18	12 16:47 (4)	18:13	14 17:46 (3)	20:11	21:06		21:52		
8	08:42	08:01	16:34 (4)	07:00	17:32 (3)	06:44	05:38		04:57		
	16:24	17:20	16 16:50 (4)	18:15	16 17:48 (3)	20:13	21:08		21:53		
9	08:41	07:59	16:33 (4)	06:57	17:31 (3)	06:42	05:36		04:57		
	16:25	17:22	19 16:52 (4)	18:17	19 17:50 (3)	20:15	21:10		21:54		
10	08:40	07:57	16:32 (4)	06:55	17:32 (3)	06:39	05:34		04:56		
	16:26	17:24	22 16:54 (4)	18:19	20 17:52 (3)	20:17	21:11		21:55		
11	08:40	07:55	16:32 (4)	06:52	17:32 (3)	06:37	05:33		04:56		
	16:28	17:26	24 16:56 (4)	18:21	22 17:54 (3)	20:19	21:13		21:55		
12	08:39	07:53	16:30 (4)	06:50	17:32 (3)	06:35	05:31		04:55		
	16:30	17:28	28 16:58 (4)	18:23	21 17:53 (3)	20:20	21:15		21:56		
13	08:38	07:51	16:30 (4)	06:48	17:33 (3)	06:32	05:29		04:55		
	16:31	2 15:53 (5)	17:30	18:25	19 17:52 (3)	20:22	5 19:54 (2)	21:17	21:57		
14	08:37	07:49	16:30 (4)	06:45	17:34 (3)	06:30	05:27		04:55		
	16:33	4 15:57 (5)	17:32	18:27	16 17:50 (3)	20:24	10 19:56 (2)	21:18	21:58		
15	08:36	07:47	16:30 (4)	06:43	17:36 (3)	06:28	05:26		04:54		
	16:34	6 15:59 (5)	17:34	18:28	13 17:49 (3)	20:26	14 19:58 (2)	21:20	21:58		
16	08:35	07:45	16:30 (4)	06:40	17:38 (3)	06:25	05:24		04:54		
	16:36	8 16:00 (5)	17:36	18:30	7 17:45 (3)	20:28	17 20:00 (2)	21:22	21:59		
17	08:34	07:43	16:30 (4)	06:38		06:23	05:22		04:54		
	16:38	11 16:03 (5)	17:38	18:32		20:30	20:01 (2)	21:23	21:59		
18	08:33	07:41	16:29 (4)	06:35		06:21	05:21		04:54		
	16:40	13 16:05 (5)	17:40	18:34		20:31	23 20:03 (2)	21:25	22:00		
19	08:32	07:39	16:29 (4)	06:33		06:18	05:19		04:54		
	16:41	14 16:07 (5)	17:42	18:36		20:33	26 20:05 (2)	21:27	22:00		
20	08:31	07:36	16:30 (4)	06:31		06:16	05:18		04:54		
	16:43	16 16:08 (5)	17:44	18:38		20:35	29 20:07 (2)	21:28	22:00		
21	08:30	07:34	16:31 (4)	06:28		06:14	05:16		04:54		
	16:45	18 16:11 (5)	17:46	18:40		20:37	31 20:08 (2)	21:30	22:01		
22	08:29	07:32	16:30 (4)	06:26		06:12	05:15		04:55		
	16:47	20 16:12 (5)	17:48	18:42		20:39	32 20:09 (2)	21:31	22:01		
23	08:27	07:30	16:31 (4)	06:23		06:09	05:13		04:55		
	16:49	22 16:15 (5)	17:50	18:43		20:41	33 20:09 (2)	21:33	22:01		
24	08:26	07:28	16:33 (4)	06:21		06:07	05:12		04:55		
	16:50	22 16:15 (5)	17:52	18:45		20:43	33 20:09 (2)	21:34	22:01		
25	08:24	07:25	16:33 (4)	06:18		06:05	05:11		04:55		
	16:52	22 16:16 (5)	17:54	18:47		20:44	33 20:09 (2)	21:36	22:01		
26	08:23	07:23	16:35 (4)	06:16		06:03	05:09		04:56		
	16:54	21 16:15 (5)	17:56	18:49		20:46	32 20:09 (2)	21:37	22:01		
27	08:22	07:21	16:37 (4)	06:13		06:01	05:08		04:56		
	16:56	20 16:15 (5)	17:58	18:51		20:48	31 20:08 (2)	21:39	22:01		
28	08:20	07:18	16:38 (4)	06:11		05:58	05:07		04:57		
	16:58	19 16:15 (5)	18:00	18:53		20:50	30 20:07 (2)	21:40	22:01		
29	08:18			07:08		05:56	05:06		04:57		
	17:00	17 16:14 (5)		19:54		20:52	29 20:07 (2)	21:41	22:01		
30	08:17			07:06		05:54	05:05		04:58		
	17:02	15 16:13 (5)		19:56		20:54	28 20:06 (2)	21:43	22:00		
31	08:15			07:04			05:04				
	17:04	11 16:11 (5)		19:58			21:44				
Potential sun hours	250		273	367		420	494		510		
Total, worst case	281		644	200		456	112				
Sun reduction	0.24		0.23	0.27		0.35	0.38				
Oper. time red.	1.00		1.00	1.00		1.00	1.00				
Wind dir. red.	0.66		0.66	0.68		0.65	0.65				
Total reduction	0.16		0.15	0.18		0.23	0.25				
Total, real	45		99	37		104	28				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: CD - H82

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:11 (3) 16:54	16:02 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:10 (3) 16:52	16:03 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:10 (3) 16:50	16:04 (4) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:09 (3) 16:48	16:05 (4) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:09 (3) 16:46	16:07 (4) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	18:09 (3) 16:44	16:08 (4) 16:07
7	05:04 21:57	05:49 21:13	19:56 (2) 20:07 (2)	06:43 20:04	07:37 18:50	16:08 (3) 16:43
8	05:05 21:56	05:50 21:12	19:53 (2) 20:08 (2)	06:45 20:01	07:39 18:48	16:09 (3) 16:41
9	05:06 21:55	05:52 21:10	19:51 (2) 20:11 (2)	06:47 19:59	07:41 18:45	18:10 (3) 16:39
10	05:07 21:55	05:54 21:07	19:49 (2) 20:11 (2)	06:49 19:56	07:42 18:43	18:11 (3) 16:37
11	05:08 21:54	05:56 21:05	19:48 (2) 20:12 (2)	06:50 19:54	07:44 18:40	16:34 (5) 15:32 (5)
12	05:09 21:53	05:57 21:03	19:47 (2) 20:14 (2)	06:52 19:51	07:46 18:38	15:30 (5) 15:45 (5)
13	05:10 21:52	05:59 21:01	19:45 (2) 20:14 (2)	06:54 19:49	07:48 18:36	17:14 (4) 16:32
14	05:12 21:51	06:01 20:59	19:45 (2) 20:14 (2)	06:56 19:47	07:50 18:33	17:10 (4) 16:31
15	05:13 21:50	06:03 20:57	19:45 (2) 20:15 (2)	06:58 19:44	07:52 18:31	17:08 (4) 16:29
16	05:14 21:49	06:04 20:55	19:43 (2) 20:15 (2)	06:59 19:42	07:54 18:29	17:06 (4) 16:27
17	05:16 21:47	06:06 20:53	19:43 (2) 20:15 (2)	07:01 19:39	07:55 18:26	17:05 (4) 16:26
18	05:17 21:46	06:08 20:51	19:43 (2) 20:15 (2)	07:03 19:37	07:57 18:24	17:03 (4) 16:24
19	05:18 21:45	06:10 20:48	19:42 (2) 20:15 (2)	07:05 19:34	07:59 18:22	17:02 (4) 16:23
20	05:20 21:44	06:12 20:46	19:42 (2) 20:15 (2)	07:06 19:32	08:01 18:20	17:01 (4) 16:22
21	05:21 21:42	06:13 20:44	19:42 (2) 20:15 (2)	07:08 19:29	08:03 18:17	17:01 (4) 16:20
22	05:23 21:41	06:15 20:42	19:42 (2) 20:12 (2)	07:10 19:27	08:05 18:15	17:00 (4) 16:19
23	05:24 21:39	06:17 20:39	19:42 (2) 20:10 (2)	07:12 19:24	08:07 18:13	17:00 (4) 16:18
24	05:26 21:38	06:19 20:37	19:43 (2) 20:09 (2)	07:13 19:22	08:09 18:11	16:59 (4) 16:17
25	05:27 21:36	06:20 20:35	19:43 (2) 20:06 (2)	07:15 19:19	07:11 17:09	15:59 (4) 16:16
26	05:29 21:35	06:22 20:32	19:43 (2) 20:04 (2)	07:17 19:17	07:13 17:06	15:59 (4) 16:14
27	05:30 21:33	06:24 20:30	19:45 (2) 20:02 (2)	07:19 19:14	07:15 17:04	15:59 (4) 16:13
28	05:32 21:32	06:26 20:28	19:45 (2) 19:59 (2)	07:21 19:12	18:17 (3) 17:02	15:59 (4) 16:12
29	05:34 21:30	06:27 20:25	19:47 (2) 19:57 (2)	07:22 19:09	18:15 (3) 18:31 (3)	16:00 (4) 16:12
30	05:35 21:28	06:29 20:23	19:50 (2) 19:55 (2)	07:24 19:07	18:12 (3) 18:31 (3)	17:00 16:58
31	05:37 21:26	06:31 20:21			07:22 16:56	16:00 (4) 16:25 (4)
Potential sun hours	512	460	382	328	259	233
Total, worst case		576	47	728	367	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.68	0.66	0.66	
Total reduction		0.22	0.22	0.19	0.18	
Total, real		127	10	141	64	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CE - H83

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:24 (5)	07:16	17:17 (4)	07:01	05:52	20:06 (2)	05:03		
	16:15	17:06	11 16:35 (5)	18:02	17:34 (4)	20:00	20:55	20	20:26 (2)	21:45	
2	08:44	08:12	16:23 (5)	07:14	17:15 (4)	06:59	05:50		20:05 (2)	05:02	
	16:16	17:08	14 16:37 (5)	18:04	17:36 (4)	20:02	20:57	22	20:27 (2)	21:46	
3	08:43	08:10	16:23 (5)	07:12	17:14 (4)	06:56	05:48		20:04 (2)	05:01	
	16:17	17:10	16 16:39 (5)	18:06	17:38 (4)	20:04	20:59	25	20:29 (2)	21:48	
4	08:43	08:08	16:23 (5)	07:09	17:14 (4)	06:54	05:46		20:04 (2)	05:00	
	16:18	17:12	18 16:41 (5)	18:07	17:41 (4)	20:06	21:01	26	20:30 (2)	21:49	
5	08:43	08:07	16:23 (5)	07:07	17:12 (4)	06:51	05:44		20:03 (2)	04:59	
	16:19	17:14	20 16:43 (5)	18:09	17:42 (4)	20:07	21:03	29	20:32 (2)	21:50	
6	08:42	08:05	16:23 (5)	07:04	17:12 (4)	06:49	05:42		20:03 (2)	04:59	
	16:21	17:16	22 16:45 (5)	18:11	17:45 (4)	20:09	21:04	29	20:32 (2)	21:51	
7	08:42	08:03	16:23 (5)	07:02	17:11 (4)	06:47	05:40		20:04 (2)	04:58	
	16:22	17:18	22 16:45 (5)	18:13	17:46 (4)	20:11	21:06	29	20:33 (2)	21:52	
8	08:42	08:01	16:24 (5)	07:00	17:11 (4)	06:44	05:38		20:04 (2)	04:57	
	16:24	17:20	21 16:45 (5)	18:15	17:47 (4)	20:13	21:08	28	20:32 (2)	21:53	
9	08:41	07:59	16:24 (5)	06:57	17:11 (4)	06:42	05:36		20:03 (2)	04:57	
	16:25	17:22	20 16:44 (5)	18:17	17:46 (4)	20:15	21:10	29	20:32 (2)	21:54	
10	08:40	07:57	16:25 (5)	06:55	17:11 (4)	06:39	05:34		20:03 (2)	04:56	
	16:26	17:24	19 16:44 (5)	18:19	17:46 (4)	20:17	21:11	28	20:31 (2)	21:55	
11	08:40	07:55	16:26 (5)	06:52	17:12 (4)	06:37	05:33		20:04 (2)	04:56	
	16:28	17:26	17 16:43 (5)	18:21	17:46 (4)	20:19	21:13	28	20:32 (2)	21:55	
12	08:39	07:53	16:27 (5)	06:50	17:11 (4)	06:35	05:31		20:04 (2)	04:55	
	16:30	17:28	14 16:41 (5)	18:23	17:45 (4)	20:20	21:15	27	20:31 (2)	21:56	
13	08:38	07:51	16:30 (5)	06:48	17:12 (4)	06:32	05:29		20:05 (2)	04:55	
	16:31	17:30	9 16:39 (5)	18:25	17:44 (4)	20:22	21:17	25	20:30 (2)	21:57	
14	08:37	07:49	06:45	18:25	17:12 (4)	06:30	05:27		20:06 (2)	04:55	
	16:33	17:32	18:27	31 17:43 (4)	20:24	21:18	24 20:30 (2)	21:57			
15	08:36	07:47	06:43	18:28	17:13 (4)	06:28	05:26		20:06 (2)	04:55	
	16:34	17:34	18:28	31 18:02 (3)	20:26	21:20	23 20:29 (2)	21:58			
16	08:35	07:45	06:40	18:30	17:14 (4)	06:25	05:24		20:08 (2)	04:54	
	16:36	17:36	18:30	32 18:04 (3)	20:28	21:22	20 20:28 (2)	21:59			
17	08:34	07:43	06:38	18:32	17:16 (4)	06:23	05:22		20:08 (2)	04:54	
	16:38	17:38	18:32	31 18:06 (3)	20:30	21:23	19 20:27 (2)	21:59			
18	08:33	07:41	06:35	18:34	17:17 (4)	06:21	05:21		20:10 (2)	04:54	
	16:40	17:40	18:34	29 18:07 (3)	20:31	21:25	16 20:26 (2)	22:00			
19	08:32	07:39	06:33	18:36	17:21 (4)	06:18	05:19		20:12 (2)	04:54	
	16:41	17:42	18:36	26 18:10 (3)	20:33	21:27	13 20:25 (2)	22:00			
20	08:31	07:36	06:31	18:38	17:54 (3)	06:16	05:18		20:14 (2)	04:54	
	16:43	17:44	18:38	17 18:11 (3)	20:35	21:28	8 20:22 (2)	22:00			
21	08:30	07:34	06:28	18:40	17:55 (3)	06:14	05:16			04:54	
	16:45	17:46	18:40	18 18:13 (3)	20:37	21:30		22:01			
22	08:28	07:32	06:26	18:43	17:54 (3)	06:12	05:15			04:55	
	16:47	17:48	18:41	21 18:15 (3)	20:39	21:31		22:01			
23	08:27	07:30	06:23	18:45	17:55 (3)	06:09	05:13			04:55	
	16:49	17:50	18:43	20 18:15 (3)	20:41	21:33		22:01			
24	08:26	07:28	06:21	18:47	17:55 (3)	06:07	05:12			04:55	
	16:50	17:52	18:45	19 18:14 (3)	20:42	21:34		22:01			
25	08:24	07:25	06:18	18:49	17:56 (3)	06:05	05:11			04:55	
	16:52	17:54	18:47	17 18:13 (3)	20:44	21:36		22:01			
26	08:23	07:23	17:23 (4)	06:16	17:57 (3)	06:03	20:13 (2)	05:09		04:56	
	16:54	17:56	5 17:28 (4)	18:49	18:10 (3)	20:46	4 20:17 (2)	21:37		22:01	
27	08:22	07:21	17:21 (4)	06:13	18:00 (3)	06:01	20:11 (2)	05:08		04:56	
	16:56	17:58	10 17:31 (4)	18:51	7 18:07 (3)	20:48	8 20:19 (2)	21:39		22:01	
28	08:20	07:18	17:18 (4)	06:11		05:58	20:09 (2)	05:07		04:57	
	16:58	18:00	14 17:32 (4)	18:53		20:50	12 20:21 (2)	21:40		22:01	
29	08:18	16:26 (5)		07:08		05:56		20:08 (2)	05:06	04:57	
	17:00	2 16:28 (5)		19:54		20:52	14 20:22 (2)	21:41		22:01	
30	08:17	16:25 (5)		07:06		05:54		20:07 (2)	05:05	04:58	
	17:02	5 16:30 (5)		19:56		20:53	17 20:24 (2)	21:43		22:00	
31	08:15	16:24 (5)		07:04				05:04			
	17:04	8 16:32 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case	15		252	705		55		468			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	2		39	129		13		115			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CE - H83

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	26	20:15 (2) 20:41 (2)	06:33 20:18		07:26 19:05	17:50 (4) 18:24 (4)	07:24 16:54	15:55 (5) 16:13 (5)	08:19 16:10
2	04:59 22:00	05:40 21:23	27	20:15 (2) 20:42 (2)	06:35 20:16		07:28 19:02	17:50 (4) 18:24 (4)	07:26 16:52	15:54 (5) 16:14 (5)	08:21 16:09
3	05:00 21:59	05:42 21:21	28	20:14 (2) 20:42 (2)	06:36 20:13		07:30 19:00	17:49 (4) 18:24 (4)	07:28 16:50	15:53 (5) 16:14 (5)	08:22 16:08
4	05:01 21:59	05:44 21:19	28	20:14 (2) 20:42 (2)	06:38 20:11		07:31 18:57	17:49 (4) 18:24 (4)	07:30 16:48	15:53 (5) 16:15 (5)	08:24 16:08
5	05:02 21:58	05:45 21:17	29	20:13 (2) 20:42 (2)	06:40 20:09		07:33 18:55	17:48 (4) 18:24 (4)	07:32 16:46	15:53 (5) 16:15 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	29	20:13 (2) 20:42 (2)	06:42 20:06		07:35 18:52	17:48 (4) 18:24 (4)	07:34 16:44	15:53 (5) 16:12 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	29	20:14 (2) 20:43 (2)	06:43 20:04		07:37 18:50	17:47 (4) 18:21 (4)	07:36 16:43	15:53 (5) 16:10 (5)	08:28 16:06
8	05:05 21:56	05:50 21:12	28	20:13 (2) 20:41 (2)	06:45 20:01		07:39 18:48	17:47 (4) 18:18 (4)	07:38 16:41	15:53 (5) 16:08 (5)	08:29 16:06
9	05:06 21:55	05:52 21:10	26	20:13 (2) 20:39 (2)	06:47 19:59		07:41 18:45	17:48 (4) 18:16 (4)	07:40 16:39	15:53 (5) 16:06 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	24	20:13 (2) 20:37 (2)	06:49 19:56		07:42 18:43	17:48 (4) 18:14 (4)	07:42 16:37	15:55 (5) 16:05 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	21	20:14 (2) 20:35 (2)	06:50 19:54		07:44 18:40	17:49 (4) 18:11 (4)	07:44 16:35	15:56 (5) 16:03 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	19	20:15 (2) 20:34 (2)	06:52 19:51		07:46 18:38	17:50 (4) 18:09 (4)	07:45 16:34	15:57 (5) 16:01 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01	16	20:15 (2) 20:31 (2)	06:54 19:49		07:48 18:36	17:51 (4) 18:07 (4)	07:47 16:32	15:58 (5) 15:59 (5)	08:35 16:05
14	05:12 21:51	06:01 20:59	13	20:16 (2) 20:29 (2)	06:56 19:47		07:50 18:33	17:52 (4) 18:04 (4)	07:49 16:31		08:36 16:04
15	05:13 21:50	06:03 20:57	11	20:17 (2) 20:28 (2)	06:58 19:44		07:52 18:31	17:54 (4) 18:02 (4)	07:51 16:29		08:37 16:05
16	05:14 21:49	06:04 20:55	7	20:18 (2) 20:25 (2)	06:59 19:42	4	07:54 18:55 (3)	17:56 (4) 18:29	07:53 16:27		08:38 16:05
17	05:16 21:47	06:06 20:53	3	20:20 (2) 20:23 (2)	07:01 19:39		07:55 18:46 (3)	17:59 (4) 18:26	16:27 16:26		08:38 16:05
18	05:17 21:46	06:08 20:50		07:03 19:37	12	18:58 (3)	07:57 18:44 (3)	16:26 16:24	16:26 16:24		16:05 16:05
19	05:18 21:45	06:10 20:48		07:05 19:34	16	19:00 (3)	07:59 18:43 (3)	16:26 16:23	16:26 16:23		16:05 16:05
20	05:20 21:44	06:12 20:46		07:06 19:32	18	19:01 (3)	08:01 19:02 (3)	16:23 16:22	16:23 16:22		16:05 16:06
21	05:21 21:42	06:13 20:44		07:08 19:29	20	18:40 (3)	08:03 19:01 (3)	16:22 16:20	16:22 16:20		16:06 16:06
22	05:23 21:41	06:15 20:42		07:10 19:27	21	18:39 (3)	08:05 19:01 (3)	16:20 16:19	16:20 16:19		16:06 16:06
23	05:24 21:39	06:17 20:40		07:12 19:24	19	18:58 (3)	08:07 18:39 (3)	16:19 16:18	16:19 16:18		16:06 16:07
24	05:26 21:38	06:19 20:38	3	07:13 19:22	17	18:06 (4)	08:09 18:56 (3)	16:18 16:17	16:18 16:17		16:07 16:08
25	05:27 21:36	06:20 20:36	10	07:15 19:20	23	18:01 (4)	07:11 18:51 (3)	16:17 16:16	16:17 16:16		16:08 16:08
26	05:29 21:35	06:22 20:34	14	07:17 19:19	29	18:04 (3)	07:13 18:58 (3)	16:16 16:14	16:16 16:14		16:08 16:09
27	05:30 21:33	06:24 20:32	17	07:19 19:17	31	17:56 (4)	07:15 18:48 (3)	16:15 16:13	16:15 16:13		16:09 16:10
28	05:32 21:32	06:26 20:30	19	07:21 19:15	32	17:55 (4)	07:16 17:56 (4)	16:14 16:12	16:14 16:12		16:10 16:11
29	05:34 21:30	06:27 20:28	21	07:22 19:12	30	17:53 (4)	07:18 18:44 (3)	16:16 16:14	16:16 16:14		16:11 16:12
30	05:35 21:28	06:29 20:26	23	07:24 19:10	30	18:23 (4)	07:20 18:23 (4)	16:12 16:11	16:12 16:11		16:11 16:12
31	05:37 21:26	06:31 20:24	24	07:26 19:08	32	18:23 (4)	07:22 18:23 (4)	16:11 16:10	16:11 16:10		16:12 16:13
Potential sun hours	512	460		382		328		259		233	
Total, worst case	156	364		334		452		189			
Sun reduction	0.32	0.34		0.32		0.29		0.27			
Oper. time red.	1.00	1.00		1.00		1.00		1.00			
Wind dir. red.	0.65	0.65		0.68		0.68		0.66			
Total reduction	0.21	0.22		0.22		0.20		0.17			
Total, real	33	80		72		89		33			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CF - H84

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:19 (5)	07:16	17:10 (4)	07:01	05:52	20:06 (2)	05:03		
	16:15	17:06	16:35 (5)	18:02	17:34 (4)	20:00	20:55	20:26 (2)	21:45		
2	08:44	08:12	16:19 (5)	07:14	17:09 (4)	06:59	05:50	20:05 (2)	05:02		
	16:16	17:08	16:37 (5)	18:04	17:36 (4)	20:02	20:57	20:27 (2)	21:46		
3	08:43	08:10	16:19 (5)	07:12	17:08 (4)	06:56	05:48	20:04 (2)	05:01		
	16:17	17:10	16:39 (5)	18:06	17:38 (4)	20:04	20:59	20:29 (2)	21:48		
4	08:43	08:08	16:19 (5)	07:09	17:08 (4)	06:54	05:46	20:04 (2)	05:00		
	16:18	17:12	16:41 (5)	18:07	17:41 (4)	20:06	21:01	20:30 (2)	21:49		
5	08:43	08:07	16:19 (5)	07:07	17:07 (4)	06:51	05:44	20:03 (2)	04:59		
	16:19	17:14	16:41 (5)	18:09	17:42 (4)	20:07	21:03	20:32 (2)	21:50		
6	08:42	08:05	16:19 (5)	07:04	17:07 (4)	06:49	05:42	20:03 (2)	04:59		
	16:21	17:16	16:41 (5)	18:11	17:44 (4)	20:09	21:04	20:33 (2)	21:51		
7	08:42	08:03	16:20 (5)	07:02	17:06 (4)	06:47	05:40	20:04 (2)	04:58		
	16:22	17:18	16:41 (5)	18:13	17:43 (4)	20:11	21:06	20:34 (2)	21:52		
8	08:42	08:01	16:21 (5)	07:00	17:06 (4)	06:44	05:38	20:03 (2)	04:57		
	16:24	17:20	16:40 (5)	18:15	17:43 (4)	20:13	21:08	20:33 (2)	21:53		
9	08:41	07:59	16:22 (5)	06:57	17:06 (4)	06:42	05:36	20:03 (2)	04:57		
	16:25	17:22	16:39 (5)	18:17	17:42 (4)	20:15	21:10	20:33 (2)	21:54		
10	08:40	07:57	16:23 (5)	06:55	17:06 (4)	06:39	05:34	20:03 (2)	04:56		
	16:26	17:24	16:38 (5)	18:19	17:42 (4)	20:17	21:11	20:32 (2)	21:55		
11	08:40	07:55	16:25 (5)	06:52	17:07 (4)	06:37	05:33	20:04 (2)	04:56		
	16:28	17:26	16:37 (5)	18:21	17:42 (4)	20:19	21:13	20:33 (2)	21:55		
12	08:39	07:53	16:27 (5)	06:50	17:07 (4)	06:35	05:31	20:04 (2)	04:55		
	16:30	17:28	16:33 (5)	18:23	17:40 (4)	20:20	21:15	20:32 (2)	21:56		
13	08:38	07:51		06:48	17:08 (4)	06:32	05:29	20:04 (2)	04:55		
	16:31	17:30		18:25	17:39 (4)	20:22	21:17	20:31 (2)	21:57		
14	08:37	07:49		06:45	17:09 (4)	06:30	05:27	20:05 (2)	04:55		
	16:33	17:32		18:27	18:00 (3)	20:24	21:18	20:31 (2)	21:57		
15	08:36	07:47		06:43	17:10 (4)	06:28	05:26	20:05 (2)	04:55		
	16:34	17:34		18:28	18:02 (3)	20:26	21:20	20:30 (2)	21:58		
16	08:35	07:45		06:40	17:11 (4)	06:25	05:24	20:07 (2)	04:54		
	16:36	17:36		18:30	18:04 (3)	20:28	21:22	20:30 (2)	21:59		
17	08:34	07:43		06:38	17:14 (4)	06:23	05:22	20:07 (2)	04:54		
	16:38	17:38		18:32	18:06 (3)	20:30	21:23	20:28 (2)	21:59		
18	08:33	07:41		06:35	17:17 (4)	06:21	05:21	20:08 (2)	04:54		
	16:40	17:40		18:34	18:07 (3)	20:31	21:25	20:28 (2)	22:00		
19	08:32	07:39		06:33	17:53 (3)	06:18	05:19	20:10 (2)	04:54		
	16:41	17:42		18:36	18:10 (3)	20:33	21:27	20:27 (2)	22:00		
20	08:31	07:36		06:31	17:52 (3)	06:16	05:18	20:11 (2)	04:54		
	16:43	17:44		18:38	18:11 (3)	20:35	21:28	20:25 (2)	22:00		
21	08:30	07:34		06:28	17:53 (3)	06:14	05:16	20:13 (2)	04:54		
	16:45	17:46		18:40	18:13 (3)	20:37	21:30	20:24 (2)	22:01		
22	08:28	07:32		06:26	17:52 (3)	06:12	05:15	20:17 (2)	04:55		
	16:47	17:48		18:41	18:14 (3)	20:39	21:31	20:20 (2)	22:01		
23	08:27	07:30		06:23	17:53 (3)	06:09	05:13		04:55		
	16:49	17:50		18:43	18:13 (3)	20:41	21:33		22:01		
24	08:26	07:28	17:19 (4)	06:21	17:53 (3)	06:07	05:12		04:55		
	16:50	17:52	17:24 (4)	18:45	18:11 (3)	20:42	21:34		22:01		
25	08:24	07:25	17:16 (4)	06:18	17:55 (3)	06:05	05:11		04:55		
	16:52	17:54	17:26 (4)	18:47	18:10 (3)	20:44	21:36		22:01		
26	08:23	07:23	17:14 (4)	06:16	17:58 (3)	06:03	05:09		04:56		
	16:54	17:56	17:28 (4)	18:49	18:08 (3)	20:46	21:37		22:01		
27	08:22	16:21 (5)	07:21	17:13 (4)	06:13	06:01	20:11 (2)	05:08	04:56		
	16:56	16:23 (5)	17:58	17:31 (4)	18:51	20:48	20:19 (2)	21:39	22:01		
28	08:20	16:21 (5)	07:18	17:11 (4)	06:11	05:58	20:10 (2)	05:07	04:57		
	16:58	16:26 (5)	18:00	17:32 (4)	18:53	20:50	20:21 (2)	21:40	22:01		
29	08:18	16:20 (5)		07:08		05:56	20:08 (2)	05:06	04:57		
	17:00	16:28 (5)		19:54		20:52	20:22 (2)	21:41	22:01		
30	08:17	16:19 (5)		07:06		05:54	20:07 (2)	05:05	04:58		
	17:02	16:30 (5)		19:56		20:53	20:24 (2)	21:43	22:00		
31	08:15	16:19 (5)		07:04			05:04				
	17:04	16:32 (5)		19:58			21:44				
Potential sun hours	250		273	367		420		494		510	
Total, worst case	39		278	718		53		515			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.64		0.64			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	6		43	132		12		127			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CF - H84

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:14 (2)	06:33		07:26	17:46 (4)	07:24	15:52 (5)	08:19	
	22:00	21:25	28 20:42 (2)	20:18		19:05	33 18:19 (4)	16:54	16	16:08 (5)	16:10
2	04:59	05:40	20:14 (2)	06:35		07:28	17:45 (4)	07:26	15:51 (5)	08:21	
	22:00	21:23	29 20:43 (2)	20:16		19:02	34 18:19 (4)	16:52	18	16:09 (5)	16:09
3	05:00	05:42	20:13 (2)	06:36		07:30	17:45 (4)	07:28	15:50 (5)	08:22	
	21:59	21:21	30 20:43 (2)	20:13		19:00	35 18:20 (4)	16:50	20	16:10 (5)	16:08
4	05:01	05:44	20:13 (2)	06:38		07:31	17:44 (4)	07:30	15:49 (5)	08:24	
	21:59	21:19	30 20:43 (2)	20:11		18:57	36 18:20 (4)	16:48	21	16:10 (5)	16:08
5	05:02	05:45	20:13 (2)	06:40		07:33	17:44 (4)	07:32	15:49 (5)	08:25	
	21:58	21:17	30 20:43 (2)	20:09		18:55	36 18:20 (4)	16:46	22	16:11 (5)	16:07
6	05:03	05:47	20:13 (2)	06:42		07:35	17:43 (4)	07:34	15:49 (5)	08:26	
	21:58	21:15	30 20:43 (2)	20:06		18:52	37 18:20 (4)	16:44	22	16:11 (5)	16:07
7	05:04	05:49	20:13 (2)	06:43		07:37	17:42 (4)	07:36	15:48 (5)	08:28	
	21:57	21:13	30 20:43 (2)	20:04		18:50	37 18:19 (4)	16:43	22	16:10 (5)	16:06
8	05:05	05:50	20:13 (2)	06:45		07:39	17:42 (4)	07:38	15:48 (5)	08:29	
	21:56	21:12	28 20:41 (2)	20:01		18:48	36 18:18 (4)	16:41	20	16:08 (5)	16:06
9	05:06	05:52	20:13 (2)	06:47		07:41	17:42 (4)	07:40	15:49 (5)	08:30	
	21:55	21:10	26 20:39 (2)	19:59		18:45	34 18:16 (4)	16:39	17	16:06 (5)	16:05
10	05:07	05:54	20:13 (2)	06:49		07:42	17:42 (4)	07:42	15:50 (5)	08:31	
	21:55	21:07	24 20:37 (2)	19:56		18:43	32 18:14 (4)	16:37	15	16:05 (5)	16:05
11	05:08	05:56	20:14 (2)	06:50		07:44	17:42 (4)	07:44	15:50 (5)	08:33	
	21:54	21:05	21 20:35 (2)	19:54		18:40	29 18:11 (4)	16:35	13	16:03 (5)	16:05
12	05:09	05:57	20:15 (2)	06:52		07:46	17:43 (4)	07:45	15:51 (5)	08:34	
	21:53	21:03	19 20:34 (2)	19:51		18:38	26 18:09 (4)	16:34	10	16:01 (5)	16:05
13	05:10	05:59	20:15 (2)	06:54		07:48	17:44 (4)	07:47	15:52 (5)	08:35	
	21:52	21:01	16 20:31 (2)	19:49		18:36	23 18:07 (4)	16:32	7	15:59 (5)	16:05
14	05:12	06:01	20:16 (2)	06:56		07:50	17:44 (4)	07:49	15:53 (5)	08:36	
	21:51	20:59	13 20:29 (2)	19:47		18:33	20 18:04 (4)	16:31	5	15:58 (5)	16:04
15	05:13	06:03	20:18 (2)	06:58		07:52	17:45 (4)	07:51	15:54 (5)	08:37	
	21:50	20:57	10 20:28 (2)	19:44		18:31	17 18:02 (4)	16:29	2	15:56 (5)	16:05
16	05:14	06:04	20:18 (2)	06:59		07:54	17:47 (4)	07:53			08:38
	21:49	20:55	7 20:25 (2)	19:42		18:29	12 17:59 (4)	16:27			16:05
17	05:16	06:06	20:21 (2)	07:01	18:46 (3)	07:55	17:49 (4)	07:55			08:38
	21:47	20:53	2 20:23 (2)	19:39	9 18:55 (3)	18:26	8 17:57 (4)	16:26			16:05
18	05:17	06:08		07:03	18:43 (3)	07:57	17:51 (4)	07:57			08:39
	21:46	20:50		19:37	14 18:57 (3)	18:24	4 17:55 (4)	16:24			16:05
19	05:18	06:10		07:05	18:41 (3)	07:59		07:59			08:40
	21:45	20:48		19:34	18 18:59 (3)	18:22		16:23			16:05
20	05:20	06:12		07:06	18:40 (3)	08:01		08:00			08:41
	21:44	20:46		19:32	19 18:59 (3)	18:20		16:22			16:06
21	05:21	06:13		07:08	18:38 (3)	08:03		08:02			08:41
	21:42	20:44		19:29	21 18:59 (3)	18:17		16:20			16:06
22	05:23	20:24 (2)	06:15	07:10	18:37 (3)	08:05		08:04			08:42
	21:41	8 20:32 (2)	20:42	19:27	21 18:58 (3)	18:15		16:19			16:06
23	05:24	20:23 (2)	06:17	07:12	18:37 (3)	08:07		08:06			08:42
	21:39	12 20:35 (2)	20:39	19:24	19 18:56 (3)	18:13		16:18			16:07
24	05:26	20:21 (2)	06:19	07:13	18:37 (3)	08:09		08:08			08:43
	21:38	15 20:36 (2)	20:37	19:22	17 18:54 (3)	18:11		16:17			16:08
25	05:27	20:20 (2)	06:20	07:15	18:02 (4)	07:11		08:09			08:43
	21:36	18 20:38 (2)	20:35	19:19	20 18:51 (3)	17:09		16:16			16:08
26	05:29	20:18 (2)	06:22	07:17	17:57 (4)	07:13		08:11			08:43
	21:35	21 20:39 (2)	20:32	19:17	27 18:48 (3)	17:06		16:14			16:09
27	05:30	20:17 (2)	06:24	07:19	17:54 (4)	07:15		08:13			08:44
	21:33	22 20:39 (2)	20:30	19:14	30 18:46 (3)	17:04		16:13			16:10
28	05:32	20:17 (2)	06:26	07:21	17:52 (4)	07:16		08:14			08:44
	21:32	23 20:40 (2)	20:28	19:12	31 18:44 (3)	17:02		16:12			16:11
29	05:34	20:15 (2)	06:27	07:22	17:50 (4)	07:18		08:16			08:44
	21:30	26 20:41 (2)	20:25	19:09	30 18:41 (3)	17:00		16:12			16:11
30	05:35	20:15 (2)	06:29	07:24	17:48 (4)	07:20	15:56 (5)	08:18			08:44
	21:28	27 20:42 (2)	20:23	19:07	30 18:18 (4)	16:58	8 16:04 (5)	16:11			16:12
31	05:37	20:15 (2)	06:31			07:22	15:53 (5)				08:44
	21:26	28 20:43 (2)	20:21			16:56	13 16:06 (5)				16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case		200		373		306		510		230	
Sun reduction		0.32		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.64		0.64		0.68		0.68		0.66	
Total reduction		0.21		0.22		0.22		0.20		0.17	
Total, real		42		82		66		101		40	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CG - H85

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44		08:14	16:14 (5)	07:16		17:03 (4)	07:01	05:52	20:06 (2)	05:03
	16:15		17:06	21 16:35 (5)	18:02	31	17:34 (4)	20:00	20:55	20 20:26 (2)	21:45
2	08:44		08:12	16:14 (5)	07:14		17:02 (4)	06:59	05:50	20:05 (2)	05:02
	16:16		17:08	23 16:37 (5)	18:04	34	17:36 (4)	20:02	20:57	22 20:27 (2)	21:46
3	08:43		08:10	16:14 (5)	07:12		17:02 (4)	06:56	05:48	20:04 (2)	05:01
	16:17		17:10	23 16:37 (5)	18:06	36	17:38 (4)	20:04	20:59	25 20:29 (2)	21:48
4	08:43		08:08	16:15 (5)	07:09		17:02 (4)	06:54	05:46	20:03 (2)	05:00
	16:18		17:12	22 16:37 (5)	18:07	38	17:40 (4)	20:06	21:01	27 20:30 (2)	21:49
5	08:43		08:07	16:15 (5)	07:07		17:01 (4)	06:51	05:44	20:03 (2)	04:59
	16:19		17:14	22 16:37 (5)	18:09	38	17:39 (4)	20:07	21:03	29 20:32 (2)	21:50
6	08:42		08:05	16:16 (5)	07:04		17:01 (4)	06:49	05:42	20:02 (2)	04:59
	16:21		17:16	20 16:36 (5)	18:11	38	17:39 (4)	20:09	21:04	31 20:33 (2)	21:51
7	08:42		08:03	16:17 (5)	07:02		17:00 (4)	06:47	05:40	20:03 (2)	04:58
	16:22		17:18	18 16:35 (5)	18:13	38	17:38 (4)	20:11	21:06	31 20:34 (2)	21:52
8	08:42		08:01	16:18 (5)	07:00		17:01 (4)	06:44	05:38	20:03 (2)	04:57
	16:24		17:20	17 16:35 (5)	18:15	37	17:38 (4)	20:13	21:08	31 20:34 (2)	21:53
9	08:41		07:59	16:19 (5)	06:57		17:01 (4)	06:42	05:36	20:02 (2)	04:57
	16:25		17:22	14 16:33 (5)	18:17	36	17:37 (4)	20:15	21:10	31 20:33 (2)	21:54
10	08:40		07:57	16:22 (5)	06:55		17:02 (4)	06:39	05:34	20:02 (2)	04:56
	16:26		17:24	9 16:31 (5)	18:19	34	17:36 (4)	20:17	21:11	31 20:33 (2)	21:55
11	08:40		07:55		06:52		17:03 (4)	06:37	05:33	20:03 (2)	04:56
	16:28		17:26		18:21	33	17:36 (4)	20:19	21:13	30 20:33 (2)	21:55
12	08:39		07:53		06:50		17:03 (4)	06:35	05:31	20:03 (2)	04:55
	16:30		17:28		18:23	31	17:34 (4)	20:20	21:15	30 20:33 (2)	21:56
13	08:38		07:51		06:48		17:05 (4)	06:32	05:29	20:03 (2)	04:55
	16:31		17:30		18:25	29	17:58 (3)	20:22	21:17	29 20:32 (2)	21:57
14	08:37		07:49		06:45		17:05 (4)	06:30	05:27	20:04 (2)	04:55
	16:33		17:32		18:27	31	18:00 (3)	20:24	21:18	28 20:32 (2)	21:58
15	08:36		07:47		06:43		17:08 (4)	06:28	05:26	20:04 (2)	04:55
	16:34		17:34		18:28	29	18:02 (3)	20:26	21:20	27 20:31 (2)	21:58
16	08:35		07:45		06:40		17:10 (4)	06:25	05:24	20:05 (2)	04:54
	16:36		17:36		18:30	27	18:04 (3)	20:28	21:22	26 20:31 (2)	21:59
17	08:34		07:43		06:38		17:16 (4)	06:23	05:22	20:06 (2)	04:54
	16:38		17:38		18:32	17	18:06 (3)	20:30	21:23	24 20:30 (2)	21:59
18	08:33		07:41		06:35		17:51 (3)	06:21	05:21	20:07 (2)	04:54
	16:40		17:40		18:34	16	18:07 (3)	20:31	21:25	22 20:29 (2)	22:00
19	08:32		07:39		06:33		17:51 (3)	06:18	05:19	20:08 (2)	04:54
	16:41		17:42		18:36	19	18:10 (3)	20:33	21:27	21 20:29 (2)	22:00
20	08:31		07:36		06:31		17:50 (3)	06:16	05:18	20:09 (2)	04:54
	16:43		17:44		18:38	21	18:11 (3)	20:35	21:28	18 20:27 (2)	22:00
21	08:30		07:34		17:16 (4)	06:28	17:51 (3)	06:14	05:16	20:11 (2)	04:54
	16:45		17:46	2	17:18 (4)	18:40	22	18:13 (3)	20:37	15 20:26 (2)	22:01
22	08:29		07:32		17:12 (4)	06:26	17:50 (3)	06:12	05:15	20:13 (2)	04:55
	16:47		17:48	7	17:19 (4)	18:42	21	18:11 (3)	20:39	12 20:25 (2)	22:01
23	08:27		07:30		17:10 (4)	06:23	17:52 (3)	06:09	05:13	20:14 (2)	04:55
	16:49		17:50	12	17:22 (4)	18:43	18	18:10 (3)	20:41	8 20:22 (2)	22:01
24	08:26		07:28		17:09 (4)	06:21	17:52 (3)	06:07	05:12		04:55
	16:50		17:52	15	17:24 (4)	18:45	16	18:08 (3)	20:42	21:34	22:01
25	08:24		07:25		17:06 (4)	06:18	17:54 (3)	06:05	05:11		04:55
	16:52	2	16:19 (5)	17:54	20 17:26 (4)	18:47	13 18:07 (3)	20:44	21:36		22:01
26	08:23		07:23		17:06 (4)	06:16	17:58 (3)	06:03	05:09		04:56
	16:54	6	16:21 (5)	17:56	22 17:28 (4)	18:49	5 18:03 (3)	20:46	3 20:17 (2)	21:37	22:01
27	08:22		07:21		17:05 (4)	06:13		06:01	20:11 (2)	05:08	04:56
	16:56	8	16:23 (5)	17:58	26 17:31 (4)	18:51		20:48	8 20:19 (2)	21:39	22:01
28	08:20		07:18		17:03 (4)	06:11		05:58	20:10 (2)	05:07	04:57
	16:58	11	16:26 (5)	18:00	29 17:32 (4)	18:53		20:50	11 20:21 (2)	21:40	22:01
29	08:18		16:14 (5)			07:08		05:56	20:08 (2)	05:06	04:57
	17:00	14	16:28 (5)			19:54		20:52	14 20:22 (2)	21:41	22:01
30	08:17		16:14 (5)			07:06		05:54	20:07 (2)	05:05	04:58
	17:02	16	16:30 (5)			19:56		20:53	17 20:24 (2)	21:43	22:00
31	08:15		16:13 (5)			07:04			05:04		
	17:04	19	16:32 (5)			19:58			21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case		76		322		708		53		568	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.67		0.68		0.64		0.64	
Total reduction		0.16		0.16		0.18		0.23		0.25	
Total, real		12		50		130		12		140	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CG - H85

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:13 (2)	06:33		07:26	17:42 (4)	07:24	15:51 (5)	08:19	
	22:00	21:25	30	20:43 (2)	20:18	19:05	30	18:12 (4)	16:54	10	16:01 (5)
2	04:59	05:40	20:13 (2)	06:35		07:28	17:41 (4)	07:26	15:49 (5)	08:21	
	22:00	21:23	31	20:44 (2)	20:16	19:02	32	18:13 (4)	16:52	14	16:03 (5)
3	05:00	05:42	20:13 (2)	06:36		07:30	17:40 (4)	07:28	15:47 (5)	08:22	
	21:59	21:21	30	20:43 (2)	20:13	19:00	34	18:14 (4)	16:50	17	16:04 (5)
4	05:01	05:44	20:13 (2)	06:38		07:31	17:39 (4)	07:30	15:46 (5)	08:24	
	21:59	21:19	31	20:44 (2)	20:11	18:57	36	18:15 (4)	16:48	19	16:05 (5)
5	05:02	05:45	20:12 (2)	06:40		07:33	17:38 (4)	07:32	15:45 (5)	08:25	
	21:58	21:17	31	20:43 (2)	20:09	18:55	37	18:15 (4)	16:46	21	16:06 (5)
6	05:03	05:47	20:12 (2)	06:42		07:35	17:38 (4)	07:34	15:45 (5)	08:26	
	21:58	21:15	31	20:43 (2)	20:06	18:52	37	18:15 (4)	16:44	21	16:06 (5)
7	05:04	05:49	20:13 (2)	06:43		07:37	17:36 (4)	07:36	15:44 (5)	08:28	
	21:57	21:13	30	20:43 (2)	20:04	18:50	38	18:14 (4)	16:43	23	16:07 (5)
8	05:05	05:51	20:12 (2)	06:45		07:39	17:36 (4)	07:38	15:44 (5)	08:29	
	21:56	21:12	29	20:41 (2)	20:01	18:48	38	18:14 (4)	16:41	23	16:07 (5)
9	05:06	05:52	20:13 (2)	06:47		07:41	17:36 (4)	07:40	15:44 (5)	08:30	
	21:55	21:10	26	20:39 (2)	19:59	18:45	38	18:14 (4)	16:39	22	16:06 (5)
10	05:07	05:54	20:13 (2)	06:49		07:42	17:36 (4)	07:42	15:45 (5)	08:31	
	21:55	21:07	24	20:37 (2)	19:56	18:43	38	18:14 (4)	16:37	20	16:05 (5)
11	05:08	05:56	20:14 (2)	06:50		07:44	17:36 (4)	07:44	15:45 (5)	08:33	
	21:54	21:05	21	20:35 (2)	19:54	18:40	35	18:11 (4)	16:35	18	16:03 (5)
12	05:09	05:57	20:14 (2)	06:52		07:46	17:36 (4)	07:45	15:46 (5)	08:34	
	21:53	21:03	20	20:34 (2)	19:51	18:38	33	18:09 (4)	16:34	15	16:01 (5)
13	05:10	05:59	20:15 (2)	06:54		07:48	17:36 (4)	07:47	15:46 (5)	08:35	
	21:52	21:01	16	20:31 (2)	19:49	18:36	31	18:07 (4)	16:32	13	15:59 (5)
14	05:12	06:01	20:16 (2)	06:56		07:50	17:37 (4)	07:49	15:47 (5)	08:36	
	21:51	20:59	13	20:29 (2)	19:47	18:33	27	18:04 (4)	16:31	11	15:58 (5)
15	05:13	06:03	20:17 (2)	06:58		07:52	17:37 (4)	07:51	15:47 (5)	08:37	
	21:50	20:57	11	20:28 (2)	19:44	18:31	25	18:02 (4)	16:29	9	15:56 (5)
16	05:14	06:04	20:19 (2)	06:59		07:54	17:38 (4)	07:53	15:48 (5)	08:38	
	21:49	20:55	6	20:25 (2)	19:42	18:29	21	17:59 (4)	16:27	6	15:54 (5)
17	05:16	06:06	20:22 (2)	07:01		07:55	17:39 (4)	07:55	15:50 (5)	08:38	
	21:47	20:53	1	20:23 (2)	19:39	18:26	18	17:57 (4)	16:26	2	15:52 (5)
18	05:17	06:08		07:03		07:57	17:40 (4)	07:57			08:39
	21:46	20:50		19:37	11	18:53 (3)	18:24	15	17:55 (4)	16:24	16:05
19	05:18	06:10		07:05		07:59	17:42 (4)	07:59			08:40
	21:45	20:48		19:34	15	18:55 (3)	18:22	10	17:52 (4)	16:23	16:05
20	05:20	20:27 (2)	06:12	07:06		08:01	17:44 (4)	08:00			08:41
	21:44	20:30 (2)	20:46	19:32	19	18:57 (3)	18:20	6	17:50 (4)	16:22	16:06
21	05:21	20:23 (2)	06:13	07:08		08:03		08:02			08:41
	21:42	20:33 (2)	20:44	19:29	21	18:57 (3)	18:17		16:20		16:06
22	05:23	20:21 (2)	06:15	07:10		08:05		08:04			08:42
	21:41	20:35 (2)	20:42	19:27	22	18:57 (3)	18:15		16:19		16:06
23	05:24	20:20 (2)	06:17	07:12		08:07		08:06			08:42
	21:39	20:37 (2)	20:39	19:24	21	18:56 (3)	18:13		16:18		16:07
24	05:26	20:19 (2)	06:19	07:13		08:09		08:08			08:43
	21:38	20:38 (2)	20:37	19:22	20	18:54 (3)	18:11		16:17		16:08
25	05:27	20:18 (2)	06:20	07:15		07:11		08:09			08:43
	21:36	20:40 (2)	20:35	19:19	18	18:51 (3)	17:09		16:16		16:08
26	05:29	20:17 (2)	06:22	07:17		07:13		08:11			08:43
	21:35	20:40 (2)	20:32	19:17	15	18:48 (3)	17:06		16:14		16:09
27	05:30	20:16 (2)	06:24	07:19		07:15		08:13			08:44
	21:33	20:40 (2)	20:30	19:14	25	18:46 (3)	17:04		16:13		16:10
28	05:32	20:15 (2)	06:26	07:21		07:16		08:14			08:44
	21:32	20:41 (2)	20:28	19:12	30	18:44 (3)	17:02		16:12		16:11
29	05:34	20:14 (2)	06:27	07:22		07:18		08:16			08:44
	21:30	20:42 (2)	20:25	19:09	30	18:41 (3)	17:00		16:12		16:11
30	05:35	20:14 (2)	06:29	07:24		07:20		08:18			08:44
	21:28	20:42 (2)	20:23	19:07	30	18:38 (3)	16:58		16:11		16:12
31	05:37	20:14 (2)	06:31			07:22					08:44
	21:26	20:43 (2)	20:21			16:56					16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case		243		381		277		579		264	
Sun reduction		0.32		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.64		0.64		0.67		0.68		0.66	
Total reduction		0.21		0.22		0.22		0.20		0.18	
Total, real		51		84		60		115		46	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CH - H86

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June	
1	08:44		08:14	16:08 (5)	07:16	16:54 (4)	07:01		05:52	20:06 (2)	05:03	
	16:15		17:06	23 16:31 (5)	18:02	40 17:34 (4)	20:00		20:55	20 20:26 (2)	21:45	
2	08:44		08:12	16:09 (5)	07:14	16:53 (4)	06:59		05:50	20:05 (2)	05:02	
	16:16		17:08	22 16:31 (5)	18:04	40 17:33 (4)	20:02		20:57	22 20:27 (2)	21:46	
3	08:44		08:10	16:09 (5)	07:12	16:53 (4)	06:56		05:48	20:04 (2)	05:01	
	16:17		17:10	22 16:31 (5)	18:06	41 17:34 (4)	20:04		20:59	25 20:29 (2)	21:48	
4	08:43		08:08	16:10 (5)	07:09	16:54 (4)	06:54		05:46	20:04 (2)	05:00	
	16:18		17:12	20 16:30 (5)	18:07	40 17:34 (4)	20:06		21:01	26 20:30 (2)	21:49	
5	08:43		08:07	16:11 (5)	07:07	16:53 (4)	06:51		05:44	20:03 (2)	04:59	
	16:19		17:14	19 16:30 (5)	18:09	40 17:33 (4)	20:07		21:03	29 20:32 (2)	21:50	
6	08:42		08:05	16:12 (5)	07:04	16:54 (4)	06:49		05:42	20:02 (2)	04:59	
	16:21		17:16	17 16:29 (5)	18:11	38 17:32 (4)	20:09		21:04	31 20:33 (2)	21:51	
7	08:42		08:03	16:13 (5)	07:02	16:53 (4)	06:47		05:40	20:03 (2)	04:58	
	16:22		17:18	14 16:27 (5)	18:13	38 17:31 (4)	20:11		21:06	32 20:35 (2)	21:52	
8	08:42		08:01	16:16 (5)	07:00	16:54 (4)	06:44		05:38	20:03 (2)	04:57	
	16:24		17:20	9 16:25 (5)	18:15	37 17:31 (4)	20:13		21:08	32 20:35 (2)	21:53	
9	08:41		07:59		06:57	16:54 (4)	06:42		05:36	20:02 (2)	04:57	
	16:25		17:22		18:17	35 17:29 (4)	20:15		21:10	33 20:35 (2)	21:54	
10	08:40		07:57		06:55	16:56 (4)	06:39		05:34	20:02 (2)	04:56	
	16:26		17:24		18:19	32 17:28 (4)	20:17		21:11	32 20:34 (2)	21:55	
11	08:40		07:55		06:52	16:57 (4)	06:37		05:33	20:03 (2)	04:56	
	16:28		17:26		18:21	30 17:27 (4)	20:19		21:13	32 20:35 (2)	21:55	
12	08:39		07:53		06:50	16:58 (4)	06:35		05:31	20:02 (2)	04:55	
	16:30		17:28		18:23	29 17:56 (3)	20:20		21:15	32 20:34 (2)	21:56	
13	08:38		07:51		06:48	17:00 (4)	06:32		05:29	20:02 (2)	04:55	
	16:31		17:30		18:25	29 17:58 (3)	20:22		21:17	32 20:34 (2)	21:57	
14	08:37		07:49		06:45	17:02 (4)	06:30		05:27	20:03 (2)	04:55	
	16:33		17:32		18:27	28 18:00 (3)	20:24		21:18	31 20:34 (2)	21:58	
15	08:36		07:47		06:43	17:07 (4)	06:28		05:26	20:03 (2)	04:55	
	16:34		17:34		18:28	21 18:02 (3)	20:26		21:20	30 20:33 (2)	21:58	
16	08:35		07:45		06:40	17:48 (3)	06:25		05:24	20:04 (2)	04:54	
	16:36		17:36		18:30	16 18:04 (3)	20:28		21:22	29 20:33 (2)	21:59	
17	08:34		07:43		06:38	17:48 (3)	06:23		05:22	20:04 (2)	04:54	
	16:38		17:38		18:32	18 18:06 (3)	20:30		21:23	28 20:32 (2)	21:59	
18	08:33		07:41	17:07 (4)	06:35	17:47 (3)	06:21		05:21	20:05 (2)	04:54	
	16:40		17:40	4 17:11 (4)	18:34	20 18:07 (3)	20:31		21:25	27 20:32 (2)	22:00	
19	08:32		07:39	17:04 (4)	06:33	17:48 (3)	06:18		05:19	20:06 (2)	04:54	
	16:41		17:42	9 17:13 (4)	18:36	22 18:10 (3)	20:33		21:27	26 20:32 (2)	22:00	
20	08:31		07:36	17:03 (4)	06:31	17:47 (3)	06:16		05:18	20:07 (2)	04:54	
	16:43		17:44	13 17:16 (4)	18:38	23 18:10 (3)	20:35		21:28	23 20:30 (2)	22:00	
21	08:30		07:34	17:01 (4)	06:28	17:48 (3)	06:14		05:16	20:08 (2)	04:54	
	16:45		17:46	17 17:18 (4)	18:40	22 18:10 (3)	20:37		21:30	22 20:30 (2)	22:01	
22	08:29	16:09 (5)	07:32	16:59 (4)	06:26	17:48 (3)	06:12		05:15	20:09 (2)	04:55	
	16:47	3 16:12 (5)	17:48	20 17:19 (4)	18:42	20 18:08 (3)	20:39		21:31	20 20:29 (2)	22:01	
23	08:27	16:09 (5)	07:30	16:58 (4)	06:23	17:50 (3)	06:09		05:13	20:10 (2)	04:55	
	16:49	6 16:15 (5)	17:50	24 17:22 (4)	18:43	17 18:07 (3)	20:41		21:33	17 20:27 (2)	22:01	
24	08:26	16:08 (5)	07:28	16:57 (4)	06:21	17:51 (3)	06:07		05:12	20:11 (2)	04:55	
	16:50	9 16:17 (5)	17:52	27 17:24 (4)	18:45	13 18:04 (3)	20:43		21:34	15 20:26 (2)	22:01	
25	08:24	16:08 (5)	07:25	16:56 (4)	06:18	17:54 (3)	06:05		05:11	20:13 (2)	04:55	
	16:52	11 16:19 (5)	17:54	30 17:26 (4)	18:47	8 18:02 (3)	20:44		21:36	12 20:25 (2)	22:01	
26	08:23	16:07 (5)	07:23	16:55 (4)	06:16		06:03		05:09	20:16 (2)	04:56	
	16:54	14 16:21 (5)	17:56	33 17:28 (4)	18:49		20:46		21:37	6 20:22 (2)	22:01	
27	08:22	16:07 (5)	07:21	16:55 (4)	06:13		06:01	20:13 (2)	05:08		04:56	
	16:56	16 16:23 (5)	17:58	36 17:31 (4)	18:51		20:48	6 20:19 (2)	21:39		22:01	
28	08:20	16:08 (5)	07:18	16:54 (4)	06:11		05:58	20:11 (2)	05:07		04:57	
	16:58	18 16:26 (5)	18:00	38 17:32 (4)	18:53		20:50	10 20:21 (2)	21:40		22:01	
29	08:18	16:07 (5)			07:08		05:56	20:09 (2)	05:06		04:57	
	17:00	21 16:28 (5)			19:54		20:52	13 20:22 (2)	21:41		22:01	
30	08:17	16:07 (5)			07:06		05:54	20:08 (2)	05:05		04:58	
	17:02	23 16:30 (5)			19:56		20:53	16 20:24 (2)	21:43		22:00	
31	08:15	16:07 (5)			07:04				05:04			
	17:04	24 16:31 (5)			19:58				21:44			
Potential sun hours	250		273		367		420		494		510	
Total, worst case	145		397		697		45		664			
Sun reduction	0.24		0.23		0.27		0.35		0.38			
Oper. time red.	1.00		1.00		1.00		1.00		1.00			
Wind dir. red.	0.66		0.67		0.67		0.64		0.64			
Total reduction	0.16		0.16		0.18		0.23		0.25			
Total, real	23		62		128		10		163			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CH - H86

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December			
1	04:59		05:39	20:13 (2)	06:33		07:26	17:38 (4)	07:24		08:19			
	22:00		21:25	32	20:45 (2)	20:18	19:05	29	18:36 (3)	16:54	16:10			
2	04:59		05:40		20:13 (2)	06:35	07:28		17:36 (4)	07:26	08:21			
	22:00		21:23	32	20:45 (2)	20:16	19:02	29	18:05 (4)	16:52	16:09			
3	05:00		05:42		20:12 (2)	06:36	07:30		17:34 (4)	07:28	15:45 (5)	08:22		
	21:59		21:21	33	20:45 (2)	20:13	19:00	32	18:06 (4)	16:50	15:55 (5)	16:08		
4	05:01		05:44		20:13 (2)	06:38	07:31		17:33 (4)	07:30	15:43 (5)	08:24		
	21:59		21:19	32	20:45 (2)	20:11	18:57	34	18:07 (4)	16:48	15:57 (5)	16:08		
5	05:02		05:45		20:12 (2)	06:40	07:33		17:32 (4)	07:32	15:41 (5)	08:25		
	21:58		21:17	32	20:44 (2)	20:09	18:55	35	18:07 (4)	16:46	15:58 (5)	16:07		
6	05:03		05:47		20:12 (2)	06:42	07:35		17:31 (4)	07:34	15:40 (5)	08:26		
	21:58		21:15	33	20:45 (2)	20:06	18:52	37	18:08 (4)	16:44	15:59 (5)	16:07		
7	05:04		05:49		20:13 (2)	06:43	07:37		17:29 (4)	07:36	15:39 (5)	08:28		
	21:57		21:13	30	20:43 (2)	20:04	18:50	38	18:07 (4)	16:43	16:00 (5)	16:06		
8	05:05		05:51		20:13 (2)	06:45	07:39		17:28 (4)	07:38	15:39 (5)	08:29		
	21:56		21:12	28	20:41 (2)	20:01	18:48	40	18:08 (4)	16:41	16:01 (5)	16:06		
9	05:06		05:52		20:13 (2)	06:47	07:41		17:28 (4)	07:40	15:38 (5)	08:30		
	21:55		21:10	26	20:39 (2)	19:59	18:45	40	18:08 (4)	16:39	16:01 (5)	16:05		
10	05:07		05:54		20:13 (2)	06:49	07:42		17:27 (4)	07:42	15:39 (5)	08:31		
	21:55		21:07	24	20:37 (2)	19:56	18:43	41	18:08 (4)	16:37	16:02 (5)	16:05		
11	05:08		05:56		20:14 (2)	06:50	07:44		17:27 (4)	07:44	15:39 (5)	08:33		
	21:54		21:05	21	20:35 (2)	19:54	18:40	41	18:08 (4)	16:35	16:02 (5)	16:05		
12	05:09		05:57		20:15 (2)	06:52	07:46		17:27 (4)	07:45	15:39 (5)	08:34		
	21:53		21:03	19	20:34 (2)	19:51	18:38	40	18:07 (4)	16:34	16:01 (5)	16:05		
13	05:10		05:59		20:15 (2)	06:54	07:48		17:27 (4)	07:47	15:39 (5)	08:35		
	21:52		21:01	16	20:31 (2)	19:49	18:36	40	18:07 (4)	16:32	15:59 (5)	16:05		
14	05:12		06:01		20:17 (2)	06:56	07:50		17:27 (4)	07:49	15:39 (5)	08:36		
	21:51		20:59	12	20:29 (2)	19:47	18:33	37	18:04 (4)	16:31	15:58 (5)	16:04		
15	05:13		06:03		20:19 (2)	06:58	07:52		17:27 (4)	07:51	15:40 (5)	08:37		
	21:50		20:57	9	20:28 (2)	19:44	18:31	35	18:02 (4)	16:29	15:56 (5)	16:05		
16	05:14		06:04		20:20 (2)	06:59	07:54		17:28 (4)	07:53	15:40 (5)	08:38		
	21:49		20:55	5	20:25 (2)	19:42	18:29	31	17:59 (4)	16:27	15:54 (5)	16:05		
17	05:16		06:06		07:01		07:55		17:28 (4)	07:55	15:41 (5)	08:38		
	21:47		20:53		19:39		18:26	29	17:57 (4)	16:26	15:52 (5)	16:05		
18	05:17	20:24 (2)	06:08		07:03	18:42 (3)	07:57		17:29 (4)	07:57	15:42 (5)	08:39		
	21:46	9	20:33 (2)	20:51	19:37	6	18:48 (3)	18:24	26	17:55 (4)	16:24	9	15:51 (5)	16:05
19	05:18	20:22 (2)	06:10		07:05	18:39 (3)	07:59		17:30 (4)	07:59	15:43 (5)	08:40		
	21:45	13	20:35 (2)	20:48	19:34	12	18:51 (3)	18:22	22	17:52 (4)	16:23	6	15:49 (5)	16:05
20	05:20	20:21 (2)	06:12		07:06	18:37 (3)	08:01		17:31 (4)	08:00	15:44 (5)	08:41		
	21:44	16	20:37 (2)	20:46	19:32	16	18:53 (3)	18:20	19	17:50 (4)	16:22	3	15:47 (5)	16:06
21	05:21	20:20 (2)	06:13		07:08	18:34 (3)	08:03		17:32 (4)	08:02		08:41		
	21:42	18	20:38 (2)	20:44	19:29	19	18:53 (3)	18:17	16	17:48 (4)	16:20		16:06	
22	05:23	20:18 (2)	06:15		07:10	18:33 (3)	08:05		17:34 (4)	08:04		08:42		
	21:41	21	20:39 (2)	20:42	19:27	21	18:54 (3)	18:15	11	17:45 (4)	16:19		16:06	
23	05:24	20:18 (2)	06:17		07:12	18:32 (3)	08:07		17:36 (4)	08:06		08:42		
	21:39	23	20:41 (2)	20:39	19:24	23	18:55 (3)	18:13	7	17:43 (4)	16:18		16:07	
24	05:26	20:17 (2)	06:19		07:13	18:31 (3)	08:09		17:39 (4)	08:08		08:43		
	21:38	24	20:41 (2)	20:37	19:22	23	18:54 (3)	18:11	2	17:41 (4)	16:17		16:08	
25	05:27	20:16 (2)	06:20		07:15	18:30 (3)	07:11			08:09		08:43		
	21:36	26	20:42 (2)	20:35	19:19	21	18:51 (3)	17:09		16:16		16:08		
26	05:29	20:15 (2)	06:22		07:17	18:30 (3)	07:13			08:11		08:43		
	21:35	27	20:42 (2)	20:32	19:17	18	18:48 (3)	17:06		16:14		16:09		
27	05:30	20:14 (2)	06:24		07:19	18:30 (3)	07:15			08:13		08:44		
	21:33	29	20:43 (2)	20:30	19:14	16	18:46 (3)	17:04		16:13		16:10		
28	05:32	20:14 (2)	06:26		07:21	18:30 (3)	07:16			08:14		08:44		
	21:32	30	20:44 (2)	20:28	19:12	14	18:44 (3)	17:02		16:12		16:11		
29	05:34	20:13 (2)	06:27		07:22	17:44 (4)	07:18			08:16		08:44		
	21:30	31	20:44 (2)	20:25	19:09	25	18:41 (3)	17:00		16:12		16:11		
30	05:35	20:13 (2)	06:29		07:24	17:40 (4)	07:20			08:18		08:44		
	21:28	31	20:44 (2)	20:23	19:07	28	18:38 (3)	16:58		16:11		16:12		
31	05:37	20:14 (2)	06:31				07:22					08:44		
	21:26	31	20:45 (2)	20:21			16:56					16:13		
Potential sun hours	512		460		382		328		259		233			
Total, worst case		329		384		242		711		292				
Sun reduction		0.32		0.34		0.32		0.29		0.27				
Oper. time red.		1.00		1.00		1.00		1.00		1.00				
Wind dir. red.		0.64		0.64		0.67		0.67		0.66				
Total reduction		0.21		0.22		0.22		0.20		0.18				
Total, real		69		84		52		140		51				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CI - H87

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CJ - H88

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CK - H89

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CL - H90

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CM - H91

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CN - H92

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CO - H93

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
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29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CP - H94

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CQ - H95

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:46	21:59	21:23	20:16	19:02	16:52	16:09
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	16:17	17:10	18:06	20:04	20:59	21:47	21:59	21:21	20:13	19:00	16:50	16:08
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	16:18	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
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	16:20	17:14	18:09	20:07	21:02	21:50	21:58	21:17	20:09	18:55	16:46	16:07
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	16:21	17:16	18:11	20:09	21:04	21:51	21:57	21:15	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:13	20:04	18:50	16:43	16:06
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	16:51	17:52	18:45	20:42	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:08
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	17:00		19:54	20:52	21:41	22:00	21:30	20:25	19:09	17:00	16:12	16:12
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	17:02		19:56	20:53	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:12
31	08:15		07:04		05:04		05:37	06:31		07:22		08:44
	17:04		19:58		21:44		21:26	20:21		16:56		16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CR - H96

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CS - H97

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CT - H98

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CU - H99

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:04	07:24 16:54	08:19 16:10
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29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:00	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
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Total reduction												
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: CV - H100

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:14 (4) 21:25	05:39 20:18	06:33 19:05	07:26 16:54	08:19 16:10
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:09 (4) 21:55	21:17 (4) 21:21	05:52 19:59	06:47 18:45	07:41 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:09 (4) 21:54	21:18 (4) 21:07	05:54 19:56	06:49 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:09 (4) 21:54	21:20 (4) 21:50	05:56 19:54	06:50 18:40	07:44 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:09 (4) 21:53	21:22 (4) 21:50	05:57 19:51	06:52 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:09 (4) 21:52	21:22 (4) 21:51	05:59 19:49	06:54 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:09 (4) 21:51	21:23 (4) 21:50	06:01 19:46	06:56 18:33	07:50 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:10 (4) 21:50	21:24 (4) 21:50	06:03 19:44	06:57 18:31	07:52 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:10 (4) 21:48	21:25 (4) 21:48	06:04 19:42	06:59 18:29	07:54 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:10 (4) 21:47	21:26 (4) 21:47	06:06 19:39	07:01 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:10 (4) 21:46	21:27 (4) 21:46	06:08 19:37	07:03 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:10 (4) 21:45	21:28 (4) 21:45	06:10 19:34	07:05 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:10 (4) 21:43	21:30 (4) 21:43	06:12 19:32	07:06 18:20	08:01 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:11 (4) 21:42	21:33 (4) 21:42	06:13 19:29	07:08 18:17	08:03 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:12 (4) 21:41	21:36 (4) 21:41	06:15 19:27	07:10 18:15	08:05 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:11 (4) 21:39	21:38 (4) 21:39	06:17 19:24	07:12 18:13	08:07 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:11 (4) 21:38	21:41 (4) 21:38	06:19 19:22	07:13 18:11	08:09 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:12 (4) 21:36	21:44 (4) 21:36	06:20 19:19	19:22 17:09	18:11 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:12 (4) 21:35	21:47 (4) 21:35	06:22 19:17	07:17 17:06	18:13 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:12 (4) 21:33	21:50 (4) 21:33	06:24 19:14	07:19 17:04	18:14 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:13 (4) 21:31	21:53 (4) 21:31	06:26 19:12	07:21 17:02	18:16 16:12	08:44 16:11
29	08:18 17:00	07:08 17:54	07:08 18:54	05:56 20:52	05:06 21:41	04:57 22:00	21:13 (4) 21:30	21:54 (4) 21:30	06:27 19:09	07:22 17:00	18:18 16:12	08:44 16:11
30	08:17 17:02	07:06 17:56	07:06 18:56	05:54 20:53	05:05 21:43	04:58 22:00	21:13 (4) 21:28	21:56 (4) 21:28	06:29 19:07	07:24 16:58	18:17 16:11	08:44 16:12
31	08:15 17:04	07:04 17:58	07:04 18:58	05:04 21:44	05:04 21:44	05:04 21:44	21:26 21:26	21:58 21:26	06:31 20:21	07:22 16:56	18:18 16:13	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case						308						
Sun reduction						0.32						
Oper. time red.						1.00						
Wind dir. red.						0.61						
Total reduction						0.19						
Total, real						60						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: CW - H101

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	[January	[February	[March	[April	[May	[June	[July	[August	[September	[October	[November	[December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:18 (4) 21:24 (4)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:19 (4) 21:24 (4)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	21:19 (4) 21:23 (4)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	21:19 (4) 21:23 (4)	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	21:20 (4) 21:23 (4)	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:15 (4) 21:16 (4)	21:21 (4) 21:22 (4)	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:14 (4) 21:16 (4)	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:14 (4) 21:17 (4)	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:13 (4) 21:18 (4)	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:14 (4) 21:19 (4)	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:14 (4) 21:20 (4)	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:13 (4) 21:20 (4)	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:14 (4) 21:21 (4)	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:14 (4) 21:22 (4)	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:14 (4) 21:22 (4)	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:14 (4) 21:23 (4)	05:14 21:48	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:14 (4) 21:23 (4)	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:14 (4) 21:24 (4)	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:15 (4) 21:24 (4)	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:15 (4) 21:24 (4)	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:15 (4) 21:24 (4)	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:16 (4) 21:25 (4)	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:16 (4) 21:25 (4)	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:15 (4) 21:25 (4)	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:16 (4) 21:25 (4)	05:27 21:36	06:20 20:35	19:22 19:19	18:11 17:09	16:17 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:16 (4) 21:25 (4)	05:29 21:35	06:22 20:32	07:17 19:17	18:13 17:06	16:18 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:16 (4) 21:24 (4)	05:30 21:33	06:24 20:30	07:19 19:14	18:13 17:04	16:18 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:17 (4) 21:25 (4)	05:32 21:31	06:26 20:28	07:21 19:12	18:14 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00	07:08 17:54	06:08 18:54	05:56 20:52	05:06 21:41	04:58 22:00	21:18 (4) 21:25 (4)	05:34 21:30	06:27 20:25	07:22 19:09	18:16 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02	07:06 17:56	06:06 18:56	05:54 20:53	05:05 21:43	04:58 22:00	21:17 (4) 21:24 (4)	05:35 21:28	06:29 20:23	07:24 19:07	18:17 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04	07:04 17:58	06:04 18:58	05:04 21:44	05:04 21:44	05:04 21:44	05:37 21:26	05:37 21:26	06:31 20:21	07:22 16:56	18:17 16:56	16:11 16:13	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case						183			23				
Sun reduction						0.32			0.32				
Oper. time red.						1.00			1.00				
Wind dir. red.						0.61			0.61				
Total reduction						0.19			0.20				
Total, real						36			5				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CX - H102

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	19:53 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:55	19	20:12 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	19:54 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	17	20:11 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:43	08:10	07:11	06:56	05:48	19:55 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	15	20:10 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08		
4	08:43	08:08	07:09	06:54	05:46	19:57 (5)	05:00	05:01	05:44	06:38	07:31	07:30	08:23			
	16:18	17:12	18:07	20:06	21:01	11	20:08 (5)	21:49	21:59	21:19	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	06:51	05:44	20:00 (5)	04:59	05:02	05:45	06:40	07:33	07:32	08:25			
	16:20	17:14	18:09	20:07	21:02	4	20:04 (5)	21:50	21:58	21:17	20:09	18:55	16:46	16:07		
6	08:42	08:05	07:04	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:26			
	16:21	17:16	18:11	20:09	21:04		21:51	21:57	21:15	20:06	18:52	16:44	16:07			
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:43	07:37	07:36	08:28			
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:13		20:04	18:50	16:43	16:06		
8	08:41	08:01	07:00	06:44	05:38		04:57	05:05	05:51		20:08 (5)	06:45	07:39	08:29		
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:11	7	20:15 (5)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52		20:06 (5)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	12	20:18 (5)	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54		20:03 (5)	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	16	20:19 (5)	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56		20:02 (5)	06:50	07:44	07:43	08:33	
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	18	20:20 (5)	19:54	18:40	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:57		20:02 (5)	06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	19	20:21 (5)	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59		20:00 (5)	06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	21	20:21 (5)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01		20:00 (5)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	22	20:22 (5)	19:47	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03		20:00 (5)	06:58	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	22	20:22 (5)	19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05		19:59 (5)	06:59	07:54	07:53	08:37	
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	23	20:22 (5)	19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06		19:59 (5)	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	23	20:22 (5)	19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	20:02 (5)	05:21	04:54	05:17	06:08		19:59 (5)	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	1	20:03 (5)	21:59	21:46	20:50	23	20:22 (5)	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:18	19:59 (5)	05:19	04:54	05:18	06:10		19:58 (5)	07:05	07:59	07:59	08:40	
	16:41	17:42	18:36	20:33	6	20:05 (5)	21:27	22:00	21:45	20:48	21	20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:57 (5)	05:18	04:54	05:20	06:12		19:59 (5)	07:06	08:01	08:00	08:41	
	16:43	17:44	18:38	20:35	10	20:07 (5)	21:28	22:00	21:43	20:46	18	20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:55 (5)	05:16	04:54	05:21	06:13		20:00 (5)	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	13	20:08 (5)	21:30	22:00	21:42	20:44	15	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:54 (5)	05:15	04:55	05:23	06:15		20:00 (5)	07:10	08:05	08:04	08:42	
	16:47	17:48	18:41	20:39	16	20:10 (5)	21:31	22:01	21:41	20:42	12	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:53 (5)	05:13	04:55	05:24	06:17		20:01 (5)	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	19	20:12 (5)	21:33	22:01	21:39	20:39	9	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:53 (5)	05:12	04:55	05:26	06:19		20:03 (5)	07:13	08:09	08:07	08:43	
	16:51	17:52	18:45	20:42	20	20:13 (5)	21:34	22:01	21:38	20:37	6	20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:52 (5)	05:11	04:56	05:27	06:20		20:05 (5)	07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	23	20:15 (5)	21:36	22:01	21:36	20:35	1	20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:52 (5)	05:09	04:56	05:29	06:22			07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	23	20:15 (5)	21:37	22:01	21:35	20:32		19:17	17:06	16:15	16:09	
27	08:21	07:21	06:13	06:01	19:52 (5)	05:08	04:56	05:30	06:24			07:19	07:14	08:13	08:43	
	16:56	17:58	18:51	20:48	23	20:15 (5)	21:39	22:01	21:33	20:30		19:14	17:04	16:13	16:10	
28	08:20	07:18	06:11	05:58	19:52 (5)	05:07	04:57	05:32	06:26			07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	23	20:15 (5)	21:40	22:01	21:32	20:28		19:12	17:02	16:13	16:11	
29	08:18		07:08	05:56	19:52 (5)	05:06	04:58	05:34	06:28			07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	22	20:14 (5)	21:41	22:00	21:30	20:25		19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	19:53 (5)	05:05	04:58	05:35	06:29			07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	20	20:13 (5)	21:43	22:00	21:28	20:23		19:07	16:58	16:11	16:12	
31	08:15		07:04			05:04			05:37	06:31			07:22		08:44	
	17:04		19:58			21:44			21:26	20:21			16:56		16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328		259	233	
Total, worst case				219	66				288							
Sun reduction				0.35	0.38				0.34							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.65	0.65				0.65							
Total reduction				0.23	0.25				0.22							
Total, real				50	16				64							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CY - H103

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:04 (5) 20:26 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:16 (5) 20:35 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	20:04 (5) 20:27 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:16 (5) 20:36 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	20:03 (5) 20:28 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:14 (5) 20:36 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	20:03 (5) 20:28 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:14 (5) 20:37 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	20:03 (5) 20:28 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:13 (5) 20:37 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:03 (5) 20:27 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:13 (5) 20:37 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:04 (5) 20:28 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:13 (5) 20:38 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:04 (5) 20:27 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:12 (5) 20:37 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:04 (5) 20:26 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:13 (5) 20:37 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:04 (5) 20:25 (5)	04:56 21:54	05:07 21:54	05:54 21:07	20:12 (5) 20:37 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:06 (5) 20:25 (5)	04:56 21:55	05:08 21:54	05:56 21:05	20:12 (5) 20:35 (5)	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:06 (5) 20:24 (5)	04:55 21:56	05:09 21:53	05:58 21:03	20:13 (5) 20:34 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:07 (5) 20:23 (5)	04:55 21:57	05:11 21:52	05:59 21:01	20:13 (5) 20:31 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:09 (5) 20:22 (5)	04:55 21:57	05:12 21:51	06:01 20:59	20:14 (5) 20:29 (5)	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:11 (5) 20:19 (5)	04:55 21:58	05:13 21:50	06:03 20:57	20:15 (5) 20:28 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	20:15 (5) 20:25 (5)	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	20:17 (5) 20:23 (5)	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25		04:54 21:59	05:17 21:46	06:08 20:50	20:21 (5) 20:22 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27		04:54 22:00	05:18 21:45	06:10 20:48		07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28		04:54 22:00	05:20 21:43	06:12 20:46		07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30		04:54 22:00	05:21 21:42	06:13 20:44		07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31		04:55 22:01	05:23 21:41	06:15 20:42		07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33		04:55 22:01	05:24 21:39	06:17 20:39		07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34		04:55 22:01	05:26 21:38	06:19 20:37		07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	20:13 (5) 20:15 (5)	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35		07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	20:10 (5) 20:17 (5)	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32		07:17 19:17	07:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	20:08 (5) 20:19 (5)	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30		07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	20:07 (5) 20:21 (5)	05:07 21:40	04:57 22:01	05:32 21:32	20:24 (5) 20:28 (5)	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	20:06 (5) 20:22 (5)	05:06 21:41	04:58 22:00	05:34 21:30	20:21 (5) 20:31 (5)	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	20:05 (5) 20:24 (5)	05:05 21:43	04:58 22:00	05:35 21:28	20:19 (5) 20:33 (5)	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58			05:04 21:44		05:37 21:26	20:18 (5) 20:34 (5)	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case				69	308			44	338					
Sun reduction				0.35	0.38			0.32	0.34					
Oper. time red.				1.00	1.00			1.00	1.00					
Wind dir. red.				0.65	0.65			0.65	0.65					
Total reduction				0.23	0.25			0.21	0.22					
Total, real				16	76			9	75					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: CZ - H104

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:04 (5) 20:26 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:12 (5) 20:38 (5)	07:26 19:05	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	20:03 (5) 20:27 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:12 (5) 20:39 (5)	07:28 19:02	07:26 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	20:02 (5) 20:29 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:11 (5) 20:39 (5)	07:30 19:00	07:28 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	20:02 (5) 20:29 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:11 (5) 20:40 (5)	07:31 18:57	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	20:01 (5) 20:29 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:11 (5) 20:39 (5)	07:33 18:55	07:32 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:01 (5) 20:29 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:11 (5) 20:39 (5)	07:35 18:52	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:02 (5) 20:30 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:11 (5) 20:40 (5)	07:37 18:50	07:36 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:01 (5) 20:30 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:11 (5) 20:39 (5)	07:39 18:48	07:38 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:01 (5) 20:29 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:11 (5) 20:39 (5)	07:41 18:45	07:40 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:01 (5) 20:28 (5)	04:56 21:55	05:07 21:54	05:54 21:07	20:11 (5) 20:37 (5)	07:42 19:56	07:42 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:02 (5) 20:29 (5)	04:56 21:55	05:08 21:54	05:56 21:05	20:12 (5) 20:35 (5)	07:44 19:54	07:43 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:02 (5) 20:28 (5)	04:55 21:56	05:09 21:53	05:58 21:03	20:12 (5) 20:34 (5)	07:46 19:51	07:45 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:02 (5) 20:27 (5)	04:55 21:57	05:11 21:52	05:59 21:01	20:12 (5) 20:31 (5)	07:48 19:49	07:47 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:04 (5) 20:27 (5)	04:55 21:51	05:12 21:51	06:01 20:59	20:14 (5) 20:29 (5)	07:50 19:47	07:49 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:04 (5) 20:26 (5)	04:55 21:50	05:13 21:50	06:03 20:57	20:15 (5) 20:28 (5)	07:52 19:44	07:51 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:05 (5) 20:25 (5)	04:54 21:48	05:14 21:48	06:05 20:55	20:16 (5) 20:25 (5)	07:54 19:42	07:53 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:06 (5) 20:24 (5)	04:54 21:59	05:16 21:47	06:06 20:53	20:19 (5) 20:23 (5)	07:55 19:39	07:55 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	20:08 (5) 20:23 (5)	04:54 21:46	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:10 (5) 20:22 (5)	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:12 (5) 20:18 (5)	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	05:21 21:42	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:36	05:29 21:36	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:09 21:39	04:56 22:01	05:31 21:33	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:11
29	08:18 17:00	07:18 19:54	06:09 20:52	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12
30	08:17 17:02	07:17 20:05	06:06 20:54	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:12
31	08:15 17:04	07:15 20:04	06:04 20:53	05:54 20:53	05:04 21:44	05:04 21:44	05:37 21:26	05:37 21:26	06:31 20:21	07:22 16:56	07:22 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				64	462		148		382			
Sun reduction				0.35	0.38		0.32		0.34			
Oper. time red.				1.00	1.00		1.00		1.00			
Wind dir. red.				0.65	0.65		0.65		0.65			
Total reduction				0.23	0.25		0.21		0.22			
Total, real				15	114		31		84			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DA - H105

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	21:04 (5) 22:00	21:04 (5) 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	21:03 (5) 22:00	21:05 (5) 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	21:02 (5) 21:59	21:05 (5) 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:01 (5) 21:59	21:05 (5) 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	21:02 (5) 21:58	21:06 (5) 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:01 (5) 21:57	21:07 (5) 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:00 (5) 21:57	21:08 (5) 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:00 (5) 21:56	21:08 (5) 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:09 (5) 21:55	21:09 (5) 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	21:10 (5) 21:54	21:10 (5) 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	21:12 (5) 21:54	21:12 (5) 21:05	06:50 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:13 (5) 21:53	21:13 (5) 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	20:59 (5) 21:52	21:15 (5) 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:00 (5) 21:51	21:01 (5) 21:09	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:00 (5) 21:53	21:03 (5) 21:03	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:00 (5) 21:48	21:05 (5) 21:48	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:00 (5) 21:47	21:06 (5) 21:47	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:00 (5) 21:46	21:08 (5) 21:46	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	21:00 (5) 21:45	21:10 (5) 21:45	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:00 (5) 21:43	21:12 (5) 21:43	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	21:00 (5) 21:42	21:14 (5) 21:42	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	21:01 (5) 21:41	21:15 (5) 21:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:01 (5) 21:39	21:17 (5) 21:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:01 (5) 21:38	21:18 (5) 21:38	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:02 (5) 21:36	21:20 (5) 21:36	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:02 (5) 21:35	21:22 (5) 21:35	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:03 (5) 21:33	21:24 (5) 21:33	07:19 19:14	08:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:03 (5) 21:32	21:25 (5) 21:32	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	21:04 (5) 21:30	21:22 (5) 21:30	07:22 19:09	08:16 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	21:03 (5) 21:28	21:25 (5) 21:28	07:24 19:07	08:17 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44	21:06 (5) 21:09 (5)	21:24 (5) 21:26	21:26 (5) 21:26	07:22 16:56	08:44 16:11	08:44 16:11	08:44 16:11
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					3	590	170					
Sun reduction					0.38	0.32	0.32					
Oper. time red.					1.00	1.00	1.00					
Wind dir. red.					0.61	0.61	0.61					
Total reduction					0.23	0.19	0.20					
Total, real					1	114	33					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DB - H106

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DC - H107

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DD - H108

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01	18:45 (5)	05:52				05:03	20:41 (3)	
	16:15	17:06	18:02						20:00	34	19:19 (5)	20:55			21:45	25	21:06 (3)
2	08:44	08:12	07:14						06:59		18:44 (5)	05:50			05:02		20:42 (3)
	16:16	17:08	18:04						20:02	34	19:18 (5)	20:57			21:46	25	21:07 (3)
3	08:43	08:10	07:12						06:56		18:45 (5)	05:48			05:01		20:42 (3)
	16:17	17:10	18:06						20:04	32	19:17 (5)	20:59			21:48	25	21:07 (3)
4	08:43	08:08	07:09						06:54		18:45 (5)	05:46			05:00		20:42 (3)
	16:18	17:12	18:07						20:06	32	19:17 (5)	21:01			21:49	25	21:07 (3)
5	08:43	08:07	07:07						06:51		18:45 (5)	05:44			04:59		20:43 (3)
	16:20	17:14	18:09						20:07	30	19:15 (5)	21:03			21:50	24	21:07 (3)
6	08:42	08:05	07:04						06:49		18:47 (5)	05:42			04:59		20:43 (3)
	16:21	17:16	18:11						20:09	27	19:14 (5)	21:04			21:51	24	21:07 (3)
7	08:42	08:03	07:02						06:47		18:47 (5)	05:40			04:58		20:43 (3)
	16:22	17:18	18:13						20:11	25	19:12 (5)	21:06			21:52	23	21:06 (3)
8	08:41	08:01	07:00						06:44		18:49 (5)	05:38			04:57		20:44 (3)
	16:24	17:20	18:15						20:13	21	19:10 (5)	21:08			21:53	23	21:07 (3)
9	08:41	07:59	06:57						06:42		18:51 (5)	05:36			04:57		20:44 (3)
	16:25	17:22	18:17						20:15	17	19:08 (5)	21:10			21:54	23	21:07 (3)
10	08:40	07:57	06:55						06:39		18:54 (5)	05:34			04:56		20:44 (3)
	16:27	17:24	18:19						20:17	10	19:04 (5)	21:11			21:55	22	21:06 (3)
11	08:40	07:55	06:52						06:37			05:33			04:56		20:45 (3)
	16:28	17:26	18:21						20:19			21:13			21:55	22	21:07 (3)
12	08:39	07:53	06:50						06:35			05:31			04:55		20:46 (3)
	16:30	17:28	18:23						20:20			21:15			21:56	21	21:07 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		20:45 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	21	21:06 (3)
14	08:37	07:49	06:45						06:30			05:27	20:46 (3)		04:55		20:46 (3)
	16:33	17:32	18:27						20:24			21:18	1	20:47 (3)	21:57	20	21:06 (3)
15	08:36	07:47	06:43						06:28			05:26	20:44 (3)		04:55		20:46 (3)
	16:34	17:34	18:28						20:26			21:20	4	20:48 (3)	21:58	21	21:07 (3)
16	08:35	07:45	06:40						06:25			05:24	20:43 (3)		04:54		20:47 (3)
	16:36	17:36	18:30						20:28			21:22	7	20:50 (3)	21:59	20	21:07 (3)
17	08:34	07:43	06:38						06:23			05:22	20:42 (3)		04:54		20:47 (3)
	16:38	17:38	18:32						20:30			21:23	9	20:51 (3)	21:59	20	21:07 (3)
18	08:33	07:41	06:35						06:21			05:21	20:42 (3)		04:54		20:48 (3)
	16:40	17:40	18:34						20:31			21:25	11	20:53 (3)	22:00	19	21:07 (3)
19	08:32	07:39	06:33						06:18			05:19	20:42 (3)		04:54		20:48 (3)
	16:41	17:42	18:36						20:33			21:27	12	20:54 (3)	22:00	19	21:07 (3)
20	08:31	07:36	06:31					17:58 (5)	06:16			05:18	20:40 (3)		04:54		20:48 (3)
	16:43	17:44	18:38	13				18:11 (5)	20:35			21:28	15	20:55 (3)	22:00	19	21:07 (3)
21	08:30	07:34	06:28					17:55 (5)	06:14			05:16	20:40 (3)		04:54		20:48 (3)
	16:45	17:46	18:40	18				18:13 (5)	20:37			21:30	17	20:57 (3)	22:00	19	21:07 (3)
22	08:28	07:32	06:26					17:53 (5)	06:12			05:15	20:40 (3)		04:55		20:49 (3)
	16:47	17:48	18:42	22				18:15 (5)	20:39			21:31	19	20:59 (3)	22:01	19	21:08 (3)
23	08:27	07:30	06:23					17:51 (5)	06:09			05:13	20:39 (3)		04:55		20:49 (3)
	16:49	17:50	18:43	26				18:17 (5)	20:41			21:33	20	20:59 (3)	22:01	19	21:08 (3)
24	08:26	07:28	06:21					17:49 (5)	06:07			05:12	20:40 (3)		04:55		20:49 (3)
	16:51	17:52	18:45	29				18:18 (5)	20:42			21:34	21	21:01 (3)	22:01	19	21:08 (3)
25	08:24	07:25	06:18					17:48 (5)	06:05			05:11	20:40 (3)		04:56		20:49 (3)
	16:52	17:54	18:47	31				18:19 (5)	20:44			21:36	22	21:02 (3)	22:01	20	21:09 (3)
26	08:23	07:23	06:16					17:48 (5)	06:03			05:09	20:40 (3)		04:56		20:49 (3)
	16:54	17:56	18:49	32				18:20 (5)	20:46			21:37	24	21:04 (3)	22:01	20	21:09 (3)
27	08:22	07:21	06:13					17:46 (5)	06:01			05:08	20:40 (3)		04:56		20:49 (3)
	16:56	17:58	18:51	34				18:20 (5)	20:48			21:39	25	21:05 (3)	22:01	20	21:09 (3)
28	08:20	07:18	06:11					17:46 (5)	05:58			05:07	20:40 (3)		04:57		20:49 (3)
	16:58	18:00	18:53	34				18:20 (5)	20:50			21:40	26	21:06 (3)	22:01	20	21:09 (3)
29	08:18		07:09					18:45 (5)	05:56			05:06	20:40 (3)		04:58		20:50 (3)
	17:00		19:54	35				19:20 (5)	20:52			21:41	27	21:07 (3)	22:01	20	21:10 (3)
30	08:17		07:06					18:45 (5)	05:54			05:05	20:40 (3)		04:58		20:49 (3)
	17:02		19:56	35				19:20 (5)	20:53			21:43	27	21:07 (3)	22:00	21	21:10 (3)
31	08:15		07:04					18:44 (5)				05:04	20:40 (3)				
	17:04		19:58	35				19:19 (5)				21:44	27	21:07 (3)			
Potential sun hours	250	273	367					420				494			510		
Total, worst case				344				262				314			638		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.68				0.68				0.63			0.63		
Total reduction				0.18				0.24				0.24			0.20		
Total, real				63				62				75			127		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DD - H108

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	20:49 (3) 21:11 (3)	05:39 21:25	06:33 20:18	07:26 19:05	08:19 16:10
2	05:00 22:00	20:50 (3) 21:12 (3)	05:40 21:23	06:35 20:16	18:53 (5) 19:03 (5)	07:28 16:52
3	05:00 21:59	20:49 (3) 21:11 (3)	05:42 21:21	06:36 20:13	18:49 (5) 19:06 (5)	07:30 16:50
4	05:01 21:59	20:49 (3) 21:12 (3)	05:44 21:19	06:38 20:11	18:46 (5) 19:07 (5)	07:31 16:48
5	05:02 21:58	20:49 (3) 21:12 (3)	05:45 21:17	06:40 20:09	18:44 (5) 19:09 (5)	07:33 16:46
6	05:03 21:57	20:49 (3) 21:13 (3)	05:47 21:15	06:42 20:06	18:43 (5) 19:10 (5)	07:35 16:44
7	05:04 21:57	20:49 (3) 21:13 (3)	05:49 21:13	06:43 20:04	18:41 (5) 19:10 (5)	07:36 16:43
8	05:05 21:56	20:49 (3) 21:14 (3)	05:51 21:11	06:45 20:01	18:40 (5) 19:11 (5)	07:39 16:41
9	05:06 21:55	20:49 (3) 21:14 (3)	05:52 21:09	06:47 19:59	18:39 (5) 19:11 (5)	07:41 16:39
10	05:07 21:55	20:49 (3) 21:15 (3)	05:54 21:07	06:49 19:56	18:37 (5) 19:11 (5)	07:42 16:37
11	05:08 21:54	20:49 (3) 21:15 (3)	05:56 21:05	06:50 19:54	18:37 (5) 19:11 (5)	07:44 16:36
12	05:09 21:53	20:49 (3) 21:15 (3)	05:58 21:03	06:52 19:51	18:37 (5) 19:11 (5)	07:45 16:34
13	05:11 21:52	20:49 (3) 21:15 (3)	05:59 21:01	06:54 19:49	18:36 (5) 19:11 (5)	07:47 16:32
14	05:12 21:51	20:49 (3) 21:15 (3)	06:01 20:59	06:56 19:47	18:35 (5) 19:10 (5)	07:50 16:31
15	05:13 21:50	20:49 (3) 21:15 (3)	06:03 20:57	06:58 19:44	18:35 (5) 19:10 (5)	07:51 16:29
16	05:14 21:49	20:50 (3) 21:15 (3)	06:05 20:55	06:59 19:42	18:36 (5) 19:09 (5)	07:54 16:27
17	05:16 21:47	20:49 (3) 21:14 (3)	06:06 20:53	07:01 19:39	18:35 (5) 19:08 (5)	07:55 16:26
18	05:17 21:46	20:49 (3) 21:12 (3)	06:08 20:50	07:03 19:37	18:36 (5) 19:07 (5)	07:57 16:25
19	05:18 21:45	20:49 (3) 21:11 (3)	06:10 20:48	07:05 19:34	18:36 (5) 19:06 (5)	07:59 16:23
20	05:20 21:44	20:50 (3) 21:10 (3)	06:12 20:46	07:06 19:32	18:37 (5) 19:04 (5)	08:00 16:22
21	05:21 21:42	20:50 (3) 21:09 (3)	06:13 20:44	07:08 19:29	18:38 (5) 19:01 (5)	08:02 16:20
22	05:23 21:41	20:50 (3) 21:07 (3)	06:15 20:42	07:10 19:27	18:39 (5) 18:59 (5)	08:04 16:19
23	05:24 21:39	20:51 (3) 21:07 (3)	06:17 20:39	07:12 19:24	18:42 (5) 18:56 (5)	08:06 16:18
24	05:26 21:38	20:51 (3) 21:05 (3)	06:19 20:37	07:13 19:22	18:46 (5) 18:53 (5)	08:08 16:17
25	05:27 21:36	20:52 (3) 21:04 (3)	06:20 20:35	07:15 19:19	18:51 (5) 17:09	08:09 16:16
26	05:29 21:35	20:52 (3) 21:02 (3)	06:22 20:32	07:17 19:17	17:13 17:07	08:11 16:15
27	05:30 21:33	20:54 (3) 21:01 (3)	06:24 20:30	07:19 19:14	17:15 17:04	08:13 16:13
28	05:32 21:32	20:54 (3) 20:59 (3)	06:26 20:28	07:21 19:12	17:16 17:02	08:14 16:11
29	05:34 21:30	20:56 (3) 20:58 (3)	06:28 20:25	07:22 19:09	17:18 17:00	08:16 16:12
30	05:35 21:28	20:58 (3) 20:23	19:09 19:07	17:00 16:58	16:12 16:11	16:11 16:12
31	05:37 21:26	20:21	19:07	16:58	16:11	16:12
Potential sun hours	512	460	382	328	259	233
Total, worst case	583		617			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.63		0.68			
Total reduction	0.20		0.22			
Total, real	118		134			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DE - H109

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		18:39 (5)	05:52			05:03		20:33 (3)
	16:15	17:06	18:02						20:00	11	18:50 (5)	20:55			21:45	17	20:50 (3)
2	08:44	08:12	07:14						06:59			05:50			05:02		20:34 (3)
	16:16	17:08	18:04						20:02			20:57			21:46	16	20:50 (3)
3	08:43	08:10	07:12						06:56			05:48			05:01		20:35 (3)
	16:17	17:10	18:06						20:04			20:59			21:48	14	20:49 (3)
4	08:43	08:08	07:09						06:54			05:46			05:00		20:36 (3)
	16:18	17:12	18:07						20:06			21:01			21:49	12	20:48 (3)
5	08:43	08:07	07:07						06:51			05:44			04:59		20:38 (3)
	16:20	17:14	18:09						20:07			21:03			21:50	9	20:47 (3)
6	08:42	08:05	07:04						06:49			05:42			04:59		20:39 (3)
	16:21	17:16	18:11						20:09			21:04			21:51	6	20:45 (3)
7	08:42	08:03	07:02						06:47			05:40			04:58		
	16:22	17:18	18:13						20:11			21:06	3		20:36 (3)		21:52
8	08:42	08:01	07:00						06:44			05:38			20:32 (3)		04:57
	16:24	17:20	18:15						20:13			21:08	5		20:37 (3)		21:53
9	08:41	07:59	06:57						06:42			05:36			20:30 (3)		04:57
	16:25	17:22	18:17						20:15			21:10	9		20:39 (3)		21:54
10	08:40	07:57	06:55						06:39			05:34			20:29 (3)		04:56
	16:27	17:24	18:19						20:17			21:11	11		20:40 (3)		21:55
11	08:40	07:55	06:53					17:46 (5)	06:37			05:33			20:29 (3)		04:56
	16:28	17:26	18:21	9				17:55 (5)	20:19			21:13	13		20:42 (3)		21:55
12	08:39	07:53	06:50					17:41 (5)	06:35			05:31			20:28 (3)		04:55
	16:30	17:28	18:23	15				17:56 (5)	20:20			21:15	15		20:43 (3)		21:56
13	08:38	07:51	06:48					17:39 (5)	06:32			05:29			20:27 (3)		04:55
	16:31	17:30	18:25	19				17:58 (5)	20:22			21:17	17		20:44 (3)		21:57
14	08:37	07:49	06:45					17:36 (5)	06:30			05:27			20:27 (3)		04:55
	16:33	17:32	18:27	24				18:00 (5)	20:24			21:18	20		20:47 (3)		21:57
15	08:36	07:47	06:43					17:35 (5)	06:28			05:26			20:26 (3)		04:55
	16:34	17:34	18:28	27				18:02 (5)	20:26			21:20	22		20:48 (3)		21:58
16	08:35	07:45	06:40					17:33 (5)	06:25			05:24			20:27 (3)		04:54
	16:36	17:36	18:30	30				18:03 (5)	20:28			21:22	23		20:50 (3)		21:59
17	08:34	07:43	06:38					17:33 (5)	06:23			05:22			20:26 (3)		04:54
	16:38	17:38	18:32	31				18:04 (5)	20:30			21:23	25		20:51 (3)		21:59
18	08:33	07:41	06:35					17:31 (5)	06:21			05:21			20:26 (3)		04:54
	16:40	17:40	18:34	33				18:04 (5)	20:31			21:25	27		20:53 (3)		22:00
19	08:32	07:39	06:33					17:31 (5)	06:18			05:19			20:27 (3)		04:54
	16:41	17:42	18:36	34				18:05 (5)	20:33			21:27	27		20:54 (3)		22:00
20	08:31	07:36	06:31					17:30 (5)	06:16			05:18			20:26 (3)		04:54
	16:43	17:44	18:38	34				18:04 (5)	20:35			21:28	27		20:53 (3)		22:00
21	08:30	07:34	06:28					17:30 (5)	06:14			05:16			20:27 (3)		04:54
	16:45	17:46	18:40	35				18:05 (5)	20:37			21:30	27		20:54 (3)		22:01
22	08:28	07:32	06:26					17:29 (5)	06:12			05:15			20:27 (3)		04:55
	16:47	17:48	18:42	35				18:04 (5)	20:39			21:31	27		20:54 (3)		22:01
23	08:27	07:30	06:23					17:29 (5)	06:09			05:13			20:27 (3)		04:55
	16:49	17:50	18:43	35				18:04 (5)	20:41			21:33	26		20:53 (3)		22:01
24	08:26	07:28	06:21					17:29 (5)	06:07			05:12			20:28 (3)		04:55
	16:51	17:52	18:45	34				18:03 (5)	20:42			21:34	25		20:53 (3)		22:01
25	08:24	07:25	06:18					17:29 (5)	06:05			05:11			20:28 (3)		04:56
	16:52	17:54	18:47	33				18:02 (5)	20:44			21:36	25		20:53 (3)		22:01
26	08:23	07:23	06:16					17:30 (5)	06:03			05:09			20:29 (3)		04:56
	16:54	17:56	18:49	32				18:02 (5)	20:46			21:37	23		20:52 (3)		22:01
27	08:22	07:21	06:13					17:30 (5)	06:01			05:08			20:29 (3)		04:56
	16:56	17:58	18:51	30				18:00 (5)	20:48			21:39	23		20:52 (3)		22:01
28	08:20	07:18	06:11					17:31 (5)	05:58			05:07			20:30 (3)		04:57
	16:58	18:00	18:53	28				17:59 (5)	20:50			21:40	22		20:52 (3)		22:01
29	08:18		07:09					18:32 (5)	05:56			05:06			20:31 (3)		04:58
	17:00		19:54	25				18:57 (5)	20:52			21:41	20		20:51 (3)		22:01
30	08:17		07:06					18:34 (5)	05:54			05:05			20:31 (3)		04:58
	17:02		19:56	22				18:56 (5)	20:53			21:43	20		20:51 (3)		22:00
31	08:15		07:04					18:35 (5)				05:04			20:32 (3)		
	17:04		19:58	18				18:53 (5)				21:44	18		20:50 (3)		
Potential sun hours	250	273	367					420				494			510		
Total, worst case				583				11				500			74		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.67				0.67				0.63			0.63		
Total reduction				0.18				0.24				0.24			0.20		
Total, real				106				3				121			15		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DE - H109

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59		05:39	20:38 (3)	06:33		07:26	18:19 (5)	07:24	08:19	
	22:00		21:25	15 20:53 (3)	20:18		19:05	17 18:36 (5)	16:54	16:10	
2	05:00		05:40		20:39 (3)	06:35			18:22 (5)	07:26	08:21
	22:00		21:23	13 20:52 (3)	20:16		19:02	11 18:33 (5)	16:52	16:09	
3	05:00		05:42		20:40 (3)	06:36			07:28	08:22	
	21:59		21:21	10 20:50 (3)	20:13		19:00		16:50	16:08	
4	05:01		05:44		20:41 (3)	06:38			07:30	08:24	
	21:59		21:19	7 20:48 (3)	20:11		18:57		16:48	16:08	
5	05:02		05:45		20:41 (3)	06:40			07:32	08:25	
	21:58		21:17	5 20:46 (3)	20:09		18:55		16:46	16:07	
6	05:03		20:47 (3)	05:47		06:42			07:34	08:26	
	21:57	4	20:51 (3)	21:15	2 20:45 (3)	20:06			16:44	16:07	
7	05:04		20:45 (3)	05:49		06:43			07:36	08:28	
	21:57	8	20:53 (3)	21:13		20:04			16:43	16:06	
8	05:05		20:44 (3)	05:51		06:45			07:38	08:29	
	21:56	10	20:54 (3)	21:11		20:01			16:41	16:06	
9	05:06		20:43 (3)	05:52		06:47			07:40	08:30	
	21:55	13	20:56 (3)	21:09		19:59			16:39	16:05	
10	05:07		20:42 (3)	05:54		06:49			07:42	08:31	
	21:55	15	20:57 (3)	21:07		19:56			16:37	16:05	
11	05:08		20:42 (3)	05:56		06:50			07:44	08:33	
	21:54	16	20:58 (3)	21:05		19:54	10 18:41 (5)		16:36	16:05	
12	05:09		20:41 (3)	05:58		06:52			07:46	08:34	
	21:53	17	20:58 (3)	21:03		19:51	17 18:45 (5)		16:34	16:05	
13	05:11		20:40 (3)	05:59		06:54			07:47	08:35	
	21:52	19	20:59 (3)	21:01		19:49	22 18:47 (5)		16:32	16:05	
14	05:12		20:39 (3)	06:01		06:56			07:50	08:36	
	21:51	21	21:00 (3)	20:59		19:47	24 18:47 (5)		16:31	16:05	
15	05:13		20:39 (3)	06:03		06:58			07:52	08:37	
	21:50	21	21:00 (3)	20:57		19:44	27 18:48 (5)		16:29	16:05	
16	05:14		20:39 (3)	06:05		06:59			07:54	08:38	
	21:49	23	21:02 (3)	20:55		19:42	29 18:49 (5)		16:27	16:05	
17	05:16		20:39 (3)	06:06		07:01			07:55	08:38	
	21:47	23	21:02 (3)	20:53		19:39	31 18:49 (5)		16:26	16:05	
18	05:17		20:38 (3)	06:08		07:03			07:57	08:39	
	21:46	24	21:02 (3)	20:50		19:37	33 18:50 (5)		16:25	16:05	
19	05:18		20:37 (3)	06:10		07:05			07:59	08:40	
	21:45	25	21:02 (3)	20:48		19:34	34 18:50 (5)		16:23	16:05	
20	05:20		20:38 (3)	06:12		07:06			08:00	08:41	
	21:44	25	21:03 (3)	20:46		19:32	34 18:50 (5)		16:22	16:06	
21	05:21		20:37 (3)	06:13		07:08			08:02	08:41	
	21:42	26	21:03 (3)	20:44		19:29	34 18:49 (5)		16:20	16:06	
22	05:23		20:37 (3)	06:15		07:10			08:04	08:42	
	21:41	26	21:03 (3)	20:42		19:27	35 18:49 (5)		16:19	16:07	
23	05:24		20:37 (3)	06:17		07:12			08:06	08:42	
	21:39	27	21:04 (3)	20:39		19:24	35 18:49 (5)		16:18	16:07	
24	05:26		20:37 (3)	06:19		07:13			08:08	08:43	
	21:38	27	21:04 (3)	20:37		19:22	34 18:49 (5)		16:17	16:08	
25	05:27		20:37 (3)	06:20		07:15			08:09	08:43	
	21:36	27	21:04 (3)	20:35		19:19	33 18:47 (5)		16:16	16:08	
26	05:29		20:37 (3)	06:22		07:17			08:11	08:43	
	21:35	25	21:02 (3)	20:32		19:17	32 18:46 (5)		16:15	16:09	
27	05:30		20:37 (3)	06:24		07:19			08:13	08:44	
	21:33	24	21:01 (3)	20:30		19:14	30 18:45 (5)		16:13	16:10	
28	05:32		20:37 (3)	06:26		07:21			08:14	08:44	
	21:32	22	20:59 (3)	20:28		19:12	28 18:44 (5)		16:13	16:11	
29	05:34		20:38 (3)	06:28		07:22			08:16	08:44	
	21:30	20	20:58 (3)	20:25		19:09	24 18:41 (5)		16:12	16:11	
30	05:35		20:38 (3)	06:29		07:24			08:18	08:44	
	21:28	18	20:56 (3)	20:23		19:07	21 18:38 (5)		16:11	16:12	
31	05:37		20:38 (3)	06:31						08:44	
	21:26	17	20:55 (3)	20:21						16:13	
Potential sun hours	512		460		382		328		259	233	
Total, worst case	523		52		567		28				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.63		0.63		0.67		0.67				
Total reduction	0.21		0.22		0.22		0.20				
Total, real	107		11		122		6				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DF - H110

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	17:06	07:01	18:00	17:37 (5)	05:52	20:22 (3)	05:03	20:44 (4)		
2	08:44	16:16	08:12	17:08	18:04	07:12	18:04	17:08	06:59	20:02	17:41 (5)	20:55	20:26 (3)	21:45	21:10 (4)		
3	08:43	16:17	08:10	17:10	18:06	07:09	18:06	17:10	20:04	20:57	17:32 (5)	05:50	20:20 (3)	05:02	20:45 (4)		
4	08:43	16:18	08:08	17:12	18:07	07:07	18:07	17:12	20:06	20:57	17:25 (5)	05:48	20:18 (3)	05:01	20:44 (4)		
5	08:43	16:20	08:07	17:14	18:09	07:04	18:09	17:14	20:07	20:57	17:24 (5)	05:46	20:17 (3)	05:00	20:43 (4)		
6	08:42	16:21	08:05	17:16	18:11	07:04	18:11	17:16	20:09	20:57	17:23 (5)	05:44	20:16 (3)	04:59	20:43 (4)		
7	08:42	16:22	08:03	17:18	18:13	07:03	18:13	17:18	20:11	20:57	17:22 (5)	05:42	20:16 (3)	04:59	20:43 (4)		
8	08:42	16:24	08:01	17:20	18:15	07:00	18:15	17:20	20:13	20:57	17:21 (5)	05:40	20:16 (3)	04:58	20:42 (4)		
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	17:25 (5)	20:15	20:57	17:20 (5)	05:38	20:15 (3)	04:57	20:43 (4)		
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	17:25 (5)	20:17	20:57	17:19 (5)	05:36	20:14 (3)	04:56	20:42 (4)		
11	08:40	16:28	07:55	17:26	18:21	06:52	18:21	17:25 (5)	20:19	20:57	17:18 (5)	05:34	20:14 (3)	04:55	20:42 (4)		
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	17:25 (5)	20:20	20:57	17:17 (5)	05:33	20:14 (3)	04:55	20:42 (4)		
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	17:21 (5)	20:22	20:57	17:16 (5)	05:31	20:14 (3)	04:55	20:42 (4)		
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	17:20 (5)	20:24	20:57	17:15 (5)	05:29	20:14 (3)	04:55	20:42 (4)		
15	08:36	16:34	07:47	17:34	18:28	06:43	18:28	17:20 (5)	20:26	20:57	17:14 (5)	05:27	20:14 (3)	04:55	20:42 (4)		
16	08:35	16:36	07:45	17:36	18:30	06:40	18:30	17:19 (5)	20:28	20:57	17:13 (5)	05:26	20:14 (3)	04:55	20:42 (4)		
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	17:20 (5)	20:30	20:57	17:12 (5)	05:24	20:14 (3)	04:55	20:42 (4)		
18	08:33	16:40	07:41	17:40	18:34	06:35	18:34	17:20 (5)	20:31	20:57	17:11 (5)	05:22	20:14 (3)	04:55	20:42 (4)		
19	08:32	16:41	07:39	17:42	18:36	06:33	18:36	17:20 (5)	20:33	20:57	17:10 (5)	05:21	20:14 (3)	04:55	20:42 (4)		
20	08:31	16:43	07:36	17:44	18:38	06:31	18:38	17:20 (5)	20:35	20:57	17:09 (5)	05:19	20:14 (3)	04:55	20:42 (4)		
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	17:21 (5)	20:37	20:57	17:08 (5)	05:18	20:14 (3)	04:55	20:42 (4)		
22	08:28	16:47	07:32	17:48	18:42	06:26	18:42	17:21 (5)	20:39	20:57	17:07 (5)	05:16	20:14 (3)	04:55	20:42 (4)		
23	08:27	16:49	07:30	17:50	18:43	06:23	18:43	17:21 (5)	20:41	20:57	17:06 (5)	05:15	20:14 (3)	04:55	20:42 (4)		
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45	17:21 (5)	20:42	20:57	17:05 (5)	05:14	20:14 (3)	04:55	20:42 (4)		
25	08:24	16:52	07:25	17:54	18:47	06:18	18:47	17:21 (5)	20:44	20:57	17:04 (5)	05:12	20:14 (3)	04:55	20:42 (4)		
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	17:21 (5)	20:46	20:57	17:03 (5)	05:11	20:14 (3)	04:55	20:42 (4)		
27	08:22	16:56	07:21	17:58	18:51	06:13	18:51	17:21 (5)	20:48	20:57	17:02 (5)	05:10	20:14 (3)	04:55	20:42 (4)		
28	08:20	16:58	07:18	18:00	18:53	06:11	18:53	17:21 (5)	20:50	20:57	17:01 (5)	05:08	20:14 (3)	04:55	20:42 (4)		
29	08:18	17:00			19:54	07:09	19:54	17:21 (5)	20:52	20:57	17:00 (5)	05:07	20:14 (3)	04:55	20:42 (4)		
30	08:17	17:02			19:56	07:06	19:56	17:21 (5)	20:54	20:57	16:59 (5)	05:06	20:14 (3)	04:55	20:42 (4)		
31	08:15	17:04			19:58	07:04	19:58	17:21 (5)	20:56	20:57	16:58 (5)	05:05	20:14 (3)	04:55	20:42 (4)		
Potential sun hours	250		273		367			420		494			510		1125		
Total, worst case					547					590					1125		
Sun reduction					0.27					0.38					0.32		
Oper. time red.					1.00					1.00					1.00		
Wind dir. red.					0.68					0.63					0.61		
Total reduction					0.18					0.24					0.20		
Total, real					100					143					219		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DF - H110

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:46 (4)	05:39	20:25 (3)	06:33	07:26	18:00 (5)	07:24	08:19		
	22:00	38	21:24 (4)	21:25	27	20:52 (3)	20:18		16:10		
2	05:00		20:47 (4)	05:40		20:25 (3)	06:35		08:21		
	22:00	37	21:24 (4)	21:23	27	20:52 (3)	20:16		16:09		
3	05:00		20:47 (4)	05:42		20:25 (3)	06:36		08:22		
	21:59	36	21:23 (4)	21:21	25	20:50 (3)	20:13		16:08		
4	05:01		20:47 (4)	05:44		20:25 (3)	06:38		08:24		
	21:59	36	21:23 (4)	21:19	23	20:48 (3)	20:11		16:08		
5	05:02		20:48 (4)	05:45		20:25 (3)	06:40		08:25		
	21:58	35	21:23 (4)	21:17	21	20:46 (3)	20:09		16:07		
6	05:03		20:49 (4)	05:47		20:25 (3)	06:42		08:26		
	21:57	33	21:22 (4)	21:15	20	20:45 (3)	20:06		16:07		
7	05:04		20:50 (4)	05:49		20:26 (3)	06:43		08:28		
	21:57	32	21:22 (4)	21:13	17	20:43 (3)	20:04		16:06		
8	05:05		20:50 (4)	05:51		20:26 (3)	06:45		08:29		
	21:56	31	21:21 (4)	21:11	15	20:41 (3)	20:01		16:06		
9	05:06		20:51 (4)	05:52		20:27 (3)	06:47		08:30		
	21:55	30	21:21 (4)	21:09	12	20:39 (3)	19:59		16:05		
10	05:07		20:52 (4)	05:54		20:27 (3)	06:49		08:31		
	21:55	28	21:20 (4)	21:07	10	20:37 (3)	19:56		16:05		
11	05:08		20:52 (4)	05:56		20:29 (3)	06:50		08:33		
	21:54	27	21:19 (4)	21:05	6	20:35 (3)	19:54		16:05		
12	05:09		20:53 (4)	05:58		20:31 (3)	06:52		08:34		
	21:53	25	21:18 (4)	21:03	3	20:34 (3)	19:51		16:05		
13	05:11		20:54 (4)	05:59		06:54			08:35		
	21:52	23	21:17 (4)	21:01		19:49			16:05		
14	05:12		20:55 (4)	06:01		06:56			08:36		
	21:51	21	21:16 (4)	20:59		19:47			16:05		
15	05:13		20:56 (4)	06:03		06:58			08:37		
	21:50	19	21:15 (4)	20:57		19:44			16:05		
16	05:14		20:58 (4)	06:05		06:59			08:38		
	21:49	17	21:15 (4)	20:55		19:42			16:05		
17	05:16		21:00 (4)	06:06		07:01			08:38		
	21:47	14	21:14 (4)	20:53		19:39			16:05		
18	05:17		21:01 (4)	06:08		07:03	18:15 (5)		08:39		
	21:46	11	21:12 (4)	20:50		19:37	13	18:28 (5)	16:05		
19	05:18		20:35 (3)	06:10		07:05	18:12 (5)		08:40		
	21:45	14	21:11 (4)	20:48		19:34	19	18:31 (5)	16:05		
20	05:20		20:33 (3)	06:12		07:06	18:10 (5)		08:41		
	21:44	12	20:45 (3)	20:46		19:32	22	18:32 (5)	16:06		
21	05:21		20:31 (3)	06:13		07:08	18:07 (5)		08:41		
	21:42	15	20:46 (3)	20:44		19:29	26	18:33 (5)	16:06		
22	05:23		20:30 (3)	06:15		07:10	18:06 (5)		08:42		
	21:41	17	20:47 (3)	20:42		19:27	28	18:34 (5)	16:07		
23	05:24		20:30 (3)	06:17		07:12	18:05 (5)		08:42		
	21:39	18	20:48 (3)	20:39		19:24	29	18:34 (5)	16:07		
24	05:26		20:28 (3)	06:19		07:13	18:04 (5)		08:43		
	21:38	21	20:49 (3)	20:37		19:22	31	18:35 (5)	16:08		
25	05:27		20:28 (3)	06:20		07:15	18:02 (5)		08:43		
	21:36	22	20:50 (3)	20:35		19:19	32	18:34 (5)	16:08		
26	05:29		20:27 (3)	06:22		07:17	18:02 (5)		08:43		
	21:35	23	20:50 (3)	20:32		19:17	33	18:35 (5)	16:09		
27	05:30		20:27 (3)	06:24		07:19	18:01 (5)		08:44		
	21:33	24	20:51 (3)	20:30		19:14	34	18:35 (5)	16:10		
28	05:32		20:26 (3)	06:26		07:21	18:01 (5)		08:44		
	21:32	25	20:51 (3)	20:28		19:12	34	18:35 (5)	16:11		
29	05:34		20:26 (3)	06:28		07:22	18:01 (5)		08:44		
	21:30	26	20:52 (3)	20:25		19:09	33	18:34 (5)	16:11		
30	05:35		20:25 (3)	06:29		07:24	18:00 (5)		08:44		
	21:28	27	20:52 (3)	20:23		19:07	33	18:33 (5)	16:12		
31	05:37		20:26 (3)	06:31					08:44		
	21:26	27	20:53 (3)	20:21					16:13		
Potential sun hours	512		460		382		328		259		233
Total, worst case	764		206		367		186				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.62		0.64		0.68		0.68				
Total reduction	0.20		0.22		0.22		0.20				
Total, real	153		45		79		37				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DG - H111

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	05:52	19:58 (2) 05:03
	16:15	17:06	18:02	20:00	20:55	11 20:09 (2) 21:45
2	08:44	08:12	07:14	06:59	05:50	20:02 (2) 05:02
	16:16	17:08	18:04	20:02	20:57	3 20:05 (2) 21:46
3	08:43	08:10	07:11	06:56	05:48	05:01
	16:17	17:10	18:05	20:04	20:59	21:48
4	08:43	08:08	07:09	06:54	05:46	05:00
	16:18	17:12	18:07	20:06	21:01	21:49
5	08:43	08:07	07:07	17:40 (4) 06:51	05:44	04:59
	16:19	17:14	18:09	2 17:42 (4) 20:07	21:03	21:50
6	08:42	08:05	07:04	17:38 (4) 06:49	05:42	04:58
	16:21	17:16	18:11	7 17:45 (4) 20:09	21:04	21:51
7	08:42	08:03	07:02	17:36 (4) 06:47	05:40	04:58
	16:22	17:18	18:13	10 17:46 (4) 20:11	21:06	21:52
8	08:41	08:01	07:00	17:36 (4) 06:44	05:38	04:57
	16:24	17:20	18:15	12 17:48 (4) 20:13	21:08	21:53
9	08:41	07:59	06:57	17:34 (4) 06:42	05:36	04:57
	16:25	17:22	18:17	16 17:50 (4) 20:15	21:10	21:54
10	08:40	07:57	06:55	17:34 (4) 06:39	05:34	04:56
	16:26	17:24	18:19	18 17:52 (4) 20:17	21:11	21:55
11	08:40	07:55	06:52	17:34 (4) 06:37	05:33	04:56
	16:28	17:26	18:21	21 17:55 (4) 20:18	21:13	21:55
12	08:39	07:53	06:50	17:33 (4) 06:35	05:31	04:55
	16:30	17:28	18:23	23 17:56 (4) 20:20	21:15	21:56
13	08:38	07:51	06:48	17:34 (4) 06:32	05:29	04:55
	16:31	17:30	18:25	24 17:58 (4) 20:22	21:17	21:57
14	08:37	07:49	06:45	17:33 (4) 06:30	05:27	04:55
	16:33	17:32	18:27	25 17:58 (4) 20:24	21:18	21:57
15	08:36	07:47	06:43	17:34 (4) 06:28	05:26	04:54
	16:34	17:34	18:28	23 17:57 (4) 20:26	21:20	21:58
16	08:35	07:45	06:40	17:34 (4) 06:25	05:24	04:54
	16:36	17:36	18:30	21 17:55 (4) 20:28	21:22	21:59
17	08:34	07:43	06:38	17:35 (4) 06:23	20:00 (2) 05:22	04:54
	16:38	17:38	18:32	19 17:54 (4) 20:30	1 20:01 (2) 21:23	21:59
18	08:33	07:41	06:35	17:36 (4) 06:21	19:58 (2) 05:21	04:54
	16:40	17:40	18:34	16 17:52 (4) 20:31	5 20:03 (2) 21:25	22:00
19	08:32	07:39	06:33	17:39 (4) 06:18	19:57 (2) 05:19	04:54
	16:41	17:42	18:36	11 17:50 (4) 20:33	8 20:05 (2) 21:27	22:00
20	08:31	07:36	06:31	06:16	19:56 (2) 05:18	04:54
	16:43	17:44	18:38	20:35	11 20:07 (2) 21:28	22:00
21	08:30	07:34	06:28	06:14	19:54 (2) 05:16	04:54
	16:45	17:46	18:40	20:37	14 20:08 (2) 21:30	22:00
22	08:28	07:32	06:26	06:11	19:54 (2) 05:15	04:55
	16:47	17:48	18:41	20:39	16 20:10 (2) 21:31	22:01
23	08:27	07:30	06:23	06:09	19:54 (2) 05:13	04:55
	16:49	17:50	18:43	20:41	18 20:12 (2) 21:33	22:01
24	08:26	07:28	06:21	06:07	19:54 (2) 05:12	04:55
	16:50	17:52	18:45	20:42	20 20:14 (2) 21:34	22:01
25	08:24	07:25	06:18	06:05	19:54 (2) 05:11	04:55
	16:52	17:54	18:47	20:44	21 20:15 (2) 21:36	22:01
26	08:23	07:23	06:16	06:03	19:54 (2) 05:09	04:56
	16:54	17:56	18:49	20:46	21 20:15 (2) 21:37	22:01
27	08:22	07:21	06:13	06:00	19:54 (2) 05:08	04:56
	16:56	17:58	18:51	20:48	20 20:14 (2) 21:39	22:01
28	08:20	07:18	06:11	05:58	19:55 (2) 05:07	04:57
	16:58	18:00	18:53	20:50	18 20:13 (2) 21:40	22:01
29	08:18		07:08	05:56	19:56 (2) 05:06	04:57
	17:00		19:54	20:52	16 20:12 (2) 21:41	22:01
30	08:17		07:06	05:54	19:57 (2) 05:05	04:58
	17:02		19:56	20:53	14 20:11 (2) 21:43	22:00
31	08:15		07:04			05:04
	17:04		19:58			21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case			248	203		
Sun reduction			0.27	0.35		0.38
Oper. time red.			1.00	1.00		1.00
Wind dir. red.			0.68	0.65		0.65
Total reduction			0.18	0.23		0.25
Total, real			45	46		3

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DG - H111

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:12 (4) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:12 (4) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:12 (4) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:12 (4) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:12 (4) 16:46	08:25 16:07
6	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	18:13 (4) 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	18:13 (4) 16:43	08:28 16:06
8	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	18:14 (4) 16:41	08:29 16:06
9	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	18:18 (4) 16:39	08:30 16:05
10	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	20:09 (2) 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	20:06 (2) 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	20:04 (2) 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	20:03 (2) 19:46	07:50 18:33	07:49 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	20:02 (2) 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	05:14 21:49	06:04 20:55	20:01 (2) 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	20:00 (2) 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:00 (2) 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	19:59 (2) 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	19:59 (2) 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	20:00 (2) 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	19:59 (2) 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	20:00 (2) 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	20:01 (2) 19:22	18:24 (4) 18:11	08:09 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	20:01 (2) 19:19	18:20 (4) 18:34 (4)	07:11 17:09	08:09 16:16
26	05:29 21:35	06:22 20:32	20:03 (2) 19:17	18:18 (4) 18:36 (4)	07:13 17:06	08:11 16:16
27	05:30 21:33	06:24 20:30	20:04 (2) 19:14	18:16 (4) 18:37 (4)	07:14 17:04	08:13 16:10
28	05:32 21:32	06:26 20:28	19:12 19:12	18:15 (4) 18:38 (4)	07:16 17:02	08:14 16:10
29	05:34 21:30	06:27 20:25	07:22 19:09	18:14 (4) 18:38 (4)	07:18 17:00	08:16 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	18:13 (4) 18:38 (4)	07:20 16:58	08:17 16:11
31	05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		223		118		
Sun reduction		0.34		0.29		
Oper. time red.		1.00		1.00		
Wind dir. red.		0.65		0.68		
Total reduction		0.22		0.20		
Total, real		49		23		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DH - H112

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:33 (5)	08:14	16:14 (4)	07:16		07:01	05:52		19:48 (2)	05:03
	16:15	4	15:37 (5)	17:06	21	16:35 (4)	18:02	20:00	38	20:26 (2)	21:45
2	08:44	15:34 (5)	08:12	16:13 (4)	07:14		06:59	05:50		19:48 (2)	05:02
	16:16	5	15:39 (5)	17:08	24	16:37 (4)	18:04	20:02	38	20:26 (2)	21:46
3	08:44	15:33 (5)	08:10	16:13 (4)	07:12		17:34 (3)	06:56		19:47 (2)	05:01
	16:17	6	15:39 (5)	17:10	26	16:39 (4)	18:06	20:04	39	20:26 (2)	21:48
4	08:43	15:34 (5)	08:08	16:12 (4)	07:09		17:33 (3)	06:54		19:47 (2)	05:00
	16:18	7	15:41 (5)	17:12	29	16:41 (4)	18:07	20:06	39	20:26 (2)	21:49
5	08:43	15:33 (5)	08:07	16:12 (4)	07:07		17:31 (3)	06:51		19:47 (2)	04:59
	16:19	9	15:42 (5)	17:14	31	16:43 (4)	18:09	20:07	39	20:26 (2)	21:50
6	08:43	15:34 (5)	08:05	16:11 (4)	07:04		17:31 (3)	06:49		19:47 (2)	04:59
	16:21	10	15:44 (5)	17:16	34	16:45 (4)	18:11	20:09	38	20:25 (2)	21:51
7	08:42	15:34 (5)	08:03	16:11 (4)	07:02		17:30 (3)	06:47		19:48 (2)	04:58
	16:22	11	15:45 (5)	17:18	36	16:47 (4)	18:13	20:11	38	20:26 (2)	21:52
8	08:42	15:34 (5)	08:01	16:10 (4)	07:00		17:30 (3)	06:44		19:47 (2)	04:57
	16:24	12	15:46 (5)	17:20	40	16:50 (4)	18:15	20:13	38	20:25 (2)	21:53
9	08:41	15:35 (5)	07:59	16:10 (4)	06:57		17:29 (3)	06:42		19:47 (2)	04:57
	16:25	14	15:49 (5)	17:22	42	16:52 (4)	18:17	20:15	38	20:25 (2)	21:54
10	08:40	15:35 (5)	07:57	16:10 (4)	06:55		17:29 (3)	06:39		19:48 (2)	04:56
	16:26	15	15:50 (5)	17:24	44	16:54 (4)	18:19	20:17	36	20:24 (2)	21:55
11	08:40	15:35 (5)	07:55	16:10 (4)	06:53		17:30 (3)	06:37		19:49 (2)	04:56
	16:28	17	15:52 (5)	17:26	46	16:56 (4)	18:21	20:19	35	20:24 (2)	21:55
12	08:39	15:35 (5)	07:53	16:09 (4)	06:50		17:29 (3)	06:35		19:49 (2)	04:55
	16:30	19	15:54 (5)	17:28	46	16:55 (4)	18:23	20:20	34	20:23 (2)	21:56
13	08:38	15:36 (5)	07:51	16:09 (4)	06:48		17:30 (3)	06:32		19:49 (2)	04:55
	16:31	19	15:55 (5)	17:30	46	16:55 (4)	18:25	20:22	33	20:22 (2)	21:57
14	08:37	15:36 (5)	07:49	16:10 (4)	06:45		17:30 (3)	06:30		19:50 (2)	04:55
	16:33	21	15:57 (5)	17:32	45	16:55 (4)	18:27	20:24	32	20:22 (2)	21:58
15	08:36	15:36 (5)	07:47	16:10 (4)	06:43		17:32 (3)	06:28		19:51 (2)	04:55
	16:34	23	15:59 (5)	17:34	45	16:55 (4)	18:28	20:26	30	20:21 (2)	21:58
16	08:35	15:36 (5)	07:45	16:11 (4)	06:40		17:33 (3)	06:25		19:52 (2)	04:54
	16:36	24	16:00 (5)	17:36	44	16:55 (4)	18:30	20:28	28	20:20 (2)	21:59
17	08:34	15:37 (5)	07:43	16:11 (4)	06:38		17:37 (3)	06:23		19:52 (2)	04:54
	16:38	24	16:01 (5)	17:38	44	16:55 (4)	18:32	20:30	27	20:19 (2)	21:59
18	08:33	15:37 (5)	07:41	16:11 (4)	06:35		16:21	06:21		19:54 (2)	04:54
	16:40	24	16:01 (5)	17:40	42	16:53 (4)	18:34	20:31	24	20:18 (2)	22:00
19	08:32	15:38 (5)	07:39	16:12 (4)	06:33		16:18	06:18		19:56 (2)	04:54
	16:41	24	16:02 (5)	17:42	41	16:53 (4)	18:36	20:33	22	20:18 (2)	22:00
20	08:31	15:38 (5)	07:36	16:13 (4)	06:31		16:16	06:16		19:57 (2)	04:54
	16:43	23	16:01 (5)	17:44	40	16:53 (4)	18:38	20:35	4	20:07 (2)	21:28
21	08:30	15:39 (5)	07:34	16:14 (4)	06:28		16:14	06:14		19:59 (2)	05:16
	16:45	22	16:01 (5)	17:46	38	16:52 (4)	18:40	20:37	9	20:08 (2)	21:30
22	08:29	15:40 (5)	07:32	16:14 (4)	06:26		16:12	06:12		19:57 (2)	05:15
	16:47	21	16:01 (5)	17:48	36	16:50 (4)	18:42	20:39	13	20:10 (2)	21:31
23	08:27	15:41 (5)	07:30	16:16 (4)	06:23		16:09	06:09		19:55 (2)	05:13
	16:49	20	16:01 (5)	17:50	33	16:49 (4)	18:43	20:41	17	20:12 (2)	21:33
24	08:26	15:42 (5)	07:28	16:17 (4)	06:21		16:07	06:07		19:53 (2)	05:12
	16:50	18	16:00 (5)	17:52	31	16:48 (4)	18:45	20:43	21	20:14 (2)	21:34
25	08:24	15:44 (5)	07:25	16:19 (4)	06:18		16:05	06:05		19:52 (2)	05:11
	16:52	16	16:00 (5)	17:54	26	16:45 (4)	18:47	20:44	23	20:15 (2)	21:36
26	08:23	15:45 (5)	07:23	16:21 (4)	06:16		16:03	06:03		19:51 (2)	05:09
	16:54	13	15:58 (5)	17:56	22	16:43 (4)	18:49	20:46	26	20:17 (2)	21:37
27	08:22	15:47 (5)	07:21	16:25 (4)	06:13		16:01	06:01		19:50 (2)	05:08
	16:56	12	16:23 (4)	17:58	15	16:40 (4)	18:51	20:48	29	20:19 (2)	21:39
28	08:20	16:19 (4)	07:18		06:11		16:07	06:07		19:50 (2)	05:07
	16:58	7	16:26 (4)	18:00		18:53		20:50	31	20:21 (2)	21:40
29	08:18	16:17 (4)			07:09		16:07	06:07		19:49 (2)	05:06
	17:00	11	16:28 (4)		19:54		20:52	20:52	33	20:22 (2)	21:41
30	08:17	16:16 (4)			07:06		16:07	06:07		19:48 (2)	05:05
	17:02	14	16:30 (4)		19:56		20:54	20:54	36	20:24 (2)	21:43
31	08:15	16:14 (4)			07:04					05:04	
	17:04	18	16:32 (4)		19:58					21:44	
Potential sun hours	250		273		367		420		494		510
Total, worst case	483		967		251		242		694		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.66		0.68		0.65		0.65		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	77		148		46		55		171		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DH - H112

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December		
1	04:59		05:39	19:59 (2)	06:33		07:26	18:08 (3)	07:24	15:40 (4)	08:19	15:17 (5)	
	22:00		21:25	35 20:34 (2)	20:18		19:05	25 18:33 (3)	16:54	43 16:23 (4)	16:10	17 15:34 (5)	
2	04:59		05:40	19:59 (2)	06:35		07:28	18:08 (3)	07:26	15:40 (4)	08:21	15:17 (5)	
	22:00		21:23	36 20:35 (2)	20:16		19:02	25 18:33 (3)	16:52	41 16:21 (4)	16:09	16 15:33 (5)	
3	05:00		05:42	19:58 (2)	06:36		07:30	18:07 (3)	07:28	15:40 (4)	08:22	15:18 (5)	
	21:59		21:21	36 20:34 (2)	20:13		19:00	24 18:31 (3)	16:50	39 16:19 (4)	16:08	14 15:32 (5)	
4	05:01		05:44	19:58 (2)	06:38		07:31	18:07 (3)	07:30	15:40 (4)	08:24	15:19 (5)	
	21:59		21:19	37 20:35 (2)	20:11		18:57	22 18:29 (3)	16:48	37 16:17 (4)	16:08	13 15:32 (5)	
5	05:02		05:45	19:57 (2)	06:40		07:33	18:07 (3)	07:32	15:41 (4)	08:25	15:19 (5)	
	21:58		21:17	38 20:35 (2)	20:09		18:55	19 18:26 (3)	16:46	34 16:15 (4)	16:07	11 15:30 (5)	
6	05:03		05:47	19:57 (2)	06:42		07:35	18:07 (3)	07:34	15:41 (4)	08:26	15:20 (5)	
	21:58		21:15	38 20:35 (2)	20:06		18:52	17 18:24 (3)	16:44	31 16:12 (4)	16:07	10 15:30 (5)	
7	05:04		05:49	19:57 (2)	06:43		07:37	18:06 (3)	07:36	15:42 (4)	08:28	15:21 (5)	
	21:57		21:13	39 20:36 (2)	20:04		18:50	15 18:21 (3)	16:43	28 16:10 (4)	16:06	8 15:29 (5)	
8	05:05		05:51	19:56 (2)	06:45		07:39	18:06 (3)	07:38	15:43 (4)	08:29	15:21 (5)	
	21:56		21:12	39 20:35 (2)	20:01		18:48	12 18:18 (3)	16:41	25 16:08 (4)	16:06	7 15:28 (5)	
9	05:06		05:52	19:56 (2)	06:47		07:41	18:07 (3)	07:40	15:43 (4)	08:30	15:22 (5)	
	21:55		21:10	39 20:35 (2)	19:59		18:45	9 18:16 (3)	16:39	23 16:06 (4)	16:05	7 15:29 (5)	
10	05:07		05:54	19:56 (2)	06:49		07:42	18:08 (3)	07:42	15:45 (4)	08:31	15:23 (5)	
	21:55		21:08	38 20:34 (2)	19:56		18:43	6 18:14 (3)	16:37	20 16:05 (4)	16:05	5 15:28 (5)	
11	05:08		05:56	19:56 (2)	06:50		07:44	18:09 (3)	07:44	15:46 (4)	08:33	15:23 (5)	
	21:54		21:05	39 20:35 (2)	19:54		18:40	2 18:11 (3)	16:35	17 16:03 (4)	16:05	4 15:27 (5)	
12	05:09		05:57	19:56 (2)	06:52		07:46		07:45	15:48 (4)	08:34	15:24 (5)	
	21:53		21:03	38 20:34 (2)	19:51		18:38		16:34	13 16:01 (4)	16:05	3 15:27 (5)	
13	05:10		05:59	19:56 (2)	06:54		07:48		07:47	15:49 (4)	08:35	15:24 (5)	
	21:52		21:01	35 20:31 (2)	19:49		18:36		16:32	10 15:59 (4)	16:05	3 15:27 (5)	
14	05:12		06:01	19:57 (2)	06:56		07:50		17:01 (4)	07:49	15:51 (4)	08:36	15:25 (5)
	21:51		20:59	32 20:29 (2)	19:47		18:33	8 17:09 (4)	16:31	7 15:58 (4)	16:05	1 15:26 (5)	
15	05:13		06:03	19:57 (2)	06:58		07:52		16:56 (4)	07:51	15:20 (5)	08:37	
	21:50		20:57	31 20:28 (2)	19:44		18:31	18 17:14 (4)	16:29	12 15:56 (4)	16:05		
16	05:14		06:04	19:57 (2)	06:59		07:54		16:52 (4)	07:53	15:18 (5)	08:38	
	21:49		20:55	28 20:25 (2)	19:42		18:29	24 17:16 (4)	16:27	13 15:31 (5)	16:05		
17	05:16		06:06	19:58 (2)	07:01		07:55		16:50 (4)	07:55	15:17 (5)	08:38	
	21:47		20:53	25 20:23 (2)	19:39		18:26	28 17:18 (4)	16:26	16 15:33 (5)	16:05		
18	05:17		06:08	19:59 (2)	07:03		07:57		16:48 (4)	07:57	15:16 (5)	08:39	
	21:46		20:51	23 20:22 (2)	19:37		18:24	32 17:20 (4)	16:24	18 15:34 (5)	16:05		
19	05:18		06:10	19:59 (2)	07:05		07:59		16:46 (4)	07:59	15:15 (5)	08:40	
	21:45		20:48	20 20:19 (2)	19:34		18:22	35 17:21 (4)	16:23	20 15:35 (5)	16:05		
20	05:20		06:12	20:01 (2)	07:06		08:01		16:45 (4)	08:00	15:15 (5)	08:41	
	21:44		20:46	16 20:17 (2)	19:32		18:20	37 17:22 (4)	16:22	21 15:36 (5)	16:06		
21	05:21	20:13 (2)	06:13	20:03 (2)	07:08		08:03		16:44 (4)	08:02	15:14 (5)	08:41	
	21:42	8 20:21 (2)	20:44	12 20:15 (2)	19:29		18:17	38 17:22 (4)	16:20	23 15:37 (5)	16:06		
22	05:23	20:09 (2)	06:15	20:04 (2)	07:10		08:05		16:43 (4)	08:04	15:14 (5)	08:42	
	21:41	14 20:23 (2)	20:42	8 20:12 (2)	19:27		18:15	40 17:23 (4)	16:19	23 15:37 (5)	16:06		
23	05:24	20:08 (2)	06:17	20:07 (2)	07:12		08:07		16:42 (4)	08:06	15:14 (5)	08:42	
	21:39	18 20:26 (2)	20:39	3 20:10 (2)	19:24		18:13	42 17:24 (4)	16:18	24 15:38 (5)	16:07		
24	05:26	20:06 (2)	06:19		07:13		08:09		16:41 (4)	08:08	15:14 (5)	08:43	
	21:38	21 20:27 (2)	20:37		19:22		18:11	43 17:24 (4)	16:17	24 15:38 (5)	16:08		
25	05:27	20:06 (2)	06:20		07:15		07:11		15:40 (4)	08:09	15:15 (5)	08:43	
	21:36	23 20:29 (2)	20:35		19:19		17:09	44 16:24 (4)	16:16	24 15:39 (5)	16:08		
26	05:29	20:04 (2)	06:22		07:17	18:21 (3)	07:13		15:40 (4)	08:11	15:15 (5)	08:43	
	21:35	25 20:29 (2)	20:32		19:17	2 18:23 (3)	17:06	44 16:24 (4)	16:14	25 15:40 (5)	16:09		
27	05:30	20:03 (2)	06:24		07:19	18:16 (3)	07:15		15:39 (4)	08:13	15:15 (5)	08:44	
	21:33	28 20:31 (2)	20:30		19:14	12 18:28 (3)	17:04	46 16:25 (4)	16:13	23 15:38 (5)	16:10		
28	05:32	20:02 (2)	06:26		07:21	18:14 (3)	07:16		15:39 (4)	08:14	15:16 (5)	08:44	
	21:32	29 20:31 (2)	20:28		19:12	17 18:31 (3)	17:02	46 16:25 (4)	16:12	22 15:38 (5)	16:11		
29	05:34	20:01 (2)	06:28		07:22	18:12 (3)	07:18		15:39 (4)	08:16	15:16 (5)	08:44	15:33 (5)
	21:30	30 20:31 (2)	20:25		19:09	20 18:32 (3)	17:00	46 16:25 (4)	16:12	20 15:36 (5)	16:11	1 15:34 (5)	
30	05:35	20:00 (2)	06:29		07:24	18:09 (3)	07:20		15:39 (4)	08:18	15:16 (5)	08:44	15:32 (5)
	21:28	33 20:33 (2)	20:23		19:07	23 18:32 (3)	16:58	45 16:24 (4)	16:11	19 15:35 (5)	16:12	2 15:34 (5)	
31	05:37	20:00 (2)	06:31				07:22		15:39 (4)		08:44	15:33 (5)	
	21:27	34 20:34 (2)	20:21				16:56	45 16:24 (4)			16:13	2 15:35 (5)	
Potential sun hours	512		460		382		328		259		233		
Total, worst case	263		685		74		837		695		124		
Sun reduction	0.32		0.34		0.32		0.29		0.27		0.21		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.65		0.65		0.68		0.66		0.66		0.66		
Total reduction	0.21		0.22		0.22		0.19		0.17		0.14		
Total, real	55		151		16		162		121		17		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DI - H113

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44			08:14			07:16		16:35 (4)	07:01			05:52		19:49 (2)	05:03		
	16:15			17:06			18:02	26	17:01 (4)	20:00			20:55	35	20:24 (2)	21:45		
2	08:44			08:12			07:14		16:36 (4)	06:59			05:50		19:49 (2)	05:02		
	16:16			17:08			18:04	22	16:58 (4)	20:02			20:57	35	20:24 (2)	21:46		
3	08:44			08:10			07:12		16:40 (4)	06:56			05:48		19:48 (2)	05:01		
	16:17			17:10			18:06	15	16:55 (4)	20:04			20:59	36	20:24 (2)	21:48		
4	08:43			08:08		16:39 (4)	07:09			06:54			05:46		19:48 (2)	05:00		
	16:18			17:12	2	16:41 (4)	18:07			20:06			21:01	35	20:23 (2)	21:49		
5	08:43			08:07		16:37 (4)	07:07		17:41 (3)	06:51			05:44		19:48 (2)	04:59		
	16:19			17:14	6	16:43 (4)	18:09	1	17:42 (3)	20:07			21:03	35	20:23 (2)	21:50		
6	08:43			08:05		16:35 (4)	07:04		17:39 (3)	06:49			05:42		19:48 (2)	04:59		
	16:21			17:16	10	16:45 (4)	18:11	6	17:45 (3)	20:09			21:04	34	20:22 (2)	21:51		
7	08:42			08:03		16:34 (4)	07:02		17:38 (3)	06:47			05:40		19:50 (2)	04:58		
	16:22			17:18	13	16:47 (4)	18:13	8	17:46 (3)	20:11			21:06	33	20:23 (2)	21:52		
8	08:42			08:01		16:33 (4)	07:00		17:37 (3)	06:44			05:38		19:50 (2)	04:57		
	16:24			17:20	17	16:50 (4)	18:15	11	17:48 (3)	20:13			21:08	32	20:22 (2)	21:53		
9	08:41			07:59		16:32 (4)	06:57		17:36 (3)	06:42			05:36		19:50 (2)	04:57		
	16:25			17:22	20	16:52 (4)	18:17	14	17:50 (3)	20:15			21:10	31	20:21 (2)	21:54		
10	08:40		15:49 (5)	07:57		16:31 (4)	06:55		17:36 (3)	06:39			05:34		19:50 (2)	04:56		
	16:26	1	15:50 (5)	17:24	23	16:54 (4)	18:19	16	17:52 (3)	20:17			21:11	30	20:20 (2)	21:55		
11	08:40		15:49 (5)	07:55		16:31 (4)	06:52		17:36 (3)	06:37			05:33		19:52 (2)	04:56		
	16:28	3	15:52 (5)	17:26	25	16:56 (4)	18:21	19	17:55 (3)	20:19			21:13	28	20:20 (2)	21:55		
12	08:39		15:49 (5)	07:53		16:29 (4)	06:50		17:35 (3)	06:35			05:31		19:52 (2)	04:55		
	16:30	5	15:54 (5)	17:28	29	16:58 (4)	18:23	21	17:56 (3)	20:20			21:15	27	20:19 (2)	21:56		
13	08:38		15:49 (5)	07:51		16:29 (4)	06:48		17:35 (3)	06:32			05:29		19:53 (2)	04:55		
	16:31	6	15:55 (5)	17:30	31	17:00 (4)	18:25	23	17:58 (3)	20:22			21:17	24	20:17 (2)	21:57		
14	08:37		15:49 (5)	07:49		16:28 (4)	06:45		17:35 (3)	06:30			05:27		19:55 (2)	04:55		
	16:33	8	15:57 (5)	17:32	34	17:02 (4)	18:27	23	17:58 (3)	20:24			21:18	22	20:17 (2)	21:58		
15	08:36		15:49 (5)	07:47		16:28 (4)	06:43		17:36 (3)	06:28			05:26		19:56 (2)	04:55		
	16:34	10	15:59 (5)	17:34	37	17:05 (4)	18:28	22	17:58 (3)	20:26			21:20	19	20:15 (2)	21:58		
16	08:35		15:48 (5)	07:45		16:28 (4)	06:40		17:36 (3)	06:25			05:24		19:58 (2)	04:54		
	16:36	12	16:00 (5)	17:36	39	17:07 (4)	18:30	20	17:56 (3)	20:28			21:22	16	20:14 (2)	21:59		
17	08:34		15:48 (5)	07:43		16:28 (4)	06:38		17:38 (3)	06:23			05:22		20:00 (2)	04:54		
	16:38	15	16:03 (5)	17:38	41	17:09 (4)	18:32	16	17:54 (3)	20:30			21:23	11	20:11 (2)	21:59		
18	08:33		15:49 (5)	07:41		16:27 (4)	06:35		17:40 (3)	06:21			05:21			04:54		
	16:40	16	16:05 (5)	17:40	42	17:09 (4)	18:34	11	17:51 (3)	20:31			21:25			22:00		
19	08:32		15:49 (5)	07:39		16:27 (4)	06:33			06:18		20:04 (2)	05:19			04:54		
	16:41	18	16:07 (5)	17:42	42	17:09 (4)	18:36			20:33	1	20:05 (2)	21:27			22:00		
20	08:31		15:49 (5)	07:36		16:28 (4)	06:31			06:16		20:01 (2)	05:18			04:54		
	16:43	19	16:08 (5)	17:44	41	17:09 (4)	18:38			20:35	6	20:07 (2)	21:28			22:00		
21	08:30		15:49 (5)	07:34		16:28 (4)	06:28			06:14		19:57 (2)	05:16			04:54		
	16:45	22	16:11 (5)	17:46	41	17:09 (4)	18:40			20:37	11	20:08 (2)	21:30			22:01		
22	08:29		15:49 (5)	07:32		16:28 (4)	06:26			06:12		19:56 (2)	05:15			04:55		
	16:47	23	16:12 (5)	17:48	40	17:08 (4)	18:42			20:39	14	20:10 (2)	21:31			22:01		
23	08:27		15:50 (5)	07:30		16:29 (4)	06:23			06:09		19:54 (2)	05:13			04:55		
	16:49	23	16:13 (5)	17:50	39	17:08 (4)	18:43			20:41	18	20:12 (2)	21:33			22:01		
24	08:26		15:50 (5)	07:28		16:29 (4)	06:21			06:07		19:53 (2)	05:12			04:55		
	16:50	23	16:13 (5)	17:52	38	17:07 (4)	18:45			20:43	21	20:14 (2)	21:34			22:01		
25	08:24		15:51 (5)	07:25		16:30 (4)	06:18			06:05		19:52 (2)	05:11			04:55		
	16:52	22	16:13 (5)	17:54	36	17:06 (4)	18:47			20:44	23	20:15 (2)	21:36			22:01		
26	08:23		15:52 (5)	07:23		16:31 (4)	06:16			06:03		19:51 (2)	05:09			04:56		
	16:54	21	16:13 (5)	17:56	34	17:05 (4)	18:49			20:46	26	20:17 (2)	21:37			22:01		
27	08:22		15:52 (5)	07:21		16:32 (4)	06:13			06:01		19:51 (2)	05:08			04:56		
	16:56	20	16:12 (5)	17:58	32	17:04 (4)	18:51			20:48	28	20:19 (2)	21:39			22:01		
28	08:20		15:54 (5)	07:18		16:33 (4)	06:11			05:58		19:50 (2)	05:07			04:57		
	16:58	18	16:12 (5)	18:00	29	17:02 (4)	18:53			20:50	31	20:21 (2)	21:40			22:01		
29	08:18		15:55 (5)				07:08			05:56		19:49 (2)	05:06			04:57		
	17:00	16	16:11 (5)				19:54			20:52	33	20:22 (2)	21:41			22:01		
30	08:17		15:56 (5)				07:06			05:54		19:49 (2)	05:05			04:58		
	17:02	14	16:10 (5)				19:56			20:54	35	20:24 (2)	21:43			22:00		
31	08:15		15:58 (5)				07:04						05:04					
	17:04	10	16:08 (5)				19:58						21:44					
Potential sun hours	250			273			367			420			494			510		
Total, worst case		325		741			274			247			483					
Sun reduction		0.24		0.23			0.27			0.35			0.38					
Oper. time red.		1.00		1.00			1.00			1.00			1.00					
Wind dir. red.		0.66		0.66			0.67			0.65			0.65					
Total reduction		0.16		0.15			0.18			0.23			0.25					
Total, real		52		114			50			56			119					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DI - H113

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December	
1	04:59		05:39	20:02 (2)	06:33		07:26	18:14 (3)	07:24		16:01 (4)	08:19
	22:00		21:25	20:29 (2)	20:18		19:05	22	18:36 (3)	16:54	22	16:23 (4)
2	04:59		05:40	20:02 (2)	06:35		07:28	18:14 (3)	07:26		16:02 (4)	08:21
	22:00		21:23	20:31 (2)	20:16		19:02	19	18:33 (3)	16:52	19	16:21 (4)
3	05:00		05:42	20:00 (2)	06:36		07:30	18:13 (3)	07:28		16:03 (4)	08:22
	21:59		21:21	20:31 (2)	20:13		19:00	18	18:31 (3)	16:50	16	16:19 (4)
4	05:01		05:44	20:00 (2)	06:38		07:31	18:13 (3)	07:30		16:04 (4)	08:24
	21:59		21:19	20:32 (2)	20:11		18:57	16	18:29 (3)	16:48	13	16:17 (4)
5	05:02		05:45	19:59 (2)	06:40		07:33	18:14 (3)	07:32		16:05 (4)	08:25
	21:58		21:17	20:31 (2)	20:09		18:55	12	18:26 (3)	16:46	10	16:15 (4)
6	05:03		05:47	19:59 (2)	06:42		07:35	18:14 (3)	07:34		16:07 (4)	08:26
	21:58		21:15	20:32 (2)	20:06		18:52	10	18:24 (3)	16:44	5	16:12 (4)
7	05:04		05:49	19:59 (2)	06:43		07:37	18:14 (3)	07:36		16:09 (4)	08:28
	21:57		21:13	20:33 (2)	20:04		18:50	7	18:21 (3)	16:43	1	16:10 (4)
8	05:05		05:51	19:58 (2)	06:45		07:39	18:15 (3)	07:38			08:29
	21:56		21:12	20:32 (2)	20:01		18:48	3	18:18 (3)	16:41		16:06
9	05:06		05:52	19:58 (2)	06:47		07:41		07:40			08:30
	21:55		21:10	20:33 (2)	19:59		18:45		16:39			16:05
10	05:07		05:54	19:57 (2)	06:49		07:42		17:17 (4)	07:42		08:31
	21:55		21:07	20:32 (2)	19:56		18:43	10	17:27 (4)	16:37		16:05
11	05:08		05:56	19:57 (2)	06:50		07:44		17:12 (4)	07:44		08:33
	21:54		21:05	20:32 (2)	19:54		18:40	18	17:30 (4)	16:35	10	15:40 (5)
12	05:09		05:57	19:57 (2)	06:52		07:46		17:09 (4)	07:45		08:34
	21:53		21:03	20:33 (2)	19:51		18:38	24	17:33 (4)	16:34	14	15:42 (5)
13	05:10		05:59	19:57 (2)	06:54		07:48		17:07 (4)	07:47		08:35
	21:52		21:01	20:31 (2)	19:49		18:36	27	17:34 (4)	16:32	16	15:43 (5)
14	05:12		06:01	19:57 (2)	06:56		07:50		17:05 (4)	07:49		08:36
	21:51		20:59	20:29 (2)	19:47		18:33	31	17:36 (4)	16:31	18	15:44 (5)
15	05:13		06:03	19:58 (2)	06:58		07:52		17:04 (4)	07:51		08:37
	21:50		20:57	20:28 (2)	19:44		18:31	33	17:37 (4)	16:29	20	15:45 (5)
16	05:14		06:04	19:57 (2)	06:59		07:54		17:02 (4)	07:53		08:38
	21:49		20:55	20:25 (2)	19:42		18:29	36	17:38 (4)	16:27	21	15:46 (5)
17	05:16		06:06	19:58 (2)	07:01		07:55		17:01 (4)	07:55		08:38
	21:47		20:53	20:23 (2)	19:39		18:26	37	17:38 (4)	16:26	22	15:46 (5)
18	05:17		06:08	19:59 (2)	07:03		07:57		17:00 (4)	07:57		08:39
	21:46		20:51	20:22 (2)	19:37		18:24	39	17:39 (4)	16:24	23	15:47 (5)
19	05:18		06:10	19:59 (2)	07:05		07:59		17:00 (4)	07:59		08:40
	21:45		20:48	20:19 (2)	19:34		18:22	39	17:39 (4)	16:23	23	15:47 (5)
20	05:20		06:12	20:00 (2)	07:06		08:01		16:59 (4)	08:00		08:41
	21:44		20:46	20:17 (2)	19:32		18:20	41	17:40 (4)	16:22	23	15:47 (5)
21	05:21		06:13	20:01 (2)	07:08		08:03		16:59 (4)	08:02		08:41
	21:42		20:44	20:15 (2)	19:29		18:17	41	17:40 (4)	16:20	22	15:46 (5)
22	05:23		06:15	20:02 (2)	07:10		08:05		16:58 (4)	08:04		08:42
	21:41		20:42	20:12 (2)	19:27		18:15	42	17:40 (4)	16:19	19	15:44 (5)
23	05:24		06:17	20:05 (2)	07:12		08:07		16:58 (4)	08:06		08:42
	21:39		20:39	20:10 (2)	19:24		18:13	42	17:40 (4)	16:18	18	15:43 (5)
24	05:26		06:19		07:13		08:09		16:58 (4)	08:08		08:43
	21:38		20:37		19:22		18:11	42	17:40 (4)	16:17	16	15:42 (5)
25	05:27		06:20		07:15		07:11		15:58 (4)	08:09		08:43
	21:36		20:35		19:19	10	18:23 (3)	40	16:38 (4)	16:16	15	15:41 (5)
26	05:29	20:12 (2)	06:22		07:17		18:21 (3)		15:58 (4)	08:11		08:43
	21:35	8	20:20 (2)	20:32	19:17	15	18:36 (3)	38	16:36 (4)	16:14	13	15:40 (5)
27	05:30	20:09 (2)	06:24		07:19		18:19 (3)		15:58 (4)	08:13		08:44
	21:33	13	20:22 (2)	20:30	19:14	18	18:37 (3)	36	16:34 (4)	16:13	10	15:38 (5)
28	05:32	20:07 (2)	06:26		07:21		18:17 (3)		15:58 (4)	08:14		08:44
	21:32	18	20:25 (2)	20:28	19:12	21	18:38 (3)	33	16:31 (4)	16:12	9	15:38 (5)
29	05:34	20:05 (2)	06:27		07:22		18:16 (3)		15:58 (4)	08:16		08:44
	21:30	21	20:26 (2)	20:25	19:09	23	18:39 (3)	31	16:29 (4)	16:12	7	15:36 (5)
30	05:35	20:05 (2)	06:29		07:24		18:14 (3)		15:59 (4)	08:18		08:44
	21:28	23	20:28 (2)	20:23	19:07	24	18:38 (3)	28	16:27 (4)	16:11	5	15:35 (5)
31	05:37	20:04 (2)	06:31				07:22		15:59 (4)			08:44
	21:26	25	20:29 (2)	20:21			16:56	26	16:25 (4)			16:13
Potential sun hours	512		460		382		328		259			233
Total, worst case	108		631		111		841		410			5
Sun reduction	0.32		0.34		0.32		0.29		0.27			0.21
Oper. time red.	1.00		1.00		1.00		1.00		1.00			1.00
Wind dir. red.	0.65		0.65		0.68		0.66		0.66			0.66
Total reduction	0.21		0.22		0.22		0.19		0.18			0.14
Total, real	23		140		24		163		72			1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DJ - H114

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June	
1	08:44		08:14	16:03 (5)	07:16	16:41 (4)	07:01		05:52	19:50 (2)	05:03	
	16:15		17:06	15 16:18 (5)	18:02	32 17:13 (4)	20:00		20:55	34 20:24 (2)	21:45	
2	08:44		08:12	16:05 (5)	07:14	16:41 (4)	06:59		05:50	19:50 (2)	05:02	
	16:16		17:08	11 16:16 (5)	18:04	30 17:11 (4)	20:02		20:57	33 20:23 (2)	21:46	
3	08:44		08:10	16:08 (5)	07:12	16:43 (4)	06:56		05:48	19:50 (2)	05:01	
	16:17		17:10	5 16:13 (5)	18:06	26 17:09 (4)	20:04		20:59	33 20:23 (2)	21:48	
4	08:43		08:08		07:09	16:45 (4)	06:54		05:46	19:50 (2)	05:00	
	16:18		17:12		18:07	23 17:08 (4)	20:06		21:01	33 20:23 (2)	21:49	
5	08:43		08:07		07:07	16:47 (4)	06:51		05:44	19:50 (2)	04:59	
	16:19		17:14		18:09	17 17:04 (4)	20:07		21:03	32 20:22 (2)	21:50	
6	08:43		08:05		07:04	16:52 (4)	06:49		05:42	19:50 (2)	04:59	
	16:21		17:16		18:11	8 17:00 (4)	20:09		21:04	31 20:21 (2)	21:51	
7	08:42		08:03		07:02	17:43 (3)	06:47		05:40	19:51 (2)	04:58	
	16:22		17:18		18:13	3 17:46 (3)	20:11		21:06	31 20:22 (2)	21:52	
8	08:42		08:01		07:00	17:42 (3)	06:44		05:38	19:52 (2)	04:57	
	16:24		17:20		18:15	6 17:48 (3)	20:13		21:08	29 20:21 (2)	21:53	
9	08:41		07:59	16:48 (4)	06:57	17:40 (3)	06:42		05:36	19:52 (2)	04:57	
	16:25		17:22	4 16:52 (4)	18:17	10 17:50 (3)	20:15		21:10	28 20:20 (2)	21:54	
10	08:40		07:57	16:46 (4)	06:55	17:40 (3)	06:39		05:34	19:53 (2)	04:56	
	16:26		17:24	8 16:54 (4)	18:19	12 17:52 (3)	20:17		21:11	26 20:19 (2)	21:55	
11	08:40		07:55	16:44 (4)	06:52	17:40 (3)	06:37		05:33	19:54 (2)	04:56	
	16:28		17:26	12 16:56 (4)	18:21	15 17:55 (3)	20:19		21:13	24 20:18 (2)	21:55	
12	08:39		07:53	16:42 (4)	06:50	17:39 (3)	06:35		05:31	19:55 (2)	04:55	
	16:30		17:28	16 16:58 (4)	18:23	17 17:56 (3)	20:20		21:15	22 20:17 (2)	21:56	
13	08:38		07:51	16:41 (4)	06:48	17:39 (3)	06:32		05:29	19:56 (2)	04:55	
	16:31		17:30	19 17:00 (4)	18:25	19 17:58 (3)	20:22		21:17	19 20:15 (2)	21:57	
14	08:37		07:49	16:40 (4)	06:45	17:38 (3)	06:30		05:27	19:58 (2)	04:55	
	16:33		17:32	22 17:02 (4)	18:27	22 18:00 (3)	20:24		21:18	16 20:14 (2)	21:58	
15	08:36		07:47	16:40 (4)	06:43	17:39 (3)	06:28		05:26	20:00 (2)	04:55	
	16:34	2 15:59 (5)	17:34	25 17:05 (4)	18:28	23 18:02 (3)	20:26		21:20	11 20:11 (2)	21:58	
16	08:35		07:45	16:39 (4)	06:40	17:39 (3)	06:25		05:24		04:54	
	16:36	4 16:00 (5)	17:36	28 17:07 (4)	18:30	21 18:00 (3)	20:28		21:22		21:59	
17	08:34		07:43	16:39 (4)	06:38	17:40 (3)	06:23		05:22		04:54	
	16:38	7 16:03 (5)	17:38	30 17:09 (4)	18:32	19 17:59 (3)	20:30		21:23		21:59	
18	08:33		07:41	16:38 (4)	06:35	17:41 (3)	06:21		05:21		04:54	
	16:40	9 16:05 (5)	17:40	33 17:11 (4)	18:34	16 17:57 (3)	20:31		21:25		22:00	
19	08:32		07:39	16:38 (4)	06:33	17:43 (3)	06:18	20:04 (2)	05:19		04:54	
	16:41	10 16:07 (5)	17:42	35 17:13 (4)	18:36	12 17:55 (3)	20:33	1 20:05 (2)	21:27		22:00	
20	08:31		07:36	16:38 (4)	06:31		06:16	20:01 (2)	05:18		04:54	
	16:43	12 16:08 (5)	17:44	38 17:16 (4)	18:38		20:35	6 20:07 (2)	21:28		22:00	
21	08:30		07:34	16:38 (4)	06:28		06:14	19:58 (2)	05:16		04:54	
	16:45	15 16:11 (5)	17:46	40 17:18 (4)	18:40		20:37	10 20:08 (2)	21:30		22:01	
22	08:29		07:32	16:37 (4)	06:26		06:12	19:56 (2)	05:15		04:55	
	16:47	16 16:12 (5)	17:48	40 17:17 (4)	18:42		20:39	14 20:10 (2)	21:31		22:01	
23	08:27		07:30	16:37 (4)	06:23		06:09	19:55 (2)	05:13		04:55	
	16:49	19 16:15 (5)	17:50	40 17:17 (4)	18:43		20:41	17 20:12 (2)	21:33		22:01	
24	08:26		07:28	16:38 (4)	06:21		06:07	19:54 (2)	05:12		04:55	
	16:50	21 16:17 (5)	17:52	39 17:17 (4)	18:45		20:43	20 20:14 (2)	21:34		22:01	
25	08:24		07:25	16:38 (4)	06:18		06:05	19:53 (2)	05:11		04:55	
	16:52	22 16:19 (5)	17:54	38 17:16 (4)	18:47		20:44	22 20:15 (2)	21:36		22:01	
26	08:23		07:23	16:38 (4)	06:16		06:03	19:52 (2)	05:09		04:56	
	16:54	23 16:20 (5)	17:56	38 17:16 (4)	18:49		20:46	25 20:17 (2)	21:37		22:01	
27	08:22		07:21	16:39 (4)	06:13		06:01	19:51 (2)	05:08		04:56	
	16:56	23 16:20 (5)	17:58	36 17:15 (4)	18:51		20:48	28 20:19 (2)	21:39		22:01	
28	08:20		07:18	16:39 (4)	06:11		05:58	19:51 (2)	05:07		04:57	
	16:58	21 16:20 (5)	18:00	34 17:13 (4)	18:53		20:50	30 20:21 (2)	21:40		22:01	
29	08:18		15:59 (5)		07:08		05:56	19:51 (2)	05:06		04:57	
	17:00	20 16:19 (5)			19:54		20:52	31 20:22 (2)	21:41		22:01	
30	08:17		16:00 (5)		07:06		05:54	19:50 (2)	05:05		04:58	
	17:02	19 16:19 (5)			19:56		20:54	34 20:24 (2)	21:43		22:00	
31	08:15		16:01 (5)		07:04				05:04			
	17:04	17 16:18 (5)			19:58				21:44			
Potential sun hours	250		273		367		420		494		510	
Total, worst case	260		606		331		238		402			
Sun reduction	0.24		0.23		0.27		0.35		0.38			
Oper. time red.	1.00		1.00		1.00		1.00		1.00			
Wind dir. red.	0.66		0.67		0.67		0.65		0.65			
Total reduction	0.16		0.15		0.18		0.23		0.25			
Total, real	42		94		60		54		99			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DJ - H114

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:05 (2)	06:33		07:26	18:18 (3)	07:24		16:16 (4)	08:19
	22:00	21:25	23 20:28 (2)	20:18		19:05	18	18:36 (3)	16:54	7 16:23 (4)	16:10
2	04:59	05:40	20:04 (2)	06:35		07:28	18:18 (3)	07:26		16:18 (4)	08:21
	22:00	21:23	25 20:29 (2)	20:16		19:02	15	18:33 (3)	16:52	3 16:21 (4)	16:09
3	05:00	05:42	20:03 (2)	06:36		07:30	18:18 (3)	07:28			08:22
	21:59	21:21	26 20:29 (2)	20:13		19:00	13	18:31 (3)	16:50		16:08
4	05:01	05:44	20:02 (2)	06:38		07:31	18:18 (3)	07:30			08:24
	21:59	21:19	28 20:30 (2)	20:11		18:57	11	18:29 (3)	16:48		16:08
5	05:02	05:45	20:01 (2)	06:40		07:33	18:19 (3)	07:32			08:25
	21:58	21:17	29 20:30 (2)	20:09		18:55	7	18:26 (3)	16:46		16:07
6	05:03	05:47	20:01 (2)	06:42		07:35	18:20 (3)	07:34			08:26
	21:58	21:15	30 20:31 (2)	20:06		18:52	4	18:24 (3)	16:44		16:07
7	05:04	05:49	20:00 (2)	06:43		07:37	18:20 (3)	07:36			08:28
	21:57	21:13	32 20:32 (2)	20:04		18:50	1	18:21 (3)	16:43		16:06
8	05:05	05:51	19:59 (2)	06:45		07:39	17:24 (4)	07:38		15:37 (5)	08:29
	21:56	21:12	33 20:32 (2)	20:01		18:48	14	17:38 (4)	16:41	6 15:43 (5)	16:06
9	05:06	05:52	19:59 (2)	06:47		07:41	17:21 (4)	07:40		15:34 (5)	08:30
	21:55	21:10	33 20:32 (2)	19:59		18:45	20	17:41 (4)	16:39	12 15:46 (5)	16:05
10	05:07	05:54	19:58 (2)	06:49		07:42	17:18 (4)	07:42		15:34 (5)	08:31
	21:55	21:07	34 20:32 (2)	19:56		18:43	25	17:43 (4)	16:37	15 15:49 (5)	16:05
11	05:08	05:56	19:58 (2)	06:50		07:44	17:16 (4)	07:44		15:32 (5)	08:33
	21:54	21:05	34 20:32 (2)	19:54		18:40	28	17:44 (4)	16:35	18 15:50 (5)	16:05
12	05:09	05:57	19:59 (2)	06:52		07:46	17:14 (4)	07:45		15:32 (5)	08:34
	21:53	21:03	33 20:32 (2)	19:51		18:38	31	17:45 (4)	16:34	19 15:51 (5)	16:05
13	05:10	05:59	19:58 (2)	06:54		07:48	17:13 (4)	07:47		15:31 (5)	08:35
	21:52	21:01	33 20:31 (2)	19:49		18:36	33	17:46 (4)	16:32	20 15:51 (5)	16:05
14	05:12	06:01	19:58 (2)	06:56		07:50	17:12 (4)	07:49		15:30 (5)	08:36
	21:51	20:59	31 20:29 (2)	19:47		18:33	35	17:47 (4)	16:31	22 15:52 (5)	16:04
15	05:13	06:03	19:59 (2)	06:58		07:52	17:11 (4)	07:51		15:30 (5)	08:37
	21:50	20:57	29 20:28 (2)	19:44		18:31	36	17:47 (4)	16:29	22 15:52 (5)	16:05
16	05:14	06:04	19:58 (2)	06:59		07:54	17:10 (4)	07:53		15:30 (5)	08:38
	21:49	20:55	27 20:25 (2)	19:42		18:29	38	17:48 (4)	16:27	23 15:53 (5)	16:05
17	05:16	06:06	19:59 (2)	07:01		07:55	17:10 (4)	07:55		15:30 (5)	08:38
	21:47	20:53	24 20:23 (2)	19:39		18:26	38	17:48 (4)	16:26	22 15:52 (5)	16:05
18	05:17	06:08	20:00 (2)	07:03		07:57	17:09 (4)	07:57		15:30 (5)	08:39
	21:46	20:51	22 20:22 (2)	19:37		18:24	39	17:48 (4)	16:24	21 15:51 (5)	16:05
19	05:18	06:10	20:00 (2)	07:05		07:59	17:09 (4)	07:59		15:30 (5)	08:40
	21:45	20:48	19 20:19 (2)	19:34		18:22	39	17:48 (4)	16:23	19 15:49 (5)	16:05
20	05:20	06:12	20:01 (2)	07:06		08:01	17:08 (4)	08:00		15:31 (5)	08:41
	21:44	20:46	16 20:17 (2)	19:32		18:20	40	17:48 (4)	16:22	16 15:47 (5)	16:06
21	05:21	06:13	20:02 (2)	07:08		08:03	17:08 (4)	08:02		15:31 (5)	08:41
	21:42	20:44	13 20:15 (2)	19:29		18:17	40	17:48 (4)	16:20	15 15:46 (5)	16:06
22	05:23	06:15	20:03 (2)	07:10		08:05	17:08 (4)	08:04		15:32 (5)	08:42
	21:41	20:42	9 20:12 (2)	19:27		18:15	37	17:45 (4)	16:19	12 15:44 (5)	16:06
23	05:24	06:17	20:05 (2)	07:12		08:07	17:08 (4)	08:06		15:33 (5)	08:42
	21:39	20:39	5 20:10 (2)	19:24		18:13	35	17:43 (4)	16:18	10 15:43 (5)	16:07
24	05:26	06:19		07:13		08:09	17:08 (4)	08:08		15:33 (5)	08:43
	21:38	20:37		19:22	10 18:38 (3)	18:11	33	17:41 (4)	16:17	9 15:42 (5)	16:08
25	05:27	06:20		07:15		07:11	16:09 (4)	08:09		15:34 (5)	08:43
	21:36	20:35		19:19	15 18:39 (3)	17:09	29	16:38 (4)	16:16	7 15:41 (5)	16:08
26	05:29	06:22		07:17		07:13	16:09 (4)	08:11		15:35 (5)	08:43
	21:35	20:32		19:17	18 18:41 (3)	17:06	27	16:36 (4)	16:14	5 15:40 (5)	16:09
27	05:30	06:24		07:19		07:15	16:10 (4)	08:13		15:36 (5)	08:44
	21:33	20:30		19:14	21 18:42 (3)	17:04	24	16:34 (4)	16:13	2 15:38 (5)	16:10
28	05:32	20:13 (2)	06:26		07:21	18:20 (3)	07:16	16:10 (4)	08:14		08:44
	21:32	7 20:20 (2)	20:28		19:12	22 18:42 (3)	17:02	21 16:31 (4)	16:12		16:11
29	05:34	20:09 (2)	06:27		07:22	18:19 (3)	07:18	16:11 (4)	08:16		08:44
	21:30	14 20:23 (2)	20:25		19:09	22 18:41 (3)	17:00	16:29 (4)	16:12		16:11
30	05:35	20:08 (2)	06:29		07:24	18:18 (3)	07:20	16:12 (4)	08:18		08:44
	21:28	17 20:25 (2)	20:23		19:07	20 18:38 (3)	16:58	16:27 (4)	16:11		16:12
31	05:37	20:07 (2)	06:31				07:22	16:13 (4)			08:44
	21:26	20 20:27 (2)	20:21				16:56	12 16:25 (4)			16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case		58		588		128		776		305	
Sun reduction		0.32		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.65		0.65		0.67		0.67		0.66	
Total reduction		0.21		0.22		0.22		0.20		0.18	
Total, real		12		130		28		151		54	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DK - H115

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:23 (5)	08:14	15:57 (4)	07:16	17:33 (3)	07:01	05:52	19:51 (2)	05:03	20:08 (2)
2	08:44	15:23 (5)	08:12	15:56 (4)	07:14	17:30 (3)	06:59	05:50	19:50 (2)	05:02	20:14 (2)
3	08:44	15:23 (5)	08:10	15:56 (4)	07:12	17:29 (3)	06:56	05:48	19:50 (2)	05:01	
4	08:43	15:24 (5)	08:08	15:56 (4)	07:09	17:28 (3)	06:54	05:46	19:49 (2)	05:00	
5	08:43	15:24 (5)	08:07	15:56 (4)	07:07	17:27 (3)	06:51	05:44	19:49 (2)	04:59	
6	08:43	15:25 (5)	08:05	15:55 (4)	07:04	17:27 (3)	06:49	05:42	19:48 (2)	04:59	
7	08:42	15:25 (5)	08:03	15:55 (4)	07:02	17:25 (3)	06:47	05:40	19:49 (2)	04:58	
8	08:42	15:25 (5)	08:01	15:55 (4)	07:00	17:25 (3)	06:44	05:38	19:48 (2)	04:57	
9	08:41	15:26 (5)	07:59	15:55 (4)	06:57	17:25 (3)	06:42	05:36	19:48 (2)	04:57	
10	08:40	15:26 (5)	07:57	15:56 (4)	06:55	17:25 (3)	06:39	05:34	19:48 (2)	04:56	
11	08:40	15:26 (5)	07:55	15:56 (4)	06:53	17:26 (3)	06:37	05:33	19:49 (2)	04:56	
12	08:39	15:27 (5)	07:53	15:56 (4)	06:50	17:26 (3)	06:35	05:31	19:48 (2)	04:55	
13	08:38	15:27 (5)	07:51	15:56 (4)	06:48	17:27 (3)	06:32	05:29	19:48 (2)	04:55	
14	08:37	15:28 (5)	07:49	15:56 (4)	06:45	17:27 (3)	06:30	05:27	19:49 (2)	04:55	
15	08:36	15:28 (5)	07:47	15:57 (4)	06:43	17:29 (3)	06:28	05:26	19:49 (2)	04:55	
16	08:35	15:28 (5)	07:45	15:58 (4)	06:40	17:31 (3)	06:25	05:24	19:50 (2)	04:54	
17	08:34	15:29 (5)	07:43	15:59 (4)	06:38	17:36 (3)	06:23	05:22	19:50 (2)	04:54	
18	08:33	15:30 (5)	07:41	15:59 (4)	06:35	17:39 (3)	06:21	05:21	19:51 (2)	04:54	
19	08:32	15:31 (5)	07:39	16:00 (4)	06:33		06:18	05:19	19:52 (2)	04:54	
20	08:31	15:32 (5)	07:36	16:01 (4)	06:31		06:16	05:18	19:52 (2)	04:54	
21	08:30	15:33 (5)	07:34	16:03 (4)	06:28		06:14	05:16	19:53 (2)	04:54	
22	08:29	15:34 (5)	07:32	16:04 (4)	06:26		06:12	05:15	19:54 (2)	04:55	
23	08:27	15:36 (5)	07:30	16:06 (4)	06:23		06:09	05:13	19:54 (2)	04:55	
24	08:26	15:38 (5)	07:28	16:09 (4)	06:21		06:07	05:12	19:55 (2)	04:55	
25	08:24	15:42 (5)	07:25	16:12 (4)	06:18		06:05	05:11	19:56 (2)	04:55	
26	08:23	16:00 (4)	07:23		06:16		06:03	05:09	19:58 (2)	04:56	
27	08:22	16:21 (4)	07:21		06:13		06:01	05:08	19:59 (2)	04:56	
28	08:20	16:23 (4)	07:18		06:11		05:58	05:07	20:00 (2)	04:57	
29	08:18	16:26 (4)	07:16		06:09		05:56	05:06	20:01 (2)	04:57	
30	08:17	16:28 (4)			06:07		05:54	05:05	20:02 (2)	04:58	
31	08:15	16:32 (4)			06:05		05:52	05:04	20:03 (2)	04:58	
Potential sun hours	250		273		367		420		494		510
Total, worst case	726		1043		287		176		1057		6
Sun reduction	0.24		0.23		0.27		0.35		0.38		0.32
Oper. time red.	1.00		1.00		1.00		1.00		1.00		1.00
Wind dir. red.	0.66		0.66		0.68		0.65		0.65		0.65
Total reduction	0.16		0.15		0.18		0.23		0.25		0.21
Total, real	116		160		53		40		260		1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DK - H115

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	19:59 (2)	06:33	07:26	18:05 (3)	07:24	15:25 (4)	08:19	15:08 (5)	
	22:00	21:25	41	20:40 (2)	20:18	19:05	24	18:29 (3)	16:54	16:10	26
2	04:59	05:40	19:59 (2)	06:35	07:28	18:04 (3)	07:26	15:25 (4)	08:21	15:08 (5)	
	22:00	21:23	42	20:41 (2)	20:16	19:02	26	18:30 (3)	16:52	16:14 (4)	25
3	05:00	05:42	19:58 (2)	06:36	07:30	18:03 (3)	07:28	15:25 (4)	08:22	15:09 (5)	
	21:59	21:21	42	20:40 (2)	20:13	19:00	27	18:30 (3)	16:50	16:14 (4)	23
4	05:01	05:44	19:59 (2)	06:38	07:31	18:03 (3)	07:30	15:25 (4)	08:24	15:10 (5)	
	21:59	21:19	42	20:41 (2)	20:11	18:57	26	18:29 (3)	16:48	16:14 (4)	22
5	05:02	05:45	19:58 (2)	06:40	07:33	18:03 (3)	07:32	15:25 (4)	08:25	15:10 (5)	
	21:58	21:17	42	20:40 (2)	20:09	18:55	23	18:26 (3)	16:46	16:14 (4)	20
6	05:03	05:47	19:58 (2)	06:42	07:35	18:02 (3)	07:34	15:25 (4)	08:26	15:11 (5)	
	21:58	21:15	42	20:40 (2)	20:06	18:52	22	18:24 (3)	16:44	16:12 (4)	19
7	05:04	05:49	19:59 (2)	06:43	07:37	18:01 (3)	07:36	15:26 (4)	08:28	15:11 (5)	
	21:57	21:13	41	20:40 (2)	20:04	18:50	20	18:21 (3)	16:43	16:10 (4)	18
8	05:05	05:51	19:58 (2)	06:45	07:39	18:02 (3)	07:38	15:26 (4)	08:29	15:11 (5)	
	21:56	21:12	41	20:39 (2)	20:01	18:48	16	18:18 (3)	16:41	16:08 (4)	17
9	05:06	05:52	19:59 (2)	06:47	07:41	18:02 (3)	07:40	15:26 (4)	08:30	15:12 (5)	
	21:55	21:10	40	20:39 (2)	19:59	18:45	14	18:16 (3)	16:39	16:06 (4)	16
10	05:07	05:54	19:58 (2)	06:49	07:42	18:03 (3)	07:42	15:28 (4)	08:31	15:13 (5)	
	21:55	21:08	39	20:37 (2)	19:56	18:43	11	18:14 (3)	16:37	16:05 (4)	15
11	05:08	05:56	19:59 (2)	06:50	07:44	18:04 (3)	07:44	15:28 (4)	08:33	15:13 (5)	
	21:54	21:05	36	20:35 (2)	19:54	18:40	7	18:11 (3)	16:35	16:03 (4)	14
12	05:09	20:14 (2)	05:57	20:00 (2)	06:52	07:46		18:05 (3)	07:45	15:29 (4)	15:13 (5)
	21:53	20:24 (2)	21:03	20:34 (2)	19:51	18:38	4	18:09 (3)	16:34	16:01 (4)	14
13	05:10	20:12 (2)	05:59	20:00 (2)	06:54	07:48		16:32	29	15:59 (4)	16:05
	21:52	20:26 (2)	21:01	20:31 (2)	19:49	18:36		07:49	27	15:58 (4)	16:05
14	05:12	20:11 (2)	06:01	20:01 (2)	06:56	07:50		16:31	27	15:58 (4)	16:05
	21:51	20:27 (2)	20:59	20:29 (2)	19:47	18:33		07:51	25	15:56 (4)	16:05
15	05:13	20:09 (2)	06:03	20:02 (2)	06:58	07:52		16:29	25	15:56 (4)	16:05
	21:50	20:29 (2)	20:57	20:28 (2)	19:44	18:31		16:29	25	15:56 (4)	16:05
16	05:14	20:08 (2)	06:05	20:02 (2)	06:59	07:54		16:27	21	15:54 (4)	16:05
	21:49	20:30 (2)	20:55	20:25 (2)	19:42	18:29	9	16:57 (4)	16:27	15:54 (4)	16:05
17	05:16	20:08 (2)	06:06	20:03 (2)	07:01	07:55		16:42 (4)	07:55	15:51 (5)	08:38
	21:47	20:32 (2)	20:53	20:23 (2)	19:39	18:26	19	17:01 (4)	16:26	15:52 (4)	16:05
18	05:17	20:06 (2)	06:08	20:05 (2)	07:03	07:57		16:39 (4)	07:57	15:12 (5)	08:39
	21:46	20:32 (2)	20:51	20:22 (2)	19:37	18:24	25	17:04 (4)	16:24	15:51 (4)	16:05
19	05:18	20:05 (2)	06:10	20:06 (2)	07:05	07:59		16:37 (4)	07:59	15:10 (5)	08:40
	21:45	20:33 (2)	20:48	20:19 (2)	19:34	18:22	29	17:06 (4)	16:23	15:49 (4)	16:05
20	05:20	20:05 (2)	06:12	20:09 (2)	07:06	08:01		16:35 (4)	08:00	15:09 (5)	08:41
	21:44	20:35 (2)	20:46	20:17 (2)	19:32	18:20	33	17:08 (4)	16:22	15:47 (4)	16:06
21	05:21	20:04 (2)	06:13	20:14 (2)	07:08	08:03		16:33 (4)	08:02	15:08 (5)	08:41
	21:42	20:35 (2)	20:44	20:15 (2)	19:29	18:17	36	17:09 (4)	16:20	15:46 (4)	16:06
22	05:23	20:03 (2)	06:15		07:10	08:05		16:31 (4)	08:04	15:08 (5)	08:42
	21:41	20:36 (2)	20:42		19:27	18:15	39	17:10 (4)	16:19	15:44 (4)	16:06
23	05:24	20:03 (2)	06:17		07:12	08:07		16:30 (4)	08:06	15:07 (5)	08:42
	21:39	20:37 (2)	20:39		19:24	18:13	41	17:11 (4)	16:18	15:29 (5)	16:07
24	05:26	20:02 (2)	06:19		07:13	08:09		16:29 (4)	08:08	15:07 (5)	08:43
	21:38	20:37 (2)	20:37		19:22	18:11	42	17:11 (4)	16:17	15:30 (5)	16:08
25	05:27	20:02 (2)	06:20		07:15	07:11		15:28 (4)	08:09	15:07 (5)	08:43
	21:36	20:38 (2)	20:35		19:19	17:09	44	16:12 (4)	16:16	15:31 (5)	16:08
26	05:29	20:01 (2)	06:22		07:17	07:13		15:27 (4)	08:11	15:07 (5)	08:43
	21:35	20:38 (2)	20:32		19:17	17:06	46	16:13 (4)	16:14	15:31 (5)	16:09
27	05:30	20:01 (2)	06:24		07:19	07:15		15:26 (4)	08:13	15:07 (5)	08:44
	21:33	20:39 (2)	20:30		19:14	18:24 (3)	47	16:13 (4)	16:13	15:32 (5)	16:10
28	05:32	20:00 (2)	06:26		07:21	07:16		15:26 (4)	08:14	15:08 (5)	08:44
	21:32	20:39 (2)	20:28		19:12	18:27 (3)	47	16:13 (4)	16:12	15:33 (5)	16:11
29	05:34	19:59 (2)	06:28		07:22	18:09 (3)	48	16:13 (4)	16:12	15:32 (5)	16:11
	21:30	20:39 (2)	20:25		19:09	18:29 (3)	48	16:13 (4)	16:12	15:32 (5)	16:11
30	05:35	19:59 (2)	06:29		07:24	18:06 (3)	49	16:14 (4)	16:11	15:33 (5)	16:12
	21:28	20:40 (2)	20:23		19:07	18:29 (3)	49	16:14 (4)	16:11	15:33 (5)	16:12
31	05:37	20:00 (2)	06:31			07:22		15:25 (4)		08:44	15:22 (5)
	21:27	20:41 (2)	20:21			16:56	49	16:14 (4)		16:13	13
Potential sun hours	512	460	382		328	259		233			
Total, worst case	595	649	69		823	966		432			
Sun reduction	0.32	0.34	0.32		0.29	0.27		0.21			
Oper. time red.	1.00	1.00	1.00		1.00	1.00		1.00			
Wind dir. red.	0.65	0.65	0.68		0.66	0.66		0.66			
Total reduction	0.21	0.22	0.22		0.19	0.17		0.14			
Total, real	124	143	15		160	169		59			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DL - H116

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	15:02 (4)	08:14	07:16	17:19 (2)	07:01
	16:15	28 15:30 (4)	17:06	18:02	15 17:34 (2)	20:00
2	08:44	15:03 (4)	08:12	07:14	17:17 (2)	06:59
	16:16	28 15:31 (4)	17:08	18:04	19 17:36 (2)	20:02
3	08:44	15:03 (4)	08:10	07:12	17:16 (2)	06:56
	16:17	28 15:31 (4)	17:10	18:06	22 17:38 (2)	20:04
4	08:43	15:04 (4)	08:08	07:09	17:15 (2)	06:54
	16:18	28 15:32 (4)	17:12	18:07	26 17:41 (2)	20:06
5	08:43	15:04 (4)	08:07	07:07	17:14 (2)	06:51
	16:19	27 15:31 (4)	17:14	18:09	28 17:42 (2)	20:07
6	08:43	15:05 (4)	08:05	07:04	17:13 (2)	06:49
	16:21	27 15:32 (4)	17:16	18:11	32 17:45 (2)	20:09
7	08:42	15:06 (4)	08:03	07:02	17:12 (2)	06:47
	16:22	26 15:32 (4)	17:18	18:13	32 17:44 (2)	20:11
8	08:42	15:06 (4)	08:01	07:00	17:12 (2)	06:44
	16:24	26 15:32 (4)	17:20	18:15	33 17:45 (2)	20:13
9	08:41	15:08 (4)	07:59	06:57	17:12 (2)	06:42
	16:25	25 15:33 (4)	17:22	18:17	32 17:44 (2)	20:15
10	08:40	15:08 (4)	07:57	06:55	17:12 (2)	06:39
	16:26	25 15:33 (4)	17:24	18:19	32 17:44 (2)	20:17
11	08:40	15:09 (4)	07:55	06:52	17:13 (2)	06:37
	16:28	23 15:32 (4)	17:26	18:21	31 17:44 (2)	20:19
12	08:39	15:10 (4)	07:53	06:50	17:12 (2)	06:35
	16:30	22 15:32 (4)	17:28	18:23	30 17:42 (2)	20:20
13	08:38	15:11 (4)	07:51	06:48	17:13 (2)	06:32
	16:31	21 15:32 (4)	17:30	18:25	29 17:42 (2)	20:22
14	08:37	15:12 (4)	07:49	06:45	17:13 (2)	06:30
	16:33	20 15:32 (4)	17:32	18:27	27 17:40 (2)	20:24
15	08:36	15:14 (4)	07:47	06:43	17:15 (2)	06:28
	16:34	17 15:31 (4)	17:34	18:28	24 17:39 (2)	20:26
16	08:35	15:15 (4)	07:45	06:40	17:16 (2)	06:25
	16:36	15 15:30 (4)	17:36	18:30	21 17:37 (2)	20:28
17	08:34	15:17 (4)	07:43	06:38	17:18 (2)	06:23
	16:38	12 15:29 (4)	17:38	18:32	17 17:35 (2)	20:30
18	08:33	15:20 (4)	07:41	06:35	17:21 (2)	06:21
	16:40	7 15:27 (4)	17:40	18:34	10 17:31 (2)	20:31
19	08:32		07:39	06:33		06:18
	16:41		17:42	18:36		20:33
20	08:31		07:36	06:31		06:16
	16:43		17:44	18:38		20:35
21	08:30		07:34	06:28		06:14
	16:45		17:46	18:40		20:37
22	08:29		07:32	06:26		06:12
	16:47		17:48	18:42		20:39
23	08:27		07:30	06:23		06:09
	16:49		17:50	18:43		20:41
24	08:26		07:28	06:21		06:07
	16:50		17:52	18:45		20:43
25	08:24		07:25	06:18		06:05
	16:52		17:54	18:47		20:44
26	08:23		07:23	06:16		06:03
	16:54		17:56	18:49		20:46
27	08:22		07:21	17:23 (2)		06:00
	16:56		17:58	17:31 (2)		20:48
28	08:20		07:18	17:20 (2)		05:58
	16:58		18:00	17:32 (2)		20:50
29	08:19			07:08		05:56
	17:00			19:54		20:52
30	08:17			07:06		05:54
	17:02			19:56		20:54
31	08:15			07:04		05:04
	17:04			19:58		21:44
Potential sun hours	250	273	367		420	510
Total, worst case	405	193	460			
Sun reduction	0.24	0.23	0.27			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.65	0.66	0.68			
Total reduction	0.16	0.15	0.18			
Total, real	64	29	85			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DL - H116

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September		October		November		December	
1	04:59 22:00	05:39 21:25	06:33 20:18		07:26 19:05	17:52 (2) 18:21 (2)	07:24 16:54	16:03 (3) 16:23 (3)	08:19 16:10	14:51 (4) 15:14 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16		07:28 19:02	17:51 (2) 18:21 (2)	07:26 16:52	16:02 (3) 16:21 (3)	08:21 16:09	14:51 (4) 15:15 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13		07:30 19:00	17:50 (2) 18:22 (2)	07:28 16:50	16:02 (3) 16:19 (3)	08:22 16:08	14:51 (4) 15:16 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11		07:31 18:57	17:50 (2) 18:22 (2)	07:30 16:48	16:02 (3) 16:17 (3)	08:24 16:08	14:51 (4) 15:17 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09		07:33 18:55	17:49 (2) 18:22 (2)	07:32 16:46	16:02 (3) 16:15 (3)	08:25 16:07	14:51 (4) 15:17 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06		07:35 18:52	17:49 (2) 18:21 (2)	07:34 16:44	16:02 (3) 16:12 (3)	08:26 16:07	14:52 (4) 15:18 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04		07:37 18:50	17:48 (2) 18:20 (2)	07:36 16:43	16:03 (3) 16:10 (3)	08:28 16:06	14:51 (4) 15:18 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01		07:39 18:48	17:48 (2) 18:18 (2)	07:38 16:41	16:03 (3) 16:08 (3)	08:29 16:06	14:51 (4) 15:19 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59		07:41 18:45	17:49 (2) 18:16 (2)	07:40 16:39	16:05 (3) 16:07 (3)	08:30 16:05	14:52 (4) 15:20 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56		07:42 18:43	17:49 (2) 18:14 (2)	07:42 16:37	08:31 16:05	14:52 (4) 15:20 (4)	15:20 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54		07:44 18:40	17:50 (2) 18:11 (2)	07:44 16:35	08:33 16:05	14:52 (4) 15:20 (4)	15:20 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51		07:46 18:38	17:51 (2) 18:09 (2)	07:45 16:34	08:34 16:05	14:53 (4) 15:21 (4)	15:21 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49		07:48 18:36	17:52 (2) 18:07 (2)	07:47 16:32	08:35 16:05	14:53 (4) 15:21 (4)	15:21 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47		07:50 18:33	17:54 (2) 18:04 (2)	07:49 16:31	08:36 16:04	14:53 (4) 15:22 (4)	15:22 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44		07:52 18:31	17:57 (2) 18:02 (2)	07:51 16:29	08:37 16:04	14:54 (4) 15:22 (4)	15:22 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42		07:54 18:29	07:53 16:27	07:53 16:27	08:38 16:05	14:54 (4) 15:23 (4)	15:23 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39		07:55 18:26	07:55 16:26	07:55 16:26	08:38 16:05	14:55 (4) 15:24 (4)	15:24 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37		07:57 18:24	07:57 16:24	07:57 16:24	08:39 16:05	14:55 (4) 15:24 (4)	15:24 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34		07:59 18:22	07:59 16:23	07:59 16:23	08:40 16:05	14:56 (4) 15:25 (4)	15:25 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32		08:01 18:20	08:01 16:22	08:00 16:22	08:41 16:06	14:56 (4) 15:25 (4)	15:25 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29		08:03 18:17	08:03 16:20	08:02 16:20	08:41 16:06	14:57 (4) 15:26 (4)	15:26 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27		08:05 18:15	08:05 16:19	08:04 16:19	08:42 16:06	14:57 (4) 15:26 (4)	15:26 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24		08:07 18:13	08:07 16:18	08:06 16:18	08:42 16:07	14:58 (4) 15:27 (4)	15:27 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22		08:09 18:11	08:09 16:17	08:08 16:17	14:57 (4) 15:04 (4)	08:43 16:08	14:58 (4) 15:27 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	6	18:05 (2) 18:11 (2)	07:11 17:09	08:09 16:16	14:55 (4) 15:07 (4)	08:43 16:08	14:58 (4) 15:27 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17		18:01 (2) 18:16 (2)	07:13 17:06	08:11 16:14	14:54 (4) 15:09 (4)	08:43 16:09	14:59 (4) 15:27 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	15	17:58 (2) 18:18 (2)	07:15 17:04	08:13 16:13	14:53 (4) 15:10 (4)	08:44 16:10	15:00 (4) 15:29 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	20	17:56 (2) 18:19 (2)	07:16 17:02	08:14 16:12	14:53 (4) 15:12 (4)	08:44 16:10	15:00 (4) 15:29 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	23	17:55 (2) 18:20 (2)	07:18 17:00	08:16 16:12	14:51 (4) 15:12 (4)	08:44 16:11	15:01 (4) 15:30 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	25	17:52 (2) 18:20 (2)	07:20 16:58	08:18 16:21 (3)	14:51 (4) 15:13 (4)	08:44 16:12	15:01 (4) 15:29 (4)
31	05:37 21:27	06:31 20:21		28	07:22 16:56	16:03 (3) 16:21 (3)	08:44 16:13	15:01 (4) 15:30 (4)	08:44 16:13	15:01 (4) 15:30 (4)
Potential sun hours	512	460	382		328		259		233	
Total, worst case				117	433		221			864
Sun reduction				0.32	0.29		0.27			0.21
Oper. time red.				1.00	1.00		1.00			1.00
Wind dir. red.				0.68	0.67		0.65			0.65
Total reduction				0.22	0.20		0.17			0.13
Total, real				25	85		38			116

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DM - H117

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	16:30 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	16:34 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:19 (2)
2	08:44	08:12	16:26 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	08:21
	16:16	17:08	16:37 (2)	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02	16:18 (2)
3	08:44	08:10	16:23 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
	16:17	17:10	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:18 (2)
4	08:43	08:08	16:22 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	08:24
	16:18	17:12	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:18 (2)
5	08:43	08:07	16:20 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	08:25
	16:19	17:14	16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:16 (2)
6	08:43	08:05	16:19 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	08:26
	16:21	17:16	16:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:14 (2)
7	08:42	08:03	16:18 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	08:28
	16:22	17:18	16:47 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:13 (2)
8	08:42	08:01	16:18 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	08:29
	16:24	17:20	16:48 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:10 (2)
9	08:41	07:59	16:17 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
	16:25	17:22	16:49 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:07 (2)
10	08:40	07:57	16:17 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	08:31
	16:26	17:24	16:49 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:05 (2)
11	08:40	15:49 (3)	16:17 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	08:33
	16:28	17:26	16:50 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:05 (2)
12	08:39	15:49 (3)	16:16 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	08:34
	16:30	15:54 (3)	16:51 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:04 (2)
13	08:38	15:49 (3)	16:15 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	08:35
	16:31	15:55 (3)	16:50 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:03 (2)
14	08:37	15:49 (3)	16:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33	15:57 (3)	16:50 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:04 (2)
15	08:36	15:49 (3)	16:16 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	08:37
	16:34	15:59 (3)	16:50 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:04 (2)
16	08:35	15:49 (3)	16:16 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	08:38
	16:36	16:00 (3)	16:50 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05 (2)
17	08:34	15:49 (3)	16:16 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	08:38
	16:38	16:02 (3)	16:50 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:05 (2)
18	08:33	15:49 (3)	16:16 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39
	16:40	16:05 (3)	16:49 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:05 (2)
19	08:32	15:50 (3)	16:17 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:40
	16:41	16:07 (3)	16:49 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:05 (2)
20	08:31	15:49 (3)	16:18 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:41
	16:43	16:08 (3)	16:48 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:06 (2)
21	08:30	15:50 (3)	16:19 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:41
	16:45	16:11 (3)	16:47 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:06 (2)
22	08:29	15:50 (3)	16:19 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
	16:47	16:11 (3)	16:46 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:06 (2)
23	08:27	15:51 (3)	16:21 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
	16:49	16:12 (3)	16:44 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:07 (2)
24	08:26	15:51 (3)	16:23 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:43
	16:50	16:11 (3)	16:43 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:08 (2)
25	08:25	15:53 (3)	16:25 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:43
	16:52	16:12 (3)	16:49 (2)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:08 (2)
26	08:23	15:53 (3)	16:32 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:43
	16:54	16:11 (3)	16:33 (2)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:09 (2)
27	08:22	15:54 (3)	16:33 (2)	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:44
	16:56	16:10 (3)	16:58 (2)	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:10 (2)
28	08:20	15:56 (3)	16:58 (2)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:44
	16:58	16:10 (3)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:11 (2)
29	08:19	15:58 (3)		07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:44
	17:00	16:08 (3)		19:55	20:52	21:41	22:01	21:30	20:25	19:09	18:00	16:11 (2)
30	08:17	16:00 (3)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:44
	17:02	16:06 (3)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:12 (2)
31	08:15			07:04		05:04		05:37	06:31		07:22	08:44
	17:04			19:58		21:44		21:27	20:21		18:00	16:13 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	274	670										3
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.66	0.66										0.66
Total reduction	0.16	0.15										0.14
Total, real	44	102										0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DN - H118

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26			07:24				07:59 (2)	08:19			07:59 (2)	08:19
	16:15		17:06	7	08:49 (2)	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05		16:54	20			08:19 (2)	16:10			08:19 (2)	16:10
2	08:44		08:12		08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26				07:58 (2)	08:21			07:58 (2)	08:21
	16:16		17:08	10	08:50 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	22			08:20 (2)	16:09			08:20 (2)	16:09
3	08:44		08:10		08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28				07:58 (2)	08:22			07:58 (2)	08:22
	16:17		17:10	12	08:50 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	22			08:20 (2)	16:08			08:20 (2)	16:08
4	08:43		08:09		08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30				08:00 (2)	16:08			08:00 (2)	16:08
	16:18		17:12	14	08:50 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	20			08:20 (2)	16:08			08:20 (2)	16:08
5	08:43		08:07		08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32				08:02 (2)	08:25			08:02 (2)	08:25
	16:20		17:14	17	08:51 (2)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	18			08:20 (2)	16:07			08:20 (2)	16:07
6	08:43		08:05		08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34				08:04 (2)	08:27			08:04 (2)	08:27
	16:21		17:16	19	08:51 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:44	16			08:20 (2)	16:07			08:20 (2)	16:07
7	08:42		08:03		08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36				08:06 (2)	08:28			08:06 (2)	08:28
	16:22		17:18	21	08:51 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	14			08:20 (2)	16:06			08:20 (2)	16:06
8	08:42		08:01		08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38				08:09 (2)	08:29			08:09 (2)	08:29
	16:24		17:20	22	08:50 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	12			08:21 (2)	16:06			08:21 (2)	16:06
9	08:41		07:59		08:28 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40				08:11 (2)	08:30			08:11 (2)	08:30
	16:25		17:22	22	08:50 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	9			08:20 (2)	16:05			08:20 (2)	16:05
10	08:41		07:57		08:29 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42				08:13 (2)	08:32			08:13 (2)	08:32
	16:27		17:24	21	08:50 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	7			08:20 (2)	16:05			08:20 (2)	16:05
11	08:40		07:55		08:30 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44				08:15 (2)	08:33			08:15 (2)	08:33
	16:28		17:26	19	08:49 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	4			08:19 (2)	16:05			08:19 (2)	16:05
12	08:39		07:53		08:32 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46				08:17 (2)	08:34			08:17 (2)	08:34
	16:30		17:28	16	08:48 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	1			08:18 (2)	16:05			08:18 (2)	16:05
13	08:38		07:51		08:34 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48					08:35				08:35
	16:31		17:30	12	08:46 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32					16:05				16:05
14	08:37		07:49		08:36 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49					08:36				08:36
	16:33		17:32	6	08:42 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34		16:31					16:05				16:05
15	08:37		07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51						08:37				08:37
	16:35		17:34		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29						16:05				16:05
16	08:36		07:45		06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54		07:53						08:38				08:38
	16:36		17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28						16:05				16:05
17	08:35		07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55						08:39				08:39
	16:38		17:38		18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26						16:05				16:05
18	08:33		07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57						08:39				08:39
	16:40		17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25						16:05				16:05
19	08:32		07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		07:59						08:40				08:40
	16:41		17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22		16:23						16:05				16:05
20	08:31		07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		08:01						08:41				08:41
	16:43		17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20		16:22						16:06				16:06
21	08:30		07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		08:02						08:41				08:41
	16:45		17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18		16:20						16:06				16:06
22	08:29		07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:04						08:42				08:42
	16:47		17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15		16:19						16:07				16:07
23	08:27		07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:06						08:42				08:42
	16:49		17:50		18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13		16:18						16:07				16:07
24	08:26		07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:08						08:43				08:43
	16:51		17:52		18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11		16:17						16:08				16:08
25	08:25		07:25		06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10		08:09						08:43				08:43
	16:52		17:54		18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:08		16:16						16:08				16:08
26	08:23		07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		08:11						08:44				08:44
	16:54		17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07		16:15						16:09				16:09
27	08:22		07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15		08:13						08:43				08:43
	16:56		17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04		16:14						16:10				16:10
28	08:20		07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17		08:15						08:44				08:44
	16:58		18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02		16:13						16:11				16:11
29	08:19				07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19		08:16						08:44				08:44
	17:00				19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00		16:13						16:11				16:11
30	08:17	08:45 (2)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20		08:18						08:44				08:44
	17:02	1	08:46 (2)		19:56	20:54	21:43	22:01	2															

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DO - H119

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:09 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:36 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:37	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:44 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DP - H120

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May		June	July		August		September	October	November	December
1	08:44	08:14	07:16	07:01	05:52		06:18 (1)	05:03	04:59	05:39	06:12 (1)	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	3	06:21 (1)	21:45	22:00	21:25	22	06:34 (1)	20:18	19:05	16:54
2	08:44	08:12	07:14	06:59	05:50		06:16 (1)	05:02	05:00	05:40	06:12 (1)	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	6	06:22 (1)	21:47	22:00	21:23	22	06:34 (1)	20:16	19:02	16:52
3	08:44	08:10	07:12	06:57	05:48		06:14 (1)	05:01	05:01	05:42	06:12 (1)	06:37	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	9	06:23 (1)	21:48	21:59	21:21	22	06:34 (1)	20:14	19:00	16:50
4	08:43	08:09	07:09	06:54	05:46		06:12 (1)	05:00	05:01	05:44	06:14 (1)	06:38	07:32	07:30	08:24
	16:18	17:12	18:08	20:06	21:01	12	06:24 (1)	21:49	21:59	21:19	21	06:35 (1)	20:11	18:57	16:48
5	08:43	08:07	07:07	06:52	05:44		06:10 (1)	04:59	05:02	05:46	06:16 (1)	06:40	07:33	07:32	08:25
	16:20	17:14	18:10	20:08	21:03	14	06:24 (1)	21:50	21:58	21:18	19	06:35 (1)	20:09	18:55	16:46
6	08:43	08:05	07:05	06:49	05:42		06:09 (1)	04:59	05:03	05:47	06:17 (1)	06:42	07:35	07:34	08:27
	16:21	17:16	18:12	20:09	21:05	16	06:25 (1)	21:51	21:58	21:16	17	06:34 (1)	20:06	18:53	16:45
7	08:42	08:03	07:02	06:47	05:40		06:07 (1)	04:58	05:04	05:49	06:19 (1)	06:44	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	18	06:25 (1)	21:52	21:57	21:14	15	06:34 (1)	20:04	18:50	16:43
8	08:42	08:01	07:00	06:44	05:38		06:05 (1)	04:57	05:05	05:51	06:20 (1)	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	19	06:24 (1)	21:53	21:56	21:12	13	06:33 (1)	20:01	18:48	16:41
9	08:41	07:59	06:58	06:42	05:36		06:03 (1)	04:57	05:06	05:52	06:22 (1)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21	06:24 (1)	21:54	21:56	21:10	11	06:33 (1)	19:59	18:45	16:39
10	08:41	07:57	06:55	06:40	05:35		06:02 (1)	04:56	05:07	05:54	06:24 (1)	06:49	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12	23	06:25 (1)	21:55	21:55	21:08	8	06:32 (1)	19:57	18:43	16:37
11	08:40	07:55	06:53	06:37	05:33		06:02 (1)	04:56	05:08	05:56	06:25 (1)	06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13	22	06:24 (1)	21:56	21:54	21:06	6	06:31 (1)	19:54	18:41	16:36
12	08:39	07:53	06:50	06:35	05:31		06:02 (1)	04:56	05:10	05:58	06:27 (1)	06:52	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	21:15	21	06:23 (1)	21:56	21:53	21:04	3	06:30 (1)	19:52	18:38	16:34
13	08:38	07:51	06:48	06:33	05:29		06:03 (1)	04:55	05:11	05:59		06:54	07:48	07:48	08:35
	16:31	17:30	18:25	20:22	21:17	20	06:23 (1)	21:57	21:52	21:01		19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		06:03 (1)	04:55	05:12	06:01		06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:19	19	06:22 (1)	21:58	21:51	20:59		19:47	18:34	16:31	16:05
15	08:37	07:47	06:43	06:28	05:26		06:04 (1)	04:55	05:13	06:03		06:58	07:52	07:51	08:37
	16:35	17:34	18:29	20:26	21:20	18	06:22 (1)	21:58	21:50	20:57		19:44	18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24		06:05 (1)	04:55	05:15	06:05		07:00	07:54	07:53	08:38
	16:36	17:36	18:31	20:28	21:22	16	06:21 (1)	21:59	21:49	20:55		19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22		06:06 (1)	04:54	05:16	06:06		07:01	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21:24	14	06:20 (1)	21:59	21:48	20:53		19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21		06:07 (1)	04:54	05:17	06:08		07:03	07:58	07:57	08:39
	16:40	17:40	18:34	20:32	21:25	11	06:18 (1)	22:00	21:46	20:51		19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19		06:10 (1)	04:54	05:19	06:10		07:05	07:59	07:59	08:40
	16:42	17:42	18:36	20:33	21:27	6	06:16 (1)	22:00	21:45	20:48		19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	06:16	05:18			04:55	05:20	06:12		07:07	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	21:28			22:00	21:44	20:46		19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16			04:55	05:22	06:14		07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30			22:01	21:42	20:44		19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15			04:55	05:23	06:15		07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	21:31			22:01	21:41	20:42		19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13			04:55	05:24	06:17		07:12	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	21:33			22:01	21:40	20:39		19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12			04:55	05:26	06:19		07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	21:35			22:01	21:38	20:37		19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11			04:56	05:28		06:19 (1)	06:21	07:15	07:11	08:09
	16:53	17:54	18:47	20:45	21:36			22:01	21:37	8	06:27 (1)	20:35	19:20	17:09	16:16
26	08:23	07:23	06:16	06:03	05:10			04:56	05:29		06:17 (1)	06:22	07:17	07:13	08:11
	16:55	17:56	18:49	20:46	21:37			22:01	21:35	12	06:29 (1)	20:33	19:17	17:07	16:15
27	08:22	07:21	06:14	06:01	05:08			04:57	05:31		06:16 (1)	06:24	07:19	07:15	08:13
	16:56	17:58	18:51	20:48	21:39			22:01	21:33	15	06:31 (1)	20:30	19:15	17:05	16:14
28	08:20	07:19	06:11	05:59	05:07			04:57	05:32		06:15 (1)	06:26	07:21	07:17	08:15
	16:58	18:00	18:53	20:50	21:40			22:01	21:32	16	06:31 (1)	20:28	19:12	17:02	16:13
29	08:19		07:09	05:56	05:06			04:58	05:34		06:14 (1)	06:28	07:23	07:19	08:16
	17:00		19:55	20:52	21:42			22:01	21:30	19	06:33 (1)	20:26	19:10	17:00	16:12
30	08:17		07:06	05:54	05:05			04:58	05:36		06:13 (1)	06:29	07:24	07:21	08:18
	17:02		19:57	20:54	21:43			22:00	21:28	20	06:33 (1)	20:23	19:07	16:58	16:13
31	08:15		07:04		05:04				05:37		06:13 (1)	06:31	07:22	16:11	16:13
	17:04		19:58		21:44				21:27	21	06:34 (1)	20:21		16:56	16:14
Potential sun hours	250	273	367	420	494		510	512		460		382	328	259	233
Total, worst case					288				111		179				
Sun reduction					0.38				0.32		0.34				
Oper. time red.					1.00				1.00		1.00				
Wind dir. red.					0.67				0.67		0.67				
Total reduction					0.26				0.22		0.23				
Total, real					74				24		41				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DQ - H121

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	05:03	05:34 (1)	04:59	05:32 (1)	05:39	06:33	07:26	07:24	08:19		
2	16:15	17:06	18:02	20:00	20:56	21:45	10	05:44 (1)	22:00	17	05:49 (1)	21:25	20:18	19:05	16:54	16:10
	08:44	08:12	07:14	06:59	05:50	05:02		05:33 (1)	05:00		05:33 (1)	05:41	06:35	07:28	07:26	08:21
3	16:16	17:08	18:04	20:02	20:57	21:47	11	05:44 (1)	22:00	17	05:50 (1)	21:23	20:16	19:02	16:52	16:09
	08:44	08:10	07:12	06:57	05:48	05:01		05:32 (1)	05:01		05:34 (1)	05:42	06:37	07:30	07:28	08:22
4	16:17	17:10	18:06	20:04	20:59	21:48	12	05:44 (1)	21:59	17	05:51 (1)	21:21	20:14	19:00	16:50	16:09
	08:43	08:09	07:09	06:54	05:46	05:00		05:31 (1)	05:01		05:34 (1)	05:44	06:38	07:32	07:30	08:24
5	16:18	17:12	18:08	20:06	21:01	21:49	13	05:44 (1)	21:59	16	05:50 (1)	21:19	20:11	18:57	16:48	16:08
	08:43	08:07	07:07	06:52	05:44	04:59		05:31 (1)	05:02		05:35 (1)	05:46	06:40	07:33	07:32	08:25
6	16:20	17:14	18:10	20:08	21:03	21:50	14	05:45 (1)	21:58	16	05:51 (1)	21:18	20:09	18:55	16:47	16:07
	08:43	08:05	07:05	06:49	05:42	04:59		05:30 (1)	05:03		05:36 (1)	05:47	06:42	07:35	07:34	08:27
7	16:21	17:16	18:12	20:09	21:05	21:51	15	05:45 (1)	21:58	15	05:51 (1)	21:16	20:06	18:53	16:45	16:07
	08:42	08:03	07:02	06:47	05:40	04:58		05:30 (1)	05:04		05:37 (1)	05:49	06:44	07:37	07:36	08:28
8	16:22	17:18	18:13	20:11	21:06	21:52	15	05:45 (1)	21:57	14	05:51 (1)	21:14	20:04	18:50	16:43	16:06
	08:42	08:01	07:00	06:44	05:38	04:57		05:29 (1)	05:05		05:38 (1)	05:51	06:45	07:39	07:38	08:29
9	16:24	17:20	18:15	20:13	21:08	21:53	16	05:45 (1)	21:56	13	05:51 (1)	21:12	20:01	18:48	16:41	16:06
	08:41	07:59	06:58	06:42	05:36	04:57		05:29 (1)	05:06		05:39 (1)	05:52	06:47	07:41	07:40	08:30
10	16:25	17:22	18:17	20:15	21:10	21:54	16	05:45 (1)	21:56	13	05:52 (1)	21:10	19:59	18:45	16:39	16:06
	08:41	07:57	06:55	06:40	05:35	04:56		05:28 (1)	05:07		05:40 (1)	05:54	06:49	07:43	07:42	08:32
11	16:27	17:24	18:19	20:17	21:12	21:55	17	05:45 (1)	21:55	12	05:52 (1)	21:08	19:57	18:43	16:37	16:05
	08:40	07:55	06:53	06:37	05:33	04:56		05:28 (1)	05:08		05:41 (1)	05:56	06:51	07:44	07:44	08:33
12	16:28	17:26	18:21	20:19	21:13	21:56	17	05:45 (1)	21:54	11	05:52 (1)	21:06	19:54	18:41	16:36	16:05
	08:39	07:53	06:50	06:35	05:31	04:56		05:28 (1)	05:10		05:42 (1)	05:58	06:52	07:46	07:46	08:34
13	16:30	17:28	18:23	20:21	21:15	21:56	18	05:46 (1)	21:53	10	05:52 (1)	21:04	19:52	18:38	16:34	16:05
	08:38	07:51	06:48	06:33	05:29	04:55		05:27 (1)	05:11		05:43 (1)	05:59	06:54	07:48	07:48	08:35
14	16:31	17:30	18:25	20:22	21:17	21:57	18	05:45 (1)	21:52	9	05:52 (1)	21:01	19:49	18:36	16:32	16:05
	08:37	07:49	06:45	06:30	05:27	04:55		05:27 (1)	05:12		05:44 (1)	06:01	06:56	07:50	07:49	08:36
15	16:33	17:32	18:27	20:24	21:19	21:58	18	05:45 (1)	21:51	7	05:51 (1)	20:59	19:47	18:34	16:31	16:05
	08:36	07:47	06:43	06:28	05:26	04:55		05:27 (1)	05:13		05:45 (1)	06:03	06:58	07:52	07:51	08:37
16	16:35	17:34	18:29	20:26	21:20	21:58	19	05:46 (1)	21:50	6	05:51 (1)	20:57	19:44	18:31	16:29	16:05
	08:36	07:45	06:41	06:25	05:24	04:55		05:27 (1)	05:15		05:47 (1)	06:05	07:00	07:54	07:53	08:38
17	16:36	17:36	18:31	20:28	21:22	21:59	19	05:46 (1)	21:49	5	05:52 (1)	20:55	19:42	18:29	16:28	16:05
	08:35	07:43	06:38	06:23	05:22	04:54		05:27 (1)	05:16		05:48 (1)	06:06	07:01	07:56	07:55	08:39
18	16:38	17:38	18:32	20:30	21:24	21:59	19	05:46 (1)	21:48	3	05:51 (1)	20:53	19:39	18:27	16:26	16:05
	08:33	07:41	06:36	06:21	05:21	04:54		05:27 (1)	05:17		05:49 (1)	06:08	07:03	07:58	07:57	08:39
19	16:40	17:40	18:34	20:32	21:25	22:00	19	05:46 (1)	21:46	2	05:51 (1)	20:51	19:37	18:24	16:25	16:05
	08:32	07:39	06:33	06:19	05:19	04:54		05:27 (1)	05:19		05:49 (1)	06:10	07:05	07:59	07:59	08:40
20	16:42	17:42	18:36	20:33	21:27	22:00	19	05:46 (1)	21:45			20:48	19:34	18:22	16:23	16:05
	08:31	07:37	06:31	06:16	05:18	04:55		05:27 (1)	05:20		06:12	07:07	08:01	08:01	08:41	
21	16:43	17:44	18:38	20:35	21:28	22:00	19	05:46 (1)	21:44		20:46	19:32	18:20	16:22	16:06	
	08:30	07:34	06:28	06:14	05:16	04:55		05:28 (1)	05:22		06:14	07:08	08:03	08:02	08:41	
22	16:45	17:46	18:40	20:37	21:30	22:01	19	05:47 (1)	21:42		20:44	19:29	18:18	16:21	16:06	
	08:29	07:32	06:26	06:12	05:15	04:55		05:28 (1)	05:23		06:15	07:10	08:05	08:04	08:42	
23	16:47	17:48	18:42	20:39	21:31	22:01	19	05:47 (1)	21:41		20:42	19:27	18:15	16:19	16:07	
	08:27	07:30	06:23	06:10	05:13	04:55		05:28 (1)	05:24		06:17	07:12	08:07	08:06	08:42	
24	16:49	17:50	18:44	20:41	21:33	22:01	19	05:47 (1)	21:40		20:39	19:24	18:13	16:18	16:07	
	08:26	07:28	06:21	06:07	05:12	04:55		05:28 (1)	05:26		06:19	07:14	08:09	08:08	08:43	
25	16:51	17:52	18:45	20:43	21:34	22:01	19	05:47 (1)	21:38		20:37	19:22	18:11	16:17	16:08	
	08:25	07:26	06:19	06:05	05:11	04:56		05:29 (1)	05:28		06:21	07:15	08:11	08:09	08:43	
26	16:53	17:54	18:47	20:45	21:36	1	05:41 (1)	22:01	19	05:48 (1)	21:37	20:35	19:20	17:09	16:16	16:08
	08:23	07:23	06:16	06:03	05:10	05:39 (1)	04:56		05:29 (1)	05:29	06:22	07:17	08:13	08:11	08:44	
27	16:55	17:56	18:49	20:46	21:37	2	05:41 (1)	22:01	19	05:48 (1)	21:35	20:33	19:17	17:07	16:15	16:09
	08:22	07:21	06:14	06:01	05:08	05:38 (1)	04:57		05:30 (1)	05:31	06:24	07:19	08:15	08:13	08:44	
28	16:56	17:58	18:51	20:48	21:39	4	05:42 (1)	22:01	19	05:49 (1)	21:33	20:30	19:15	17:05	16:14	16:10
	08:20	07:19	06:11	05:59	05:07	05:37 (1)	04:57		05:30 (1)	05:32	06:26	07:21	08:17	08:14	08:44	
29	16:58	18:00	18:53	20:50	21:40	5	05:42 (1)	22:01	18	05:48 (1)	21:32	20:28	19:12	17:02	16:13	16:11
	08:19		07:09	05:56	05:06	05:36 (1)	04:58		05:31 (1)	05:34	06:28	07:23	08:19	08:16	08:44	
30	17:00		19:55	20:52	21:42	7	05:43 (1)	22:01	18	05:49 (1)	21:30	20:26	19:10	17:00	16:12	16:12
	08:17		07:06	05:54	05:05	05:35 (1)	04:58		05:31 (1)	05:36	06:29	07:24	08:21	08:18	08:44	
31	17:02		19:57	20:54	21:43	8	05:43 (1)	22:00	18	05:49 (1)	21:28	20:23	19:07	16:58	16:11	16:13
	08:15		07:04		05:04	05:34 (1)				05:37	06:31	07:22	08:19	08:16	08:44	
	17:04		19:58		21:44	9	05:43 (1)				21:27	20:21	16:56	16:10	16:14	
Potential sun hours	250	273	367	420	494	510	512	512	460	382	328	259	233			
Total, worst case					36	511		203								
Sun reduction					0.38	0.32		0.32								
Oper. time red.					1.00	1.00		1.00								
Wind dir. red.					0.66	0.66		0.66								
Total reduction					0.25	0.21		0.21								
Total, real					9	107		43								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DR - H122

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DS - H123
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		07:25 (5)	05:52			05:03		05:34 (3)
	16:15	17:06	18:02						20:00	7	07:32 (5)	20:55			21:45	9	05:43 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50			05:02		05:33 (3)
	16:16	17:08	18:04						20:02	10	07:33 (5)	20:57			21:47	10	05:43 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48			05:01		05:32 (3)
	16:17	17:10	18:06						20:04	12	07:32 (5)	20:59			21:48	10	05:42 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46			05:00		05:31 (3)
	16:18	17:12	18:08						20:06	14	07:32 (5)	21:01			21:49	11	05:42 (3)
5	08:43	08:07	07:07						06:52		07:15 (5)	05:44			04:59		05:31 (3)
	16:20	17:14	18:10						20:08	16	07:31 (5)	21:03			21:50	12	05:43 (3)
6	08:43	08:05	07:05						06:49		07:13 (5)	05:42			04:59		05:30 (3)
	16:21	17:16	18:11						20:09	18	07:31 (5)	21:04			21:51	13	05:43 (3)
7	08:42	08:03	07:02						06:47		07:11 (5)	05:40			04:58		05:30 (3)
	16:22	17:18	18:13						20:11	20	07:31 (5)	21:06			21:52	13	05:43 (3)
8	08:42	08:01	07:00						06:44		07:09 (5)	05:38			04:57		05:29 (3)
	16:24	17:20	18:15						20:13	20	07:29 (5)	21:08			21:53	14	05:43 (3)
9	08:41	07:59	06:57						06:42		07:11 (5)	05:36			04:57		05:29 (3)
	16:25	17:22	18:17						20:15	17	07:28 (5)	21:10			21:54	14	05:43 (3)
10	08:40	07:57	06:55						06:40		07:11 (5)	05:35			04:56		05:28 (3)
	16:27	17:24	18:19						20:17	14	07:25 (5)	21:12			21:55	15	05:43 (3)
11	08:40	07:55	06:53						06:37		07:14 (5)	05:33			04:56		05:28 (3)
	16:28	17:26	18:21						20:19	8	07:22 (5)	21:13			21:55	15	05:43 (3)
12	08:39	07:53	06:50						06:35			05:31			04:56		05:28 (3)
	16:30	17:28	18:23						20:21			21:15			21:56	16	05:44 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:27 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	16	05:43 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:27 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	16	05:43 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:27 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	17	05:44 (3)
16	08:35	07:45	06:41						06:25			05:24			04:55		05:27 (3)
	16:36	17:36	18:30						20:28			21:22			21:59	17	05:44 (3)
17	08:34	07:43	06:38						06:23			05:22			04:54		05:27 (3)
	16:38	17:38	18:32						20:30			21:23			21:59	17	05:44 (3)
18	08:33	07:41	06:36						06:21			05:21			04:54		05:27 (3)
	16:40	17:40	18:34						20:32			21:25			22:00	17	05:44 (3)
19	08:32	07:39	06:33						06:19			05:19			04:54		05:27 (3)
	16:42	17:42	18:36						20:33			21:27			22:00	17	05:44 (3)
20	08:31	07:37	06:31						06:16			05:18			04:55		05:27 (3)
	16:43	17:44	18:38						20:35			21:28			22:00	17	05:44 (3)
21	08:30	07:34	06:28						06:14			05:16			04:55		05:28 (3)
	16:45	17:46	18:40						20:37			21:30			22:01	17	05:45 (3)
22	08:29	07:32	06:26						06:12			05:15			04:55		05:28 (3)
	16:47	17:48	18:42						20:39			21:31			22:01	17	05:45 (3)
23	08:27	07:30	06:23						06:09			05:13			04:55		05:28 (3)
	16:49	17:50	18:44						20:41			21:33			22:01	17	05:45 (3)
24	08:26	07:28	06:21						06:07			05:12			04:55		05:28 (3)
	16:51	17:52	18:45						20:43			21:34			22:01	17	05:45 (3)
25	08:25	07:25	06:18						06:05			05:11			04:56		05:29 (3)
	16:53	17:54	18:47						20:44			21:36			22:01	17	05:46 (3)
26	08:23	07:23	06:16						06:03			05:10		05:39 (3)	04:56		05:29 (3)
	16:54	17:56	18:49						20:46			21:37	1	05:40 (3)	22:01	17	05:46 (3)
27	08:22	07:21	06:14						06:01			05:08		05:38 (3)	04:57		05:30 (3)
	16:56	17:58	18:51						20:48			21:39	3	05:41 (3)	22:01	17	05:47 (3)
28	08:20	07:19	06:11						05:59			05:07		05:37 (3)	04:57		05:30 (3)
	16:58	18:00	18:53						20:50			21:40	4	05:41 (3)	22:01	16	05:46 (3)
29	08:19		07:09						05:56			05:06		05:36 (3)	04:58		05:31 (3)
	17:00		19:55						20:52			21:41	5	05:41 (3)	22:01	16	05:47 (3)
30	08:17		07:06						05:54			05:05		05:35 (3)	04:58		05:31 (3)
	17:02		19:56	1					07:31 (5)	20:54		21:43	7	05:42 (3)	22:00	16	05:47 (3)
31	08:15		07:04						07:27 (5)			05:04		05:34 (3)			
	17:04		19:58	4					07:31 (5)			21:44	8	05:42 (3)			
Potential sun hours	250	273	367						420			494			510		
Total, worst case				5					156				28		453		
Sun reduction				0.27					0.35				0.38		0.32		
Oper. time red.				1.00					1.00				1.00		1.00		
Wind dir. red.				0.68					0.68				0.66		0.66		
Total reduction				0.18					0.24				0.25		0.21		
Total, real				1					37				7		95		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DS - H123

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33	8	07:13 (5)	07:26	07:24	08:19		
	22:00	16 05:48 (3)	21:25	20:18		07:21 (5)	19:05	16:54	16:10		
2	05:00	05:33 (3)	05:40	06:35		07:10 (5)	07:28	07:26	08:21		
	22:00	15 05:48 (3)	21:23	20:16	14	07:24 (5)	19:02	16:52	16:09		
3	05:00	05:33 (3)	05:42	06:37		07:09 (5)	07:30	07:28	08:22		
	21:59	15 05:48 (3)	21:21	20:14	17	07:26 (5)	19:00	16:50	16:09		
4	05:01	05:34 (3)	05:44	06:38		07:06 (5)	07:32	07:30	08:24		
	21:59	14 05:48 (3)	21:19	20:11	20	07:26 (5)	18:57	16:48	16:08		
5	05:02	05:35 (3)	05:46	06:40		07:07 (5)	07:33	07:32	08:25		
	21:58	14 05:49 (3)	21:17	20:09	20	07:27 (5)	18:55	16:46	16:07		
6	05:03	05:36 (3)	05:47	06:42		07:09 (5)	07:35	07:34	08:26		
	21:58	13 05:49 (3)	21:16	20:06	18	07:27 (5)	18:53	16:45	16:07		
7	05:04	05:37 (3)	05:49	06:44		07:10 (5)	07:37	07:36	08:28		
	21:57	12 05:49 (3)	21:14	20:04	17	07:27 (5)	18:50	16:43	16:06		
8	05:05	05:38 (3)	05:51	06:45		07:12 (5)	07:39	07:38	08:29		
	21:56	12 05:50 (3)	21:12	20:01	15	07:27 (5)	18:48	16:41	16:06		
9	05:06	05:39 (3)	05:52	06:47		07:14 (5)	07:41	07:40	08:30		
	21:55	11 05:50 (3)	21:10	19:59	13	07:27 (5)	18:45	16:39	16:06		
10	05:07	05:40 (3)	05:54	06:49		07:16 (5)	07:43	07:42	08:32		
	21:55	10 05:50 (3)	21:08	19:57	10	07:26 (5)	18:43	16:37	16:05		
11	05:08	05:41 (3)	05:56	06:51		07:17 (5)	07:44	07:44	08:33		
	21:54	9 05:50 (3)	21:06	19:54	8	07:25 (5)	18:41	16:36	16:05		
12	05:10	05:42 (3)	05:58	06:52		07:19 (5)	07:46	07:46	08:34		
	21:53	8 05:50 (3)	21:04	19:52	5	07:24 (5)	18:38	16:34	16:05		
13	05:11	05:43 (3)	05:59	06:54		07:21 (5)	07:48	07:47	08:35		
	21:52	7 05:50 (3)	21:01	19:49	2	07:23 (5)	18:36	16:32	16:05		
14	05:12	05:44 (3)	06:01	06:56			07:50	07:49	08:36		
	21:51	6 05:50 (3)	20:59	19:47			18:34	16:31	16:05		
15	05:13	05:45 (3)	06:03	06:58			07:52	07:51	08:37		
	21:50	5 05:50 (3)	20:57	19:44			18:31	16:29	16:05		
16	05:15	05:47 (3)	06:05	06:59			07:54	07:53	08:38		
	21:49	3 05:50 (3)	20:55	19:42			18:29	16:28	16:05		
17	05:16	05:48 (3)	06:06	07:01			07:56	07:55	08:39		
	21:47	2 05:50 (3)	20:53	19:39			18:27	16:26	16:05		
18	05:17	05:49 (3)	06:08	07:03			07:57	07:57	08:39		
	21:46	1 05:50 (3)	20:51	19:37			18:24	16:25	16:05		
19	05:19		06:10	07:05			07:59	07:59	08:40		
	21:45		20:48	19:34			18:22	16:23	16:05		
20	05:20		06:12	07:07			08:01	08:01	08:41		
	21:44		20:46	19:32			18:20	16:22	16:06		
21	05:21		06:14	07:08			08:03	08:02	08:41		
	21:42		20:44	19:29			18:18	16:21	16:06		
22	05:23		06:15	07:10			08:05	08:04	08:42		
	21:41		20:42	19:27			18:15	16:19	16:07		
23	05:24		06:17	07:12			08:07	08:06	08:42		
	21:39		20:39	19:24			18:13	16:18	16:07		
24	05:26		06:19	07:14			08:09	08:08	08:43		
	21:38		20:37	19:22			18:11	16:17	16:08		
25	05:28		06:21	07:15			07:11	08:09	08:43		
	21:36		20:35	19:19			17:09	16:16	16:08		
26	05:29		06:22	07:17			07:13	08:11	08:43		
	21:35		20:33	19:17			17:07	16:15	16:09		
27	05:31		06:24	07:19			07:15	08:13	08:44		
	21:33		20:30	19:15			17:05	16:14	16:10		
28	05:32		06:26	07:21			07:17	08:14	08:44		
	21:32		20:28	19:12			17:02	16:13	16:11		
29	05:34		06:28	07:23			07:19	08:16	08:44		
	21:30		20:25	19:10			17:00	16:12	16:12		
30	05:35		06:29	07:24			07:20	08:18	08:44		
	21:28		20:23	19:07			16:58	16:11	16:13		
31	05:37		06:31				07:22		08:44		
	21:27		20:21				16:56		16:14		
Potential sun hours	512		460	382			328	259	233		
Total, worst case		173		167							
Sun reduction		0.32		0.32							
Oper. time red.		1.00		1.00							
Wind dir. red.		0.66		0.68							
Total reduction		0.21		0.22							
Total, real		37		36							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DT - H124

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DU - H125

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DV - H126

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27
	16:21	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05
10	08:41	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	2 08:39 (2) 16:05
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33 (2) 16:05
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	10 08:43 (2) 16:05
12	08:39	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:31 (2) 16:05
	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	14 08:45 (2) 16:05
13	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:30 (2) 16:05
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16 08:46 (2) 16:05
14	08:37	09:09 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:29 (2) 16:05
	16:33	1 09:10 (2)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	18 08:47 (2) 16:05
15	08:37	09:08 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:29 (2) 16:05
	16:34	3 09:11 (2)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	19 08:48 (2) 16:05
16	08:36	09:07 (2)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:28 (2) 16:05
	16:36	5 09:12 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	20 08:48 (2) 16:05
17	08:35	09:05 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:28 (2) 16:05
	16:38	7 09:12 (2)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	21 08:49 (2) 16:05
18	08:33	09:04 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:29 (2) 16:05
	16:40	9 09:13 (2)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	20 08:49 (2) 16:05
19	08:32	09:03 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:31 (2) 16:05
	16:41	11 09:14 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	18 08:49 (2) 16:05
20	08:31	09:01 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:33 (2) 16:05
	16:43	13 09:14 (2)	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	17 08:50 (2) 16:06
21	08:30	09:00 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:35 (2) 16:06
	16:45	15 09:15 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	15 08:50 (2) 16:06
22	08:29	08:59 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:37 (2) 16:07
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23	08:27	08:57 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:39 (2) 16:07
	16:49	18 09:15 (2)	17:50	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	11 08:50 (2) 16:07
24	08:26	08:55 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:41 (2) 16:08
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25	08:25	08:55 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09	08:43 (2) 16:08
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26	08:23	08:55 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:11	08:45 (2) 16:09
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	16:56	19 09:16 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	3 08:50 (2) 16:10
28	08:20	08:57 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:15	08:49 (2) 16:11
	16:58	18 09:15 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	1 08:50 (2) 16:11
29	08:19	08:58 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:16	08:44
	17:00	16 09:14 (2)		19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:11
30	08:17	08:59 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:18	08:44
	17:02	14 09:13 (2)		19:56	20:54	21:43	22:01	21:28	20:23	19:07	18:02	16:12
31	08:15	09:02 (2)		07:04	05:54	05:04		05:37	06:31		07:22	08:44
	17:04	10 09:12 (2)		19:58	21:44			21:27	20:21		16:56	16:13
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259
Total, worst case		237										239
Sun reduction		0.24										0.27
Oper. time red.		1.00										1.00
Wind dir. red.		0.61										0.61
Total reduction		0.15										0.16
Total, real		35										39

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DW - H127

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:23 (5)	08:14	15:50 (4)	07:16	17:09 (3)	07:01	19:17 (2)	05:52	05:03	
	16:15	14	15:37 (5)	17:06	36	16:26 (4)	18:02	23	17:32 (3)	20:00	16
2	08:44	15:23 (5)	08:12	15:50 (4)	07:14	17:09 (3)	06:59	19:14 (2)	05:50	05:02	
	16:16	16	15:39 (5)	17:08	36	16:26 (4)	18:04	21	17:30 (3)	20:02	21
3	08:44	15:23 (5)	08:10	15:50 (4)	07:12	17:10 (3)	06:56	19:13 (2)	05:48	05:01	
	16:17	16	15:39 (5)	17:10	36	16:26 (4)	18:06	19	17:29 (3)	20:04	24
4	08:43	15:24 (5)	08:08	15:51 (4)	07:09	17:12 (3)	06:54	19:12 (2)	05:46	05:00	
	16:18	17	15:41 (5)	17:12	35	16:26 (4)	18:07	16	17:28 (3)	20:06	27
5	08:43	15:24 (5)	08:07	15:51 (4)	07:07	17:13 (3)	06:51	19:10 (2)	05:44	04:59	
	16:19	18	15:42 (5)	17:14	34	16:25 (4)	18:09	13	17:26 (3)	20:07	30
6	08:43	15:25 (5)	08:05	15:52 (4)	07:04	17:17 (3)	06:49	19:09 (2)	05:42	04:59	
	16:21	19	15:44 (5)	17:16	33	16:25 (4)	18:11	5	17:22 (3)	20:09	33
7	08:42	15:25 (5)	08:03	15:53 (4)	07:02		06:47		19:08 (2)	05:40	
	16:22	20	15:45 (5)	17:18	31	16:24 (4)	18:13		20:11	19:42 (2)	34
8	08:42	15:25 (5)	08:01	15:54 (4)	07:00		06:44		19:08 (2)	05:38	
	16:24	21	15:46 (5)	17:20	29	16:23 (4)	18:15		20:13	19:42 (2)	34
9	08:41	15:26 (5)	07:59	15:55 (4)	06:57		06:42		19:08 (2)	05:36	
	16:25	22	15:48 (5)	17:22	28	16:23 (4)	18:17		20:15	19:43 (2)	35
10	08:40	15:27 (5)	07:57	15:56 (4)	06:55		06:39		19:07 (2)	05:34	
	16:26	21	15:48 (5)	17:24	26	16:22 (4)	18:19		20:17	19:42 (2)	35
11	08:40	15:27 (5)	07:55	15:58 (4)	06:52		06:37		19:07 (2)	05:33	
	16:28	21	15:48 (5)	17:26	22	16:20 (4)	18:21		20:19	19:42 (2)	35
12	08:39	15:27 (5)	07:53	15:59 (4)	06:50		06:35		19:07 (2)	05:31	
	16:30	21	15:48 (5)	17:28	18	16:17 (4)	18:23		20:20	19:42 (2)	35
13	08:38	15:28 (5)	07:51	16:03 (4)	06:48		06:32		19:06 (2)	05:29	
	16:31	20	15:48 (5)	17:30	11	16:14 (4)	18:25		20:22	19:41 (2)	35
14	08:37	15:29 (5)	07:49		06:45		06:30		19:07 (2)	05:27	
	16:33	23	15:57 (4)	17:32		18:27		20:24	19:40 (2)	21:18	
15	08:36	15:30 (5)	07:47		06:43		06:28		19:07 (2)	05:26	
	16:34	24	15:59 (4)	17:34		18:28		20:26	19:40 (2)	21:20	
16	08:35	15:30 (5)	07:45		06:40		06:25		19:08 (2)	05:24	
	16:36	26	16:00 (4)	17:36		18:30		20:28	19:39 (2)	21:22	
17	08:34	15:31 (5)	07:43		06:38		06:23		19:08 (2)	05:22	
	16:38	27	16:02 (4)	17:38		18:32		20:30	19:37 (2)	21:23	
18	08:33	15:32 (5)	07:41		06:35		06:21		19:09 (2)	05:21	
	16:40	30	16:05 (4)	17:40		18:34		20:31	19:36 (2)	21:25	
19	08:32	15:34 (5)	07:39		06:33		06:18		19:10 (2)	05:19	
	16:41	29	16:07 (4)	17:42		18:36		20:33	19:35 (2)	21:27	
20	08:31	15:35 (5)	07:36	17:15 (3)	06:31		06:16		19:12 (2)	05:18	
	16:43	28	16:08 (4)	17:44	1	17:16 (3)	18:38		20:35	19:33 (2)	21:28
21	08:30	15:38 (5)	07:34	17:13 (3)	06:28		06:14		19:13 (2)	05:16	
	16:45	27	16:11 (4)	17:46	5	17:18 (3)	18:40		20:37	19:30 (2)	17
22	08:29	15:49 (4)	07:32	17:11 (3)	06:26		06:12		19:16 (2)	05:15	
	16:47	23	16:12 (4)	17:48	8	17:19 (3)	18:42		20:39	19:27 (2)	11
23	08:27	15:49 (4)	07:30	17:10 (3)	06:23		06:09			05:13	
	16:49	26	16:15 (4)	17:50	12	17:22 (3)	18:43		20:41		
24	08:26	15:49 (4)	07:28	17:10 (3)	06:21		06:07			05:12	
	16:50	28	16:17 (4)	17:52	14	17:24 (3)	18:45		20:43		
25	08:24	15:49 (4)	07:25	17:09 (3)	06:18		06:05			05:11	
	16:52	30	16:19 (4)	17:54	17	17:26 (3)	18:47		20:44		
26	08:23	15:49 (4)	07:23	17:09 (3)	06:16		06:03			05:09	
	16:54	32	16:21 (4)	17:56	19	17:28 (3)	18:49		20:46		
27	08:22	15:48 (4)	07:21	17:09 (3)	06:13		06:01			05:08	
	16:56	35	16:23 (4)	17:58	22	17:31 (3)	18:51		20:48		
28	08:20	15:49 (4)	07:18	17:09 (3)	06:11		05:58			05:07	
	16:58	36	16:25 (4)	18:00	23	17:32 (3)	18:53		20:50		
29	08:18	15:49 (4)			07:08		05:56			05:06	
	17:00	36	16:25 (4)		19:54		20:52			21:41	
30	08:17	15:49 (4)			07:06		19:24 (2)		05:54		
	17:02	36	16:25 (4)		19:56		19:30 (2)		20:54		
31	08:15	15:49 (4)			07:04		19:19 (2)			05:04	
	17:04	36	16:25 (4)		19:58		19:31 (2)			21:44	
Potential sun hours	250		273		367		420		494		510
Total, worst case	778		496		115		621				
Sun reduction	0.24		0.23		0.27		0.35				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.66		0.67		0.67		0.67				
Total reduction	0.16		0.15		0.18		0.24				
Total, real	125		77		21		147				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: DW - H127

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December	
1	04:59 22:00	05:39 21:25	06:33 20:18	19:06 (2) 07:26 19:41 (2) 19:05	07:24 16:54	15:26 (4) 08:19 15:51 (4) 16:10	15:09 (5) 15:30 (5)
2	04:59 22:00	05:40 21:23	06:35 20:16	19:06 (2) 07:28 19:41 (2) 19:02	07:26 16:52	15:24 (4) 08:21 15:52 (4) 16:09	15:09 (5) 15:30 (5)
3	05:00 21:59	05:42 21:21	06:36 20:13	19:05 (2) 07:30 19:40 (2) 19:00	07:28 16:50	15:23 (4) 08:22 15:53 (4) 16:08	15:09 (5) 15:31 (5)
4	05:01 21:59	05:44 21:19	06:38 20:11	19:05 (2) 07:31 19:39 (2) 18:57	07:30 16:48	15:22 (4) 08:24 15:54 (4) 16:08	15:10 (5) 15:32 (5)
5	05:02 21:58	05:45 21:17	06:40 20:09	19:05 (2) 07:33 19:39 (2) 18:55	07:32 16:46	15:22 (4) 08:25 15:55 (4) 16:07	15:10 (5) 15:30 (5)
6	05:03 21:58	05:47 21:15	06:42 20:06	19:06 (2) 07:35 19:38 (2) 18:52	07:34 16:44	15:21 (4) 08:26 15:55 (4) 16:07	15:11 (5) 15:30 (5)
7	05:04 21:57	05:49 21:13	06:43 20:04	19:05 (2) 07:37 19:35 (2) 18:50	07:36 16:43	15:20 (4) 08:28 15:55 (4) 16:06	15:11 (5) 15:29 (5)
8	05:05 21:56	05:50 21:12	06:45 20:01	19:06 (2) 07:39 19:33 (2) 18:48	17:50 (3) 07:38 17:59 (3) 16:41	15:20 (4) 08:29 15:56 (4) 16:06	15:11 (5) 15:28 (5)
9	05:06 21:55	05:52 21:10	06:47 19:59	19:07 (2) 07:41 19:31 (2) 18:45	9 17:47 (3) 07:40 18:02 (3) 16:39	15:20 (4) 08:30 15:56 (4) 16:05	15:12 (5) 15:28 (5)
10	05:07 21:55	05:54 21:08	06:49 19:56	19:07 (2) 07:42 19:28 (2) 18:43	15 17:45 (3) 07:42 18:03 (3) 16:37	15:21 (4) 08:31 15:57 (4) 16:05	15:13 (5) 15:28 (5)
11	05:08 21:54	05:56 21:05	06:50 19:54	19:09 (2) 07:44 19:26 (2) 18:40	18 17:44 (3) 07:44 18:04 (3) 16:35	15:21 (4) 08:33 15:57 (4) 16:05	15:13 (5) 15:27 (5)
12	05:09 21:53	05:57 21:03	06:52 19:51	19:11 (2) 07:46 19:24 (2) 18:38	20 17:43 (3) 07:45 18:04 (3) 16:34	15:21 (4) 08:34 15:57 (4) 16:05	15:13 (5) 15:27 (5)
13	05:10 21:52	05:59 21:01	06:54 19:49	19:15 (2) 07:48 19:22 (2) 18:36	21 17:42 (3) 07:47 18:05 (3) 16:32	15:21 (4) 08:35 15:57 (4) 16:05	15:14 (5) 15:27 (5)
14	05:12 21:51	06:01 20:59	06:56 19:47	7 07:50 18:33	23 17:42 (3) 07:49 18:04 (3) 16:31	36 15:21 (4) 08:36 15:57 (4) 16:04	15:14 (5) 15:26 (5)
15	05:13 21:50	06:03 20:57	06:58 19:44	17:52 18:31	22 17:41 (3) 07:51 18:02 (3) 16:29	36 15:21 (4) 08:37 15:56 (4) 16:05	15:15 (5) 15:26 (5)
16	05:14 21:49	06:04 20:55	06:59 19:42	17:54 18:29	21 17:41 (3) 07:53 17:59 (3) 16:27	35 15:22 (4) 08:38 15:54 (4) 16:05	15:15 (5) 15:26 (5)
17	05:16 21:47	06:06 20:53	07:01 19:39	17:55 18:26	18 17:41 (3) 07:55 17:57 (3) 16:26	32 15:22 (4) 08:38 15:52 (4) 16:05	15:16 (5) 15:27 (5)
18	05:17 21:46	06:08 20:51	07:03 19:37	17:57 18:24	16 17:41 (3) 07:57 17:55 (3) 16:24	30 15:23 (4) 08:39 15:51 (4) 16:05	15:17 (5) 15:27 (5)
19	05:18 21:45	06:10 20:48	07:05 19:34	17:59 18:22	14 17:42 (3) 07:59 17:52 (3) 16:23	28 15:23 (4) 08:40 15:49 (4) 16:05	10 15:18 (5) 15:28 (5)
20	05:20 21:44	06:12 20:46	07:06 19:32	18:01 18:20	10 17:43 (3) 08:00 17:50 (3) 16:22	26 15:24 (4) 08:41 15:47 (4) 16:06	10 15:18 (5) 15:27 (5)
21	05:21 21:42	06:13 20:44	19:21 (2) 07:08 19:33 (2) 19:29	7 18:03 17:44 (3) 08:02	23 15:13 (5) 08:41 15:46 (4) 16:06	9 15:19 (5) 15:28 (5)	
22	05:23 21:41	06:15 20:42	19:18 (2) 07:10 19:35 (2) 19:27	4 17:48 (3) 16:20	27 15:11 (5) 08:42 15:44 (4) 16:06	9 15:19 (5) 15:28 (5)	
23	05:24 21:39	06:17 20:39	19:16 (2) 07:12 19:37 (2) 19:24	16:19 18:13	28 15:10 (5) 08:42 15:43 (4) 16:07	9 15:20 (5) 15:29 (5)	
24	05:26 21:38	06:19 20:37	19:14 (2) 07:13 19:39 (2) 19:22	08:08 16:17	29 15:09 (5) 08:43 15:42 (4) 16:08	9 15:20 (5) 15:30 (5)	
25	05:27 21:36	06:20 20:35	19:12 (2) 07:15 19:39 (2) 19:19	08:09 16:16	30 15:09 (5) 08:43 15:41 (4) 16:08	10 15:20 (5) 15:30 (5)	
26	05:29 21:35	06:22 20:32	19:11 (2) 07:17 19:40 (2) 19:17	08:11 16:14	28 15:09 (5) 08:43 15:39 (4) 16:09	10 15:20 (5) 15:30 (5)	
27	05:30 21:33	06:24 20:30	19:10 (2) 07:19 19:41 (2) 19:14	08:13 16:13	26 15:09 (5) 08:44 15:38 (4) 16:10	10 15:21 (5) 15:32 (5)	
28	05:32 21:32	06:26 20:28	19:08 (2) 07:21 19:41 (2) 19:12	08:14 16:12	24 15:09 (5) 08:44 15:37 (4) 16:11	11 15:22 (5) 15:33 (5)	
29	05:34 21:30	06:27 20:25	19:07 (2) 07:22 19:41 (2) 19:09	08:16 16:12	23 15:08 (5) 08:44 15:28 (5) 16:11	11 15:22 (5) 15:34 (5)	
30	05:35 21:28	06:29 20:23	19:07 (2) 07:24 19:41 (2) 19:07	14 15:29 (4) 08:18 15:47 (4) 16:11	20 15:09 (5) 08:44 15:29 (5) 16:12	12 15:22 (5) 15:34 (5)	
31	05:37 21:27	06:31 20:21	19:06 (2) 07:25 19:41 (2) 16:56	18 15:26 (4) 07:22 15:49 (4) 16:13	20 08:44 15:49 (4) 16:13	12 15:22 (5) 15:35 (5)	
Potential sun hours	512	460	382	328	259	233	
Total, worst case		298	344	273	898	422	
Sun reduction		0.34	0.32	0.29	0.27	0.21	
Oper. time red.		1.00	1.00	1.00	1.00	1.00	
Wind dir. red.		0.67	0.67	0.67	0.66	0.66	
Total reduction		0.23	0.21	0.20	0.18	0.14	
Total, real		68	74	54	158	57	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** DX - H128

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:02 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19	14:51 (2)								
	16:15	23	15:25 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10	18	15:09 (2)							
2	08:44		15:03 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26		08:21		14:50 (2)							
	16:16	23	15:26 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09	19	15:09 (2)							
3	08:44		15:02 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22		14:50 (2)							
	16:17	23	15:25 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50		16:08	20	15:10 (2)							
4	08:43		15:03 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30		08:24		14:51 (2)							
	16:18	23	15:26 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48		16:08	21	15:12 (2)							
5	08:43		15:04 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25		14:50 (2)							
	16:19	22	15:26 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46		16:07	22	15:12 (2)							
6	08:43		15:05 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34		08:26		14:51 (2)							
	16:21	22	15:27 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44		16:07	22	15:13 (2)							
7	08:42		15:05 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36		08:28		14:51 (2)							
	16:22	22	15:27 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43		16:06	22	15:13 (2)							
8	08:42		15:05 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38		08:29		14:51 (2)							
	16:23	21	15:26 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41		16:06	22	15:13 (2)							
9	08:41		15:07 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:30		14:52 (2)							
	16:25	20	15:27 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39		16:05	22	15:14 (2)							
10	08:40		15:08 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42		08:32		14:52 (2)							
	16:26	19	15:27 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37		16:05	23	15:15 (2)							
11	08:40		15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44		08:33		14:52 (2)							
	16:28	19	15:27 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35		16:05	23	15:15 (2)							
12	08:39		15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46		08:34		14:52 (2)							
	16:29	18	15:27 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34		16:05	23	15:15 (2)							
13	08:38		15:10 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47		08:35		14:52 (2)							
	16:31	17	15:27 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32		16:04	24	15:16 (2)							
14	08:37		15:12 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49		08:36		14:54 (2)							
	16:33	14	15:26 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30		16:04	23	15:17 (2)							
15	08:36		15:13 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51		08:37		14:53 (2)							
	16:34	13	15:26 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29		16:04	24	15:17 (2)							
16	08:35		15:15 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53		08:38		14:54 (2)							
	16:36	8	15:23 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27		16:05	23	15:17 (2)							
17	08:34		15:19 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55		08:39		14:54 (2)							
	16:38	2	15:21 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26		16:05	24	15:18 (2)							
18	08:33		15:19 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57		08:39		14:55 (2)							
	16:39		15:22 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24		16:05	24	15:19 (2)							
19	08:32		15:17 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59		08:40		14:56 (2)							
	16:41		15:24 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23		16:05	23	15:19 (2)							
20	08:31		15:16 (2)	07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00		08:41		14:56 (2)							
	16:43		15:25 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22		16:05	23	15:19 (2)							
21	08:30		15:14 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02		08:41		14:57 (2)							
	16:45		15:26 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20		16:06	23	15:20 (2)							
22	08:29		15:13 (2)	07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04		08:42		14:57 (2)							
	16:47		15:27 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19		16:06	23	15:20 (2)							
23	08:27		15:11 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		08:42		14:58 (2)							
	16:49		15:28 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18		16:07	23	15:21 (2)							
24	08:26		15:09 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08		08:43		14:58 (2)							
	16:50		15:30 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17		16:07	23	15:21 (2)							
25	08:25		15:07 (2)	07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	07:11	08:09				14:57 (2)							
	16:52		15:31 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:15	1			14:58 (2)							
26	08:23		15:04 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11				14:54 (2)							
	16:54		15:33 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	8			15:02 (2)							
27	08:22		15:01 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13				14:53 (2)							
	16:56		15:34 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	12			15:05 (2)							
28	08:20		15:00 (2)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14				14:52 (2)							
	16:58		15:35 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	14			15:06 (2)							
29	08:19		15:00 (2)	07:17	06:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16				14:51 (2)							
	17:00		15:36 (2)	18:00	19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	16			15:07 (2)							
30	08:17		15:00 (2)	07:15	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18				14:50 (2)							
	17:02		15:37 (2)	18:01	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	18			15:08 (2)							
31	08:15		15:00 (2)	07:13	07:04	06:50	05:04	05:04	05:37	06:31	07:22	07:22	08:											

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DY - H129

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: DZ - H130

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EA - H131

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EB - H132

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EC - H133

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: ED - H134

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EE - H135

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EF - H136

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
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22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EG - H137

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
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13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: EH - H138

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	29 06:27 (5) 06:56 (5)	05:03 21:45	12 05:34 (4) 05:46 (4)	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10		
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	26 06:28 (5) 06:54 (5)	05:02 21:47	13 05:33 (4) 05:46 (4)	05:00 22:00	3 05:42 (4) 05:45 (4)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	24 06:29 (5) 06:53 (5)	05:01 21:48	13 05:32 (4) 05:45 (4)	05:00 21:59	6 05:40 (4) 05:46 (4)	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09	
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	23 06:29 (5) 06:52 (5)	05:00 21:49	13 05:31 (4) 05:44 (4)	05:01 21:59	8 05:39 (4) 05:47 (4)	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08	
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6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	16 06:33 (5) 06:49 (5)	04:59 21:51	12 05:32 (4) 05:44 (4)	05:03 21:58	12 05:38 (4) 05:50 (4)	05:47 21:16	13 06:57 (5) 06:42 (5)	05:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	11 06:35 (5) 06:46 (5)	04:58 21:52	12 05:33 (4) 05:44 (4)	05:04 21:57	12 05:38 (4) 05:50 (4)	05:49 21:14	17 06:59 (5) 06:59 (5)	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	10 06:47 (5) 06:53 (5)	04:57 21:53	11 05:33 (4) 05:42 (4)	05:05 21:56	13 05:38 (4) 05:51 (4)	05:51 21:12	20 06:40 (5) 07:00 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	9 08:41 (5) 07:57 (5)	06:47 21:54	10 05:35 (4) 05:42 (4)	05:06 21:55	13 05:39 (4) 05:52 (4)	05:52 21:10	23 07:02 (5) 07:19 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	8 08:40 (5) 07:55 (5)	06:46 21:55	14 05:36 (4) 05:43 (4)	05:07 21:55	13 05:40 (4) 05:53 (4)	05:54 21:08	25 06:38 (5) 07:03 (5)	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	11 08:40 (5) 07:53 (5)	06:46 21:55	15 05:37 (4) 05:44 (4)	05:08 21:54	13 05:41 (4) 05:53 (4)	05:56 21:06	27 06:36 (5) 07:03 (5)	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	12 08:39 (5) 07:51 (5)	06:46 21:56	16 05:39 (4) 05:46 (4)	05:09 21:53	12 05:42 (4) 05:43 (4)	05:58 21:03	29 06:35 (5) 07:04 (5)	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	13 08:38 (5) 07:49 (5)	06:45 21:57	17 05:40 (4) 05:47 (4)	05:09 21:52	12 05:44 (4) 05:44 (4)	05:59 21:01	30 06:33 (5) 07:05 (5)	06:48 19:49	07:48 18:37	07:45 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	14 08:37 (5) 07:46 (5)	06:45 21:58	18 05:41 (4) 05:48 (4)	05:05 21:51	11 05:44 (4) 05:45 (4)	06:01 20:59	31 06:34 (5) 07:05 (5)	06:56 19:47	07:49 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	15 08:36 (5) 07:45 (5)	06:45 21:58	19 05:42 (4) 05:49 (4)	05:03 21:50	10 05:45 (4) 05:55 (4)	06:03 20:57	32 06:33 (5) 07:05 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	16 08:35 (5) 07:44 (5)	06:45 21:59	20 05:43 (4) 05:50 (4)	05:05 21:49	11 05:46 (4) 05:56 (4)	06:05 20:55	32 06:33 (5) 07:05 (5)	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	17 08:34 (5) 07:43 (5)	06:45 21:59	21 05:44 (4) 05:51 (4)	05:06 21:47	12 05:48 (4) 05:56 (4)	06:06 20:53	30 06:35 (5) 07:05 (5)	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	18 08:33 (5) 07:40 (5)	06:45 22:00	22 05:45 (4) 05:52 (4)	05:07 21:46	13 05:49 (4) 05:56 (4)	06:08 20:51	28 06:37 (5) 07:05 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	19 08:32 (5) 07:39 (5)	06:45 22:00	23 05:46 (4) 05:53 (4)	05:09 21:45	14 05:50 (4) 05:56 (4)	06:10 20:48	26 06:38 (5) 07:04 (5)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:15 20:35	05:18 21:28	20 08:31 (5) 07:44 (5)	06:45 22:00	24 05:47 (4) 05:54 (4)	05:10 21:44	15 05:52 (4) 05:57 (4)	06:15 20:46	27 06:39 (5) 07:04 (5)	07:07 19:32	08:01 18:20	08:41 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	21 08:30 (5) 07:46 (5)	06:45 22:01	25 05:48 (4) 05:55 (4)	05:11 21:42	16 05:53 (4) 05:56 (4)	06:13 20:44	28 06:42 (5) 07:04 (5)	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	22 08:29 (5) 07:48 (5)	06:45 22:01	26 05:49 (4) 05:56 (4)	05:15 21:41	17 05:55 (4) 05:57 (4)	06:15 20:42	29 06:43 (5) 07:03 (5)	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	23 08:27 (5) 07:50 (5)	06:45 22:01	27 05:50 (4) 05:57 (4)	05:24 21:39	18 05:56 (4) 05:57 (4)	06:17 20:39	20 06:45 (5) 07:02 (5)	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	24 08:26 (5) 07:51 (5)	06:45 22:01	28 05:41 (4) 05:48 (4)	05:26 21:38	19 05:56 (4) 05:57 (4)	06:19 20:37	21 06:47 (5) 07:02 (5)	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	25 08:25 (5) 07:53 (5)	06:46 22:01	29 05:40 (4) 05:47 (4)	05:27 21:36	20 05:57 (4) 05:58 (4)	06:21 20:35	22 06:48 (5) 07:00 (5)	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:17 18:49	06:03 20:46	05:09 21:37	26 08:23 (5) 07:54 (5)	06:46 22:01	30 05:39 (4) 05:46 (4)	05:29 21:35	21 05:58 (4) 05:59 (4)	06:22 20:32	23 06:50 (5) 07:19 (5)	07:17 19:17	07:13 18:15	08:11 16:09	08:43 16:07
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	27 08:22 (5) 07:55 (5)	06:47 22:01	31 05:38 (4) 05:45 (4)	05:28 21:33	22 05:57 (4) 05:58 (4)	06:23 20:30	24 06:52 (5) 07:15 (5)	07:19 19:15	07:13 18:14	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	28 08:20 (5) 07:57 (5)	06:47 22:01	32 05:37 (4) 05:44 (4)	05:27 21:32	23 05:56 (4) 05:57 (4)	06:26 20:28	25 06:54 (5) 07:21 (5)	07:15 19:12	07:17 18:14	08:14 16:11	08:44 16:11
29	08:19 17:00	07:09 17:55	05:56 18:42	05:56 20:52	05:06 21:41	29 08:19 (5) 07:58 (5)	06:48 22:01	33 05:36 (4) 05:43 (4)	05:06 21:30	24 05:55 (4) 05:56 (4)	06:28 20:25	26 06:56 (5) 07:24 (5)	07:18 19:10	07:18 18:16	08:16 16:12	08:44 16:13
30	08:17 17:02	07:06 17:56	05:54 18:40	05:54 20:54	05:05 21:43	30 08:17 (5) 07:59 (5)	06:48 22:00	34 05:35 (4) 05:42 (4)	05:05 21:28	25 05:54 (4) 05:55 (4)	06:29 20:23	27 06:57 (5) 07:26 (5)	07:19 19:07	07:20 18:18	08:18 16:11	08:44 16:13
31	08:15 17:04	07:04 17:58	05:54 18:40	05:54 20:54	05:04 21:44	31 08:15 (5) 07:59 (5)	06:49 22:01	35 05:34 (4) 05:41 (4)	05:07 21:27	26 05:53 (4) 05:54 (4)	06:31 20:21	28 06:58 (5) 07:27 (5)	07:20 19:07	07:22 18:16	08:19 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233				
Total, worst case																
Sun reduction				0.341	0.225	0.107	0.186	0.495								
Oper. time red.				0.30	0.38	0.32	0.32	0.34								
Wind dir. red.				1.00	1.00	1.00	1.00	1.00								
Total reduction				0.68	0.67	0.66	0.66	0.68								
Total, real				0.24	0.26	0.21	0.21	0.23								
				81	57	22	39	114								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EI - H139

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EJ - H140

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EK - H141

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EL - H142

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: EM - H143

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		07:25 (5)	05:52		06:18 (4)	05:03		05:34 (3)
	16:15	17:06	18:02						20:00	27	07:52 (5)	20:55	8	06:26 (4)	21:45	3	05:37 (3)
2	08:44	08:12	07:14						06:59		07:26 (5)	05:50		06:16 (4)	05:02		05:33 (3)
	16:16	17:08	18:04						20:02	25	07:51 (5)	20:57	9	06:25 (4)	21:47	5	05:38 (3)
3	08:44	08:10	07:12						06:56		07:26 (5)	05:48		06:14 (4)	05:01		05:32 (3)
	16:17	17:10	18:06						20:04	23	07:49 (5)	20:59	10	06:24 (4)	21:48	6	05:38 (3)
4	08:43	08:09	07:09						06:54		07:27 (5)	05:46		06:12 (4)	05:00		05:31 (3)
	16:18	17:12	18:08						20:06	21	07:48 (5)	21:01	11	06:23 (4)	21:49	7	05:38 (3)
5	08:43	08:07	07:07						06:52		07:28 (5)	05:44		06:10 (4)	04:59		05:31 (3)
	16:20	17:14	18:10						20:08	18	07:46 (5)	21:03	11	06:21 (4)	21:50	8	05:39 (3)
6	08:43	08:05	07:05						06:49		07:30 (5)	05:42		06:13 (4)	04:59		05:30 (3)
	16:21	17:16	18:11						20:09	14	07:44 (5)	21:04	7	06:20 (4)	21:51	9	05:39 (3)
7	08:42	08:03	07:02						06:47		07:34 (5)	05:40			04:58		05:30 (3)
	16:22	17:18	18:13						20:11	6	07:40 (5)	21:06			21:52	10	05:40 (3)
8	08:42	08:01	07:00						06:44			05:38			04:57		05:29 (3)
	16:24	17:20	18:15						20:13			21:08			21:53	11	05:40 (3)
9	08:41	07:59	06:57						06:42			05:36			04:57		05:29 (3)
	16:25	17:22	18:17						20:15			21:10			21:54	11	05:40 (3)
10	08:40	07:57	06:55						06:40			05:35			04:56		05:28 (3)
	16:27	17:24	18:19						20:17			21:12			21:55	12	05:40 (3)
11	08:40	07:55	06:53						06:37			05:33			04:56		05:28 (3)
	16:28	17:26	18:21						20:19			21:13			21:55	13	05:41 (3)
12	08:39	07:53	06:50						06:35			05:31			04:56		05:28 (3)
	16:30	17:28	18:23						20:20			21:15			21:56	13	05:41 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:27 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	14	05:41 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:27 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	14	05:41 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:27 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	14	05:41 (3)
16	08:35	07:45	06:41						06:25			05:24			04:55		05:27 (3)
	16:36	17:36	18:30						20:28			21:22			21:59	15	05:42 (3)
17	08:34	07:43	06:38						06:23			05:22			04:54		05:27 (3)
	16:38	17:38	18:32						20:30			21:23			21:59	15	05:42 (3)
18	08:33	07:41	06:36						06:21			05:21			04:54		05:27 (3)
	16:40	17:40	18:34						20:32			21:25			22:00	15	05:42 (3)
19	08:32	07:39	06:33						06:18			05:19			04:54		05:27 (3)
	16:42	17:42	18:36						20:33			21:27			22:00	15	05:42 (3)
20	08:31	07:37	06:31						06:16			05:18			04:54		05:27 (3)
	16:43	17:44	18:38						20:35			21:28			22:00	15	05:42 (3)
21	08:30	07:34	06:28						06:14			05:16			04:55		05:27 (3)
	16:45	17:46	18:40						20:37			21:30			22:01	15	05:42 (3)
22	08:29	07:32	06:26					06:50 (5)	06:12			05:15			04:55		05:28 (3)
	16:47	17:48	18:42	1	06:51 (5)	20:39			20:39			21:31			22:01	15	05:43 (3)
23	08:27	07:30	06:23					06:47 (5)	06:09			05:13			04:55		05:28 (3)
	16:49	17:50	18:44	5	06:52 (5)	20:41			20:41			21:33			22:01	15	05:43 (3)
24	08:26	07:28	06:21					06:45 (5)	06:07			05:12			04:55		05:28 (3)
	16:51	17:52	18:45	8	06:53 (5)	20:43			20:43			21:34			22:01	15	05:43 (3)
25	08:25	07:25	06:18					06:42 (5)	06:05			05:11			04:56		05:29 (3)
	16:53	17:54	18:47	11	06:53 (5)	20:44			20:44			21:36			22:01	15	05:44 (3)
26	08:23	07:23	06:16					06:40 (5)	06:03			05:09			04:56		05:29 (3)
	16:54	17:56	18:49	14	06:54 (5)	20:46			20:46			21:37			22:01	15	05:44 (3)
27	08:22	07:21	06:14					06:37 (5)	06:01		06:26 (4)	05:08			04:57		05:30 (3)
	16:56	17:58	18:51	17	06:54 (5)	20:48	1	06:27 (4)	21:39			05:07			22:01	14	05:44 (3)
28	08:20	07:19	06:11					06:35 (5)	05:59		06:24 (4)	05:07			04:57		05:30 (3)
	16:58	18:00		19	06:54 (5)	20:50	3	06:27 (4)	21:40			21:40			22:01	14	05:44 (3)
29	08:19		07:09					07:32 (5)	05:56		06:22 (4)	05:06			04:58		05:31 (3)
	17:00		19:55	21	07:53 (5)	20:52	5	06:27 (4)	21:41			21:41			22:01	14	05:45 (3)
30	08:17		07:06					07:30 (5)	05:54		06:20 (4)	05:05		05:35 (3)	04:58		05:31 (3)
	17:02		19:56	23	07:53 (5)	20:54	7	06:27 (4)	21:43		1	05:36 (3)			22:00	13	05:44 (3)
31	08:15		07:04					07:27 (5)				05:04			05:34 (3)		
	17:04		19:58	25	07:52 (5)				21:44		2	05:36 (3)					
Potential sun hours	250	273	367					420				494			510		
Total, worst case				144				150				59			370		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.67				0.67				0.67			0.66		
Total reduction				0.18				0.24				0.26			0.21		
Total, real				26				36				15			78		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EM - H143

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33		07:26		07:24		08:19	
	22:00	13 05:45 (3)	21:25	20:18		19:05		16:54		16:10	
2	05:00	05:33 (3)	05:40	06:35		07:28		07:26		08:21	
	22:00	12 05:45 (3)	21:23	20:16		19:02		16:52		16:09	
3	05:00	05:33 (3)	05:42	06:37		07:30		07:28		08:22	
	21:59	12 05:45 (3)	21:21	20:14		19:00		16:50		16:09	
4	05:01	05:34 (3)	05:44	06:38		07:32		07:30		08:24	
	21:59	11 05:45 (3)	21:19	20:11		18:57		16:48		16:08	
5	05:02	05:35 (3)	05:46	06:40		07:31 (5)		07:33		08:25	
	21:58	10 05:45 (3)	21:17	20:09	4	07:35 (5)		18:55		16:07	
6	05:03	05:36 (3)	05:47	06:42		07:26 (5)		07:35		08:26	
	21:58	9 05:45 (3)	21:16	20:06	14	07:40 (5)		18:53		16:07	
7	05:04	05:37 (3)	05:49	06:44		07:23 (5)		07:37		08:28	
	21:57	8 05:45 (3)	21:14	20:04	18	07:41 (5)		18:50		16:06	
8	05:05	05:38 (3)	05:51	06:45		07:21 (5)		07:39		08:29	
	21:56	7 05:45 (3)	21:12	20:01	21	07:42 (5)		18:48		16:06	
9	05:06	05:39 (3)	05:52	06:47		07:20 (5)		07:41		08:30	
	21:55	6 05:45 (3)	21:10	19:59	23	07:43 (5)		18:45		16:06	
10	05:07	05:40 (3)	05:54	06:49		07:19 (5)		07:43		08:32	
	21:55	5 05:45 (3)	21:08	19:57	25	07:44 (5)		18:43		16:05	
11	05:08	05:41 (3)	05:56	06:51		07:18 (5)		07:44		08:33	
	21:54	4 05:45 (3)	21:06	19:54	26	07:44 (5)		18:41		16:05	
12	05:09	05:42 (3)	05:58	06:52		07:19 (5)		07:46		08:34	
	21:53	3 05:45 (3)	21:03	19:52	25	07:44 (5)		18:38		16:05	
13	05:11	05:43 (3)	05:59	06:54		07:21 (5)		07:48		08:35	
	21:52	1 05:44 (3)	21:01	19:49	24	07:45 (5)		18:36		16:05	
14	05:12		06:01	06:56		07:22 (5)		07:50		08:36	
	21:51		20:59	19:47	22	07:44 (5)		18:34		16:05	
15	05:13		06:03	06:58		07:24 (5)		07:52		08:37	
	21:50		20:57	19:44	19	07:43 (5)		18:31		16:05	
16	05:14		06:05	06:59		07:26 (5)		07:54		08:38	
	21:49		20:55	19:42	17	07:43 (5)		18:29		16:05	
17	05:16		06:06	07:01		07:28 (5)		07:56		08:39	
	21:47		20:53	19:39	15	07:43 (5)		18:27		16:05	
18	05:17		06:08	07:03		07:29 (5)		07:57		08:39	
	21:46		20:51	19:37	12	07:41 (5)		18:24		16:05	
19	05:19		06:10	07:05		07:31 (5)		07:59		08:40	
	21:45		20:48	19:34	9	07:40 (5)		18:22		16:05	
20	05:20		06:12	07:07		07:33 (5)		08:01		08:41	
	21:44		20:46	19:32	6	07:39 (5)		18:20		16:06	
21	05:21		06:13	07:08		07:35 (5)		08:03		08:41	
	21:42		20:44	19:29	2	07:37 (5)		18:18		16:06	
22	05:23		06:15	07:10				08:05		08:42	
	21:41		20:42	19:27				18:15		16:07	
23	05:24		06:17	07:12				08:07		08:42	
	21:39		20:39	19:24				18:13		16:07	
24	05:26		06:19	07:14				08:09		08:43	
	21:38		20:37	19:22				18:11		16:08	
25	05:27		06:21	07:15				07:11		08:43	
	21:36		20:35	19:19				17:09		16:08	
26	05:29		06:22	07:17				07:13		08:43	
	21:35		20:32	19:17				17:07		16:09	
27	05:31		06:24	07:19				07:15		08:44	
	21:33		20:30	19:15				17:05		16:10	
28	05:32		06:26	07:21				07:17		08:44	
	21:32		20:28	19:12				17:02		16:11	
29	05:34		06:28	07:23				07:19		08:44	
	21:30		20:25	19:10				17:00		16:12	
30	05:35		06:29	07:24				07:20		08:44	
	21:28		20:23	19:07				16:58		16:13	
31	05:37		06:31					07:22		08:44	
	21:27		20:21					16:56		16:14	
Potential sun hours	512		460	382		328		259		233	
Total, worst case		101	73	282							
Sun reduction		0.32	0.34	0.32							
Oper. time red.		1.00	1.00	1.00							
Wind dir. red.		0.66	0.67	0.67							
Total reduction		0.21	0.23	0.22							
Total, real		22	17	61							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EN - H144

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		15:07 (5)	08:14		15:26 (4)	07:16		17:05 (3)	07:01		05:52			19:18 (2)	05:03	
	16:15	30	15:37 (4)	17:06	40	16:06 (4)	18:02	26	17:31 (3)	20:00		20:55	34		19:52 (2)	21:45	
2	08:44		15:07 (5)	08:12		15:26 (4)	07:14		17:05 (3)	06:59		05:50			19:19 (2)	05:02	
	16:16	32	15:39 (4)	17:08	39	16:05 (4)	18:04	24	17:29 (3)	20:02		20:57	32		19:51 (2)	21:46	
3	08:44		15:07 (5)	08:10		15:27 (4)	07:12		17:06 (3)	06:56		05:48			19:20 (2)	05:01	
	16:17	32	15:39 (4)	17:10	38	16:05 (4)	18:06	23	17:29 (3)	20:04		20:59	29		19:49 (2)	21:48	
4	08:43		15:09 (5)	08:08		15:28 (4)	07:09		17:07 (3)	06:54		05:46			19:21 (2)	05:00	
	16:18	32	15:41 (4)	17:12	36	16:04 (4)	18:07	21	17:28 (3)	20:06		21:01	27		19:48 (2)	21:49	
5	08:43		15:09 (5)	08:07		15:29 (4)	07:07		17:08 (3)	06:51		05:44			19:22 (2)	04:59	
	16:19	33	15:42 (4)	17:14	34	16:03 (4)	18:09	17	17:25 (3)	20:07		21:03	24		19:46 (2)	21:50	
6	08:43		15:10 (5)	08:05		15:31 (4)	07:04		17:10 (3)	06:49		05:42			19:24 (2)	04:59	
	16:21	34	15:44 (4)	17:16	31	16:02 (4)	18:11	13	17:23 (3)	20:09	2	19:41 (2)	20		19:44 (2)	21:51	
7	08:42		15:10 (5)	08:03		15:32 (4)	07:02		17:14 (3)	06:47		05:40			19:28 (2)	04:58	
	16:22	35	15:45 (4)	17:18	28	16:00 (4)	18:13	4	17:18 (3)	20:11	12	19:43 (2)	14		19:42 (2)	21:52	
8	08:42		15:11 (5)	08:01		15:34 (4)	07:00			06:44		05:38			19:33 (2)	04:57	
	16:24	35	15:46 (4)	17:20	25	15:59 (4)	18:15			20:13	18	19:46 (2)	3		19:36 (2)	21:53	
9	08:41		15:12 (5)	07:59		15:37 (4)	06:57			06:42		05:36				04:57	
	16:25	37	15:49 (4)	17:22	20	15:57 (4)	18:17			20:15	22	19:48 (2)				21:54	
10	08:40		15:13 (5)	07:57		15:41 (4)	06:55			06:39		05:34				04:56	
	16:26	37	15:50 (4)	17:24	13	15:54 (4)	18:19			20:17	26	19:49 (2)				21:55	
11	08:40		15:14 (5)	07:55			06:53			06:37		05:33				04:56	
	16:28	38	15:52 (4)	17:26			18:21			20:19	29	19:51 (2)				21:55	
12	08:39		15:15 (5)	07:53			06:50			06:35		05:31				04:55	
	16:30	39	15:54 (4)	17:28			18:23			20:20	32	19:53 (2)				21:56	
13	08:38		15:17 (5)	07:51			06:48			06:32		05:29				04:55	
	16:31	38	15:55 (4)	17:30			18:25			20:22	35	19:54 (2)				21:57	
14	08:37		15:18 (5)	07:49			06:45			06:30		05:27				04:55	
	16:33	39	15:57 (4)	17:32			18:27			20:24	38	19:56 (2)				21:58	
15	08:36		15:20 (4)	07:47			06:43			06:28		05:26				04:55	
	16:34	39	15:59 (4)	17:34			18:28			20:26	40	19:58 (2)				21:58	
16	08:35		15:19 (4)	07:45			06:40			06:25		05:24				04:54	
	16:36	41	16:00 (4)	17:36			18:30			20:28	41	19:58 (2)				21:59	
17	08:34		15:20 (4)	07:43			06:38			06:23		05:22				04:54	
	16:38	42	16:02 (4)	17:38			18:32			20:30	42	19:58 (2)				21:59	
18	08:33		15:20 (4)	07:41			06:35			06:21		05:21				04:54	
	16:40	44	16:04 (4)	17:40			18:34			20:31	43	19:58 (2)				22:00	
19	08:32		15:20 (4)	07:39		17:10 (3)	06:33			06:18		05:19				04:54	
	16:41	45	16:05 (4)	17:42	3	17:13 (3)	18:36			20:33	43	19:58 (2)				22:00	
20	08:31		15:20 (4)	07:36		17:09 (3)	06:31			06:16		05:18				04:54	
	16:43	44	16:04 (4)	17:44	7	17:16 (3)	18:38			20:35	43	19:58 (2)				22:00	
21	08:30		15:21 (4)	07:34		17:08 (3)	06:28			06:14		05:16				04:54	
	16:45	44	16:05 (4)	17:46	10	17:18 (3)	18:40			20:37	43	19:57 (2)				22:01	
22	08:29		15:20 (4)	07:32		17:06 (3)	06:26			06:12		05:15				04:55	
	16:47	45	16:05 (4)	17:48	13	17:19 (3)	18:42			20:39	43	19:57 (2)				22:01	
23	08:27		15:21 (4)	07:30		17:06 (3)	06:23			06:09		05:13				04:55	
	16:49	45	16:06 (4)	17:50	16	17:22 (3)	18:43			20:41	43	19:57 (2)				22:01	
24	08:26		15:21 (4)	07:28		17:05 (3)	06:21			06:07		05:12				04:55	
	16:50	45	16:06 (4)	17:52	19	17:24 (3)	18:45			20:43	43	19:57 (2)				22:01	
25	08:24		15:22 (4)	07:25		17:04 (3)	06:18			06:05		05:11				04:55	
	16:52	44	16:06 (4)	17:54	22	17:26 (3)	18:47			20:44	42	19:56 (2)				22:01	
26	08:23		15:22 (4)	07:23		17:04 (3)	06:16			06:03		05:09				04:56	
	16:54	44	16:06 (4)	17:56	24	17:28 (3)	18:49			20:46	41	19:56 (2)				22:01	
27	08:22		15:22 (4)	07:21		17:05 (3)	06:13			06:01		05:08				04:56	
	16:56	44	16:06 (4)	17:58	26	17:31 (3)	18:51			20:48	40	19:55 (2)				22:01	
28	08:20		15:23 (4)	07:18		17:04 (3)	06:11			05:58		05:07				04:57	
	16:58	44	16:07 (4)	18:00	27	17:31 (3)	18:53			20:50	39	19:55 (2)				22:01	
29	08:19		15:23 (4)				07:09			05:56		05:06				04:57	
	17:00	43	16:06 (4)				19:54			20:52	38	19:54 (2)				22:01	
30	08:17		15:24 (4)				07:06			05:54		05:05				04:58	
	17:02	42	16:06 (4)				19:56			20:54	36	19:53 (2)				22:00	
31	08:15		15:24 (4)				07:04					05:04					
	17:04	41	16:05 (4)				19:58					21:44					
Potential sun hours	250				273			367			420			494			510
Total, worst case	1227				471			128			874			183			
Sun reduction	0.24				0.23			0.27			0.35			0.38			
Oper. time red.	1.00				1.00			1.00			1.00			1.00			
Wind dir. red.	0.66				0.66			0.67			0.66			0.66			
Total reduction	0.16				0.15			0.18			0.23			0.25			
Total, real	196				73			23			203			46			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: EN - H144

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:21 (2) 19:50 (2)	07:26 19:05	07:24 15:24 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	19:22 (2) 19:48 (2)	07:28 19:02	15:06 (4) 15:27 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	19:24 (2) 19:46 (2)	07:30 19:00	15:04 (4) 15:29 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	19:25 (2) 19:43 (2)	07:31 18:57	15:02 (4) 15:30 (4)
5	05:02 21:58	05:45 21:17	19:39 (2) 19:48 (2)	06:40 20:09	19:28 (2) 18:55	07:32 16:46
6	05:03 21:58	05:47 21:15	19:36 (2) 19:52 (2)	06:42 20:06	19:34 (2) 19:38 (2)	07:35 18:52
7	05:04 21:57	05:49 21:14	19:34 (2) 19:55 (2)	06:43 20:04	07:37 18:50	16:44 15:34 (4)
8	05:05 21:56	05:51 21:12	19:31 (2) 19:56 (2)	06:45 20:01	07:39 18:48	14:57 (4) 15:34 (4)
9	05:06 21:55	05:52 21:10	19:30 (2) 19:58 (2)	06:47 19:59	07:41 18:45	16:41 15:35 (4)
10	05:07 21:55	05:54 21:08	19:28 (2) 19:58 (2)	06:49 19:56	07:42 18:43	16:06 15:37 (4)
11	05:08 21:54	05:56 21:05	19:27 (2) 19:59 (2)	06:50 19:54	07:44 18:40	16:05 15:37 (4)
12	05:09 21:53	05:57 21:03	19:26 (2) 20:01 (2)	06:52 19:51	07:46 18:38	16:05 15:38 (4)
13	05:10 21:52	05:59 21:01	19:24 (2) 20:01 (2)	06:54 19:49	07:48 18:36	16:05 15:38 (4)
14	05:12 21:51	06:01 20:59	19:23 (2) 20:02 (2)	06:56 19:47	07:50 18:33	16:05 15:39 (4)
15	05:13 21:50	06:03 20:57	19:23 (2) 20:02 (2)	06:58 19:44	07:52 18:31	16:05 15:39 (4)
16	05:14 21:49	06:04 20:55	19:21 (2) 20:02 (2)	06:59 19:42	07:54 18:29	16:05 15:39 (4)
17	05:16 21:47	06:06 20:53	19:21 (2) 20:03 (2)	07:01 19:39	07:55 18:26	16:05 15:39 (4)
18	05:17 21:46	06:08 20:51	19:21 (2) 20:03 (2)	07:03 19:37	07:57 18:24	16:05 15:40 (4)
19	05:18 21:45	06:10 20:48	19:20 (2) 20:03 (2)	07:05 19:34	07:59 18:22	16:05 15:40 (4)
20	05:20 21:44	06:12 20:46	19:19 (2) 20:03 (2)	07:06 19:32	08:01 18:20	16:05 15:40 (4)
21	05:21 21:42	06:13 20:44	19:19 (2) 20:03 (2)	07:08 19:29	08:03 18:17	16:05 15:40 (4)
22	05:23 21:41	06:15 20:42	19:18 (2) 20:02 (2)	07:10 19:27	08:05 18:15	16:05 15:40 (4)
23	05:24 21:39	06:17 20:39	19:19 (2) 20:02 (2)	07:12 19:24	08:07 18:13	16:05 15:41 (4)
24	05:26 21:38	06:19 20:37	19:19 (2) 20:02 (2)	07:13 19:22	08:09 18:11	16:05 15:41 (4)
25	05:27 21:36	06:20 20:35	19:18 (2) 20:01 (2)	07:15 19:19	08:09 17:09	16:05 15:41 (4)
26	05:29 21:35	06:22 20:32	19:18 (2) 20:01 (2)	07:17 19:17	08:11 17:06	16:05 15:39 (4)
27	05:30 21:33	06:24 20:30	19:19 (2) 20:00 (2)	07:19 19:14	08:13 17:04	16:05 15:38 (4)
28	05:32 21:32	06:26 20:28	19:18 (2) 19:59 (2)	07:21 19:12	08:14 17:02	16:05 15:37 (4)
29	05:34 21:30	06:28 20:25	19:19 (2) 19:57 (2)	07:22 19:09	08:16 17:00	16:05 15:36 (4)
30	05:35 21:28	06:29 20:23	19:20 (2) 19:55 (2)	07:24 19:07	08:18 16:58	16:05 15:35 (4)
31	05:37 21:27	06:31 20:21	19:20 (2) 19:52 (2)	07:25 16:56	07:22 16:56	16:05 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		970	112	299	1163	932
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.66	0.67	0.66	0.65
Total reduction		0.23	0.21	0.20	0.17	0.14
Total, real		218	24	59	203	126

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EO - H145

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	15:16 (3)	08:14	15:32 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	15:03 (3)		
	16:15	21	15:37 (3)	17:06	16:07 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	15:32 (2)		
2	08:44	15:16 (3)	08:12	15:32 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	15:03 (3)		
	16:16	22	15:38 (3)	17:08	16:07 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	15:29 (2)		
3	08:44	15:16 (3)	08:10	15:33 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	15:03 (3)		
	16:17	22	15:38 (3)	17:10	16:06 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	15:24 (3)		
4	08:43	15:17 (3)	08:08	15:33 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	15:04 (3)		
	16:18	22	15:39 (3)	17:12	16:06 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	15:25 (3)		
5	08:43	15:17 (3)	08:07	15:34 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	15:03 (3)		
	16:19	22	15:39 (3)	17:14	16:05 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	15:25 (3)		
6	08:43	15:18 (3)	08:05	15:35 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	15:04 (3)		
	16:21	22	15:40 (3)	17:16	16:05 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	15:26 (3)		
7	08:42	15:18 (3)	08:03	15:36 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	15:04 (3)		
	16:22	22	15:40 (3)	17:18	16:04 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	15:26 (3)		
8	08:42	15:19 (3)	08:01	15:37 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	15:04 (3)		
	16:24	21	15:40 (3)	17:20	16:03 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	15:26 (3)		
9	08:41	15:20 (3)	07:59	15:39 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	15:05 (3)		
	16:25	21	15:41 (3)	17:22	16:02 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	15:27 (3)		
10	08:40	15:20 (3)	07:57	15:41 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	15:05 (3)		
	16:26	27	15:42 (2)	17:24	16:00 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	15:27 (3)		
11	08:40	15:21 (3)	07:55	15:44 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	15:06 (3)		
	16:28	28	15:49 (2)	17:26	14	15:58 (2)	18:21	20:19	21:13	21:55	21:05	19:54	15:27 (3)		
12	08:39	15:22 (3)	07:53	15:48 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	15:06 (3)		
	16:30	29	15:51 (2)	17:28	5	15:53 (2)	18:23	20:20	21:15	21:56	21:03	19:51	15:27 (3)		
13	08:38	15:23 (3)	07:51	16:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:42	15:06 (3)		
	16:31	30	15:53 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	15:26 (3)		
14	08:37	15:24 (3)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	15:07 (3)		
	16:33	31	15:55 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	15:26 (3)		
15	08:36	15:25 (3)	07:47	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	15:07 (3)		
	16:34	31	15:56 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	15:26 (3)		
16	08:35	15:25 (3)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	15:08 (3)		
	16:36	32	15:57 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	15:26 (3)		
17	08:34	15:27 (3)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	15:09 (3)		
	16:38	31	15:58 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	15:27 (3)		
18	08:33	15:29 (3)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	15:09 (3)		
	16:40	30	15:59 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	15:27 (3)		
19	08:32	15:32 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	15:10 (3)		
	16:41	29	16:01 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	15:28 (3)		
20	08:31	15:31 (2)	07:36	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	15:10 (3)		
	16:43	30	16:01 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	15:27 (3)		
21	08:30	15:31 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	15:11 (3)		
	16:45	31	16:02 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	15:28 (3)		
22	08:29	15:30 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	15:11 (3)		
	16:47	32	16:02 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	15:28 (3)		
23	08:27	15:31 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	15:12 (3)		
	16:49	33	16:04 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	15:29 (3)		
24	08:26	15:30 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	15:12 (3)		
	16:50	34	16:04 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	15:29 (3)		
25	08:25	15:31 (2)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09	15:12 (3)		
	16:52	34	16:05 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	15:30 (3)		
26	08:23	15:30 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	15:12 (3)		
	16:54	35	16:05 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	15:30 (3)		
27	08:22	15:30 (2)	07:21	06:13	06:00	05:08	04:53	05:30	06:24	07:19	08:15	08:13	15:14 (3)		
	16:56	35	16:05 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	15:32 (3)		
28	08:20	15:31 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	15:14 (3)		
	16:58	35	16:06 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	15:33 (3)		
29	08:19	15:31 (2)		07:09	05:56	05:06	04:57	05:34	06:27	07:22	08:17	08:16	15:15 (3)		
	17:00	35	16:06 (2)		19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	15:34 (3)		
30	08:17	15:31 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	15:15 (3)		
	17:02	35	16:06 (2)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	15:35 (3)		
31	08:15	15:31 (2)		07:04	05:04		05:37	06:31		07:22	08:18	08:16	15:15 (3)		
	17:04	35	16:06 (2)		19:58	21:44	21:27	20:21		16:56	15	15:28 (2)	16:13	20	15:35 (3)
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	233	618	
Total, worst case	897		312									946		618	
Sun reduction	0.24		0.23									0.27		0.21	
Oper. time red.	1.00		1.00									1.00		1.00	
Wind dir. red.	0.66		0.66									0.66		0.65	
Total reduction	0.16		0.15									0.18		0.14	
Total, real	144		48									166		84	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Assumptions for shadow calculations

Shadow receptor: EP - H146

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:17 (3)	08:14		15:35 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		15:07 (2)	08:19		15:04 (3)			
	16:15	20	15:37 (3)	17:06	40	16:15 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	36	15:43 (2)	16:10	22	15:26 (3)			
2	08:44		15:18 (3)	08:12		15:35 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28		07:26		15:06 (2)	08:21		15:03 (3)			
	16:16	21	15:39 (3)	17:08	40	16:15 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	38	15:44 (2)	16:09	23	15:26 (3)			
3	08:44		15:18 (3)	08:10		15:35 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		15:06 (2)	08:22		15:04 (3)			
	16:17	21	15:39 (3)	17:10	40	16:15 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00		16:50	38	15:44 (2)	16:08	23	15:27 (3)			
4	08:43		15:18 (3)	08:08		15:35 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31		07:30		15:05 (2)	08:24		15:05 (3)			
	16:18	23	15:41 (3)	17:12	40	16:15 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	39	15:44 (2)	16:08	23	15:28 (3)			
5	08:43		15:18 (3)	08:07		15:35 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33		07:32		15:05 (2)	08:25		15:05 (3)			
	16:19	24	15:42 (3)	17:14	40	16:15 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55		16:46	40	15:45 (2)	16:07	23	15:28 (3)			
6	08:43		15:19 (3)	08:05		15:35 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35		07:34		15:05 (2)	08:26		15:05 (3)			
	16:21	24	15:43 (3)	17:16	40	16:15 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52		16:44	40	15:45 (2)	16:07	24	15:29 (3)			
7	08:42		15:19 (3)	08:03		15:36 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37		07:36		15:05 (2)	08:28		15:05 (3)			
	16:22	24	15:43 (3)	17:18	39	16:15 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	40	15:45 (2)	16:06	24	15:29 (3)			
8	08:42		15:20 (3)	08:01		15:36 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39		07:38		15:05 (2)	08:29		15:06 (3)			
	16:24	23	15:43 (3)	17:20	38	16:14 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	40	15:45 (2)	16:06	22	15:28 (3)			
9	08:41		15:21 (3)	07:59		15:37 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		15:06 (2)	08:30		15:07 (3)			
	16:25	23	15:44 (3)	17:22	37	16:14 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45		16:39	40	15:46 (2)	16:05	21	15:28 (3)			
10	08:40		15:21 (3)	07:57		15:38 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42		07:42		15:06 (2)	08:32		15:07 (3)			
	16:26	23	15:44 (3)	17:24	36	16:14 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43		16:37	39	15:45 (2)	16:05	21	15:28 (3)			
11	08:40		15:22 (3)	07:55		15:38 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44		07:44		15:06 (2)	08:33		15:07 (3)			
	16:28	22	15:44 (3)	17:26	35	16:13 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40		16:35	39	15:45 (2)	16:05	20	15:27 (3)			
12	08:39		15:22 (3)	07:53		15:40 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46		07:46		15:06 (2)	08:34		15:08 (3)			
	16:30	23	15:45 (3)	17:28	32	16:12 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38		16:34	39	15:45 (2)	16:05	19	15:27 (3)			
13	08:38		15:23 (3)	07:51		15:40 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48		07:47		15:07 (2)	08:35		15:08 (3)			
	16:31	22	15:45 (3)	17:30	31	16:11 (2)	18:24	20:22	21:17	21:57	21:52	21:07	19:55	18:42		16:32	38	15:45 (2)	16:06	18	15:26 (3)			
14	08:37		15:24 (3)	07:49		15:41 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49		15:07 (2)	08:36		15:09 (3)			
	16:33	21	15:45 (3)	17:32	29	16:10 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31	37	15:44 (2)	16:04	17	15:26 (3)			
15	08:36		15:24 (3)	07:47		15:43 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52		07:51		15:08 (2)	08:37		15:09 (3)			
	16:34	26	15:52 (2)	17:34	25	16:08 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	36	15:44 (2)	16:04	17	15:26 (3)			
16	08:35		15:25 (3)	07:45		15:45 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54		07:53		15:08 (2)	08:38		15:10 (3)			
	16:36	31	15:56 (2)	17:36	21	16:06 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:27	35	15:43 (2)	16:05	16	15:26 (3)			
17	08:34		15:26 (3)	07:43		15:49 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55		07:55		15:09 (2)	08:38		15:10 (3)			
	16:38	32	15:58 (2)	17:38	15	16:04 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26		16:26	34	15:43 (2)	16:05	17	15:27 (3)			
18	08:33		15:27 (3)	07:41		15:54 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57		15:10 (2)	08:39		15:11 (3)			
	16:40	34	16:01 (2)	17:40	3	15:57 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24		16:24	32	15:42 (2)	16:05	16	15:27 (3)			
19	08:32		15:29 (3)	07:39		16:33	06:18	05:19	04:54	05:18	05:18	06:10	07:05	07:59		07:59		15:11 (2)	08:40		15:12 (3)			
	16:41	34	16:03 (2)	17:42		16:36	20:33	21:27	22:00	21:45	21:45	20:48	19:34	18:22		16:23	31	15:42 (2)	16:05	16	15:28 (3)			
20	08:31		15:30 (3)	07:36		16:30 (3)	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00		08:00		15:12 (2)	08:41		15:12 (3)			
	16:43	34	16:04 (2)	17:44		16:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22		16:22	29	15:41 (2)	16:06	15	15:27 (3)			
21	08:30		15:33 (3)	07:34		16:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02		08:02		15:08 (3)	08:41		15:13 (3)			
	16:45	32	16:05 (2)	17:46		16:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20		16:20	32	15:40 (2)	16:06	15	15:28 (3)			
22	08:29		15:37 (2)	07:32		16:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		08:04		15:06 (3)	08:42		15:13 (3)			
	16:47	29	16:06 (2)	17:48		16:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19		16:19	34	15:40 (2)	16:06	15	15:28 (3)			
23	08:27		15:37 (2)	07:30		16:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		08:06		15:05 (3)	08:42		15:14 (3)			
	16:49	31	16:08 (2)	17:50		16:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18		16:18	34	15:39 (2)	16:07	15	15:29 (3)			
24	08:26		15:36 (2)	07:28		16:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09		16:21 (2)	08:08		15:04 (3)	08:43		15:14 (3)			
	16:50	32	16:08 (2)	17:52		16:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	9	16:30 (2)	16:17	34	15:38 (2)	16:08	15	15:29 (3)			
25	08:25		15:36 (2)	07:25		16:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	15:17 (2)	08:09		15:04 (3)	08:43		15:14 (3)				
	16:52	34	16:10 (2)	17:54		16:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	17	15:34 (2)	16:16	32	15:36 (2)	16:08	16	15:30 (3)			
26	08:23		15:35 (2)	07:23		16:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	15:14 (2)	08:11		15:04 (3)	08:43		15:14 (3)				
	16:54	36	16:11 (2)	17:56		16:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	22	15:36 (2)	16:14	31	15:35 (2)	16:09	16	15:30 (3)			

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EQ - H147

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: ER - H148

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:09 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:36 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:37	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:44 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: ES - H149

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** ET - H150

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:27 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:12 (1)									
2	08:44	15:37 (1)	08:12	07:06	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:12 (1)									
3	08:44	15:38 (1)	08:12	07:06	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:12 (1)									
4	08:43	15:39 (1)	08:10	07:12	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
5	08:43	15:40 (1)	08:09	07:11	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
6	08:43	15:41 (1)	08:08	07:10	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
7	08:42	15:42 (1)	08:07	07:09	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
8	08:42	15:43 (1)	08:06	07:08	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
9	08:41	15:44 (1)	08:05	07:07	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
10	08:40	15:45 (1)	08:04	07:06	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
11	08:40	15:46 (1)	08:03	07:05	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
12	08:39	15:47 (1)	08:02	07:04	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
13	08:38	15:48 (1)	08:01	07:03	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
14	08:37	15:49 (1)	08:00	07:02	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
15	08:36	15:50 (1)	07:59	07:01	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
16	08:35	15:51 (1)	07:58	07:00	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
17	08:34	15:52 (1)	07:57	06:59	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
18	08:33	15:53 (1)	07:56	06:58	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
19	08:32	15:54 (1)	07:55	06:57	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
20	08:31	15:55 (1)	07:54	06:56	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
21	08:30	15:56 (1)	07:53	06:55	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
22	08:29	15:57 (1)	07:52	06:54	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
23	08:27	15:58 (1)	07:51	06:53	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
24	08:26	15:59 (1)	07:50	06:52	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
25	08:25	16:00 (1)	07:49	06:51	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
26	08:23	16:01 (1)	07:48	06:50	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
27	08:22	16:02 (1)	07:47	06:49	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
28	08:20	16:03 (1)	07:46	06:48	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
29	08:19	16:04 (1)	07:45	06:47	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
30	08:17	16:05 (1)	07:44	06:46	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
31	08:15	16:06 (1)	07:43	06:45	07:02	05:53	05:04	04:58	05:40	06:34	07:28	07:26	08:21	15:12 (1)									
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	227	288									
Total, worst case	398																						
Sun reduction	0.24																						
Oper. time red.	1.00																						
Wind dir. red.	0.66																						
Total reduction	0.16																						
Total, real	64																						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EU - H151

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	14:47 (4)	08:14	16:23 (3)	07:16	17:05 (2)	07:01	05:52	05:03		
	16:15	24	15:11 (4)	17:06	11	16:34 (3)	18:02	29	17:34 (2)	20:00	21:45
2	08:44	14:48 (4)	08:12	16:22 (3)	07:14	17:03 (2)	06:59		05:50	05:02	
	16:16	23	15:11 (4)	17:08	15	16:37 (3)	18:04	33	17:36 (2)	20:02	21:46
3	08:44	14:48 (4)	08:10	16:22 (3)	07:12	17:03 (2)	06:56		05:48	05:01	
	16:17	23	15:11 (4)	17:10	17	16:39 (3)	18:06	34	17:37 (2)	20:04	21:48
4	08:43	14:49 (4)	08:08	16:22 (3)	07:09	17:03 (2)	06:54		05:46	05:00	
	16:18	22	15:11 (4)	17:12	19	16:41 (3)	18:07	34	17:37 (2)	20:06	21:49
5	08:43	14:50 (4)	08:07	16:22 (3)	07:07	17:02 (2)	06:51		05:44	04:59	
	16:19	21	15:11 (4)	17:14	21	16:43 (3)	18:09	35	17:37 (2)	20:07	21:50
6	08:43	14:51 (4)	08:05	16:23 (3)	07:04	17:02 (2)	06:49		05:42	04:58	
	16:21	20	15:11 (4)	17:16	21	16:44 (3)	18:11	35	17:37 (2)	20:09	21:51
7	08:42	14:52 (4)	08:03	16:23 (3)	07:02	17:01 (2)	06:47		05:40	04:58	
	16:22	19	15:11 (4)	17:18	21	16:44 (3)	18:13	35	17:36 (2)	20:11	21:52
8	08:42	14:53 (4)	08:01	16:24 (3)	07:00	17:01 (2)	06:44		05:38	04:57	
	16:24	17	15:10 (4)	17:20	20	16:44 (3)	18:15	35	17:36 (2)	20:13	21:53
9	08:41	14:55 (4)	07:59	16:25 (3)	06:57	17:01 (2)	06:42		05:36	04:57	
	16:25	15	15:10 (4)	17:22	18	16:43 (3)	18:17	34	17:35 (2)	20:15	21:54
10	08:40	14:57 (4)	07:57	16:26 (3)	06:55	17:01 (2)	06:39		05:34	04:56	
	16:26	12	15:09 (4)	17:24	16	16:42 (3)	18:19	34	17:35 (2)	20:17	21:55
11	08:40	14:59 (4)	07:55	16:28 (3)	06:53	17:02 (2)	06:37		05:33	04:56	
	16:28	9	15:08 (4)	17:26	12	16:40 (3)	18:21	33	17:35 (2)	20:19	21:55
12	08:39		07:53	16:32 (3)	06:50	17:02 (2)	06:35		05:31	04:55	
	16:30		17:28	5	16:37 (3)	18:23	31	17:33 (2)	20:20	21:56	
13	08:38		07:51		06:48	17:04 (2)	06:32		05:29	04:55	
	16:31		17:30		18:25	28	17:32 (2)	20:22	21:17	21:57	
14	08:37		07:49		06:45	17:04 (2)	06:30		05:27	04:55	
	16:33		17:32		18:27	26	17:30 (2)	20:24	21:18	21:58	
15	08:36		07:47		06:43	17:06 (2)	06:28		05:26	04:54	
	16:34		17:34		18:28	23	17:29 (2)	20:26	21:20	21:58	
16	08:35		07:45		06:40	17:08 (2)	06:25		05:24	04:54	
	16:36		17:36		18:30	18	17:26 (2)	20:28	21:22	21:59	
17	08:34		07:43		06:38	17:11 (2)	06:23		05:22	04:54	
	16:38		17:38		18:32	12	17:23 (2)	20:30	21:23	21:59	
18	08:33		07:41		06:35		06:21		05:21	04:54	
	16:40		17:40		18:34		20:31		21:25	22:00	
19	08:32		07:39		06:33		06:18		05:19	04:54	
	16:41		17:42		18:36		20:33		21:27	22:00	
20	08:31		07:36		06:31		06:16		05:18	04:54	
	16:43		17:44		18:38		20:35		21:28	22:00	
21	08:30		07:34		06:28		06:14		05:16	04:54	
	16:45		17:46		18:40		20:37		21:30	22:01	
22	08:29		07:32		06:26		06:12		05:15	04:55	
	16:47		17:48		18:42		20:39		21:31	22:01	
23	08:27		07:30		06:23		06:09		05:13	04:55	
	16:49		17:50	4	17:22 (2)		20:41		21:33	22:01	
24	08:26		07:28		06:21		06:07		05:12	04:55	
	16:50		17:52	11	17:24 (2)		20:43		21:34	22:01	
25	08:24		07:25		06:18		06:05		05:11	04:55	
	16:52		17:54	16	17:26 (2)		20:44		21:36	22:01	
26	08:23		07:23		06:16		06:03		05:09	04:56	
	16:54		17:56	20	17:28 (2)		20:46		21:37	22:01	
27	08:22		07:21		06:13		06:00		05:08	04:56	
	16:56		17:58	24	17:31 (2)		20:48		21:39	22:01	
28	08:20		07:18		06:11		05:58		05:07	04:57	
	16:58	2	16:26 (3)	27	17:05 (2)		20:50		21:40	22:01	
29	08:19		16:23 (3)		07:08		05:56		05:06	04:57	
	17:00	5	16:28 (3)		19:54		20:52		21:41	22:01	
30	08:17		16:23 (3)		07:06		05:54		05:05	04:58	
	17:02	6	16:29 (3)		19:56		20:54		21:43	22:00	
31	08:15		16:22 (3)		07:04				05:04		
	17:04	9	16:31 (3)		19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case	227		298		509						
Sun reduction	0.24		0.23		0.27						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.65		0.66		0.68						
Total reduction	0.16		0.15		0.18						
Total, real	36		46		93						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: EU - H151

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:42 (2) 18:11 (2)	07:24 16:54	15:56 (3) 16:12 (3)	08:19 16:10	14:41 (4) 14:50 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:41 (2) 18:12 (2)	07:26 16:52	15:55 (3) 16:13 (3)	08:21 16:09	14:39 (4) 14:51 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:40 (2) 18:13 (2)	07:28 16:50	15:54 (3) 16:13 (3)	08:22 16:08	14:38 (4) 14:53 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:39 (2) 18:13 (2)	07:30 16:48	15:53 (3) 16:14 (3)	08:24 16:08	14:38 (4) 14:55 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:38 (2) 18:13 (2)	07:32 16:46	15:52 (3) 16:14 (3)	08:25 16:07	14:37 (4) 14:56 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:38 (2) 18:13 (2)	07:34 16:44	15:52 (3) 16:12 (3)	08:26 16:07	14:37 (4) 14:57 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:37 (2) 18:12 (2)	07:36 16:43	15:52 (3) 16:10 (3)	08:28 16:06	14:37 (4) 14:58 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:37 (2) 18:12 (2)	07:38 16:41	15:52 (3) 16:08 (3)	08:29 16:06	14:36 (4) 14:58 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:37 (2) 18:12 (2)	07:40 16:39	15:53 (3) 16:07 (3)	08:30 16:05	14:37 (4) 15:00 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:37 (2) 18:11 (2)	07:42 16:37	15:53 (3) 16:05 (3)	08:31 16:05	14:37 (4) 15:00 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:37 (2) 18:10 (2)	07:44 16:35	15:54 (3) 16:03 (3)	08:33 16:05	14:37 (4) 15:01 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:37 (2) 18:09 (2)	07:45 16:34	15:55 (3) 16:01 (3)	08:34 16:05	14:37 (4) 15:01 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:38 (2) 18:07 (2)	07:47 16:32	15:55 (3) 15:59 (3)	08:35 16:05	14:37 (4) 15:02 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:39 (2) 18:04 (2)	07:49 16:31	15:56 (3) 15:57 (3)	08:36 16:04	14:37 (4) 15:02 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:40 (2) 18:02 (2)	07:51 16:29		08:37 16:04	14:37 (4) 15:03 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:41 (2) 17:59 (2)	07:53 16:27		08:38 16:05	14:38 (4) 15:04 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:43 (2) 17:57 (2)	07:55 16:26		08:38 16:05	14:38 (4) 15:05 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:46 (2) 17:55 (2)	07:57 16:24		08:39 16:05	14:39 (4) 15:05 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22		07:59 16:23		08:40 16:05	14:40 (4) 15:06 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20		08:00 16:22		08:41 16:06	14:39 (4) 15:06 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17		08:02 16:20		08:41 16:06	14:40 (4) 15:07 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:04 16:19		08:42 16:06	14:40 (4) 15:07 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13		08:06 16:18		08:42 16:07	14:41 (4) 15:08 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11		08:08 16:17		08:43 16:08	14:42 (4) 15:08 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09		08:09 16:16		08:43 16:08	14:42 (4) 15:08 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	17:55 (2) 18:03 (2)	07:13 17:06	08:11 16:14		08:43 16:09	14:42 (4) 15:08 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	17:50 (2) 18:07 (2)	07:15 17:04	08:13 16:13		08:44 16:10	14:44 (4) 15:10 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	17:48 (2) 18:09 (2)	07:16 17:02	08:14 16:12		08:44 16:10	14:44 (4) 15:10 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	17:46 (2) 18:10 (2)	07:18 17:00	08:16 16:12		08:44 16:11	14:45 (4) 15:10 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:43 (2) 18:11 (2)	07:20 16:58	15:59 (3) 16:07 (3)	08:18 16:11		14:45 (4) 15:10 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	15:57 (3) 16:09 (3)			08:44 16:13	14:45 (4) 15:10 (4)
Potential sun hours	512	460	382	328		259		233	
Total, worst case			98	538		196		723	
Sun reduction			0.32	0.29		0.27		0.21	
Oper. time red.			1.00	1.00		1.00		1.00	
Wind dir. red.			0.68	0.68		0.66		0.65	
Total reduction			0.22	0.20		0.17		0.13	
Total, real			21	106		34		97	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: EV - H152

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:09 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:54 (2)										
2	16:15	24	15:33 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	27	15:21 (2)								
	08:44		15:10 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21		14:54 (2)								
	16:16	24	15:34 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	26	15:20 (2)								
3	08:44		15:09 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22		14:55 (2)								
	16:17	25	15:34 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	26	15:21 (2)								
	08:43		15:10 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24		14:56 (2)								
4	16:18	25	15:35 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	26	15:22 (2)								
	08:43		15:10 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25		14:56 (2)								
	16:19	25	15:35 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	26	15:22 (2)								
6	08:43		15:11 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26		14:57 (2)								
	16:21	25	15:36 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:07	25	15:22 (2)								
	08:42		15:11 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28		14:57 (2)								
7	16:22	26	15:37 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	25	15:22 (2)								
	08:42		15:11 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29		14:57 (2)								
	16:23	26	15:37 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	25	15:22 (2)								
9	08:41		15:12 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30		14:58 (2)								
	16:25	26	15:38 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	25	15:23 (2)								
	08:40		15:12 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32		14:59 (2)								
10	16:26	26	15:38 (2)	17:24	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	16:05	24	15:23 (2)								
	08:40		15:12 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33		14:59 (2)								
	16:28	27	15:39 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05	24	15:23 (2)								
12	08:39		15:12 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34		15:00 (2)								
	16:29	27	15:39 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	23	15:23 (2)								
	08:38		15:13 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35		15:00 (2)								
13	16:31	26	15:39 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04	23	15:23 (2)								
	08:37		15:13 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36		15:02 (2)								
	16:33	27	15:40 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04	23	15:25 (2)								
15	08:36		15:14 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37		15:01 (2)								
	16:34	26	15:40 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	23	15:24 (2)								
	08:35		15:14 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53		14:59 (2)	08:38								
16	16:36	26	15:40 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	22	15:24 (2)								
	08:34		15:14 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	14:57 (2)	08:39									
	16:38	26	15:40 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	13	15:10 (2)	16:05	22	15:25 (2)						
18	08:33		15:15 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	14:55 (2)	08:39									
	16:40	25	15:40 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	17	15:12 (2)	16:05	22	15:26 (2)						
	08:32		15:16 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	14:54 (2)	08:40									
19	16:41	25	15:41 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	19	15:13 (2)	16:05	22	15:26 (2)						
	08:31		15:17 (2)	07:36	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	14:53 (2)	08:41									
	16:43	23	15:40 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	21	15:14 (2)	16:06	22	15:26 (2)						
21	08:30		15:18 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	14:53 (2)	08:41									
	16:45	22	15:40 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	22	15:15 (2)	16:06	22	15:27 (2)						
	08:29		15:18 (2)	07:32	06:26	06:11	05:15	04:55	05:23	06:15	07:10	08:05	08:04	14:53 (2)	08:42									
22	16:47	21	15:39 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	23	15:16 (2)	16:06	22	15:27 (2)						
	08:27		15:20 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	14:52 (2)	08:42									
	16:49	19	15:39 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	25	15:17 (2)	16:07	22	15:28 (2)						
24	08:26		15:21 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	14:52 (2)	08:43									
	16:50	17	15:38 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	25	15:17 (2)	16:08	22	15:28 (2)						
	08:25		15:24 (2)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09	14:53 (2)	08:43									
25	16:52	13	15:37 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:16	25	15:18 (2)	16:08	22	15:28 (2)						
	08:23		15:26 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	14:53 (2)	08:43									
	16:54	9	15:35 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14	26	15:19 (2)	16:09	22	15:29 (2)						
27	08:22		15:21 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13	14:53 (2)	08:44									
	16:56		15:17 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	26	15:19 (2)	16:10	22	15:30 (2)						
	08:20		15:18 (2)	17:59	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	27	15:20 (2)	16:10	23	15:31 (2)						
28	16:58		15:19 (2)	17:59	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	27	15:20 (2)	16:10	23	15:31 (2)						
	08:19		15:19 (2)	17:59	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	27	15:20 (2)	16:10	23	15:31 (2)						
	17:00		15:19 (2)	17:59	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	27	15:20 (2)	16:10	23	15:31 (2)						
30	08:17		15:19 (2)	17:59	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	27	15:20 (2)	16:10	23	15:31 (2)						
	17:00		15:19 (2)	17:59	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	27	15:20 (2)	16:10	23	15:31 (2)						
	08:15		15:19 (2)	17:59	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	27	15:20 (2)	16:10	23	15:31 (2)						
3																								

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EW - H153

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
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13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EX - H154

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EY - H155

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: EZ - H156

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March	April	May	June	July	August	September	October	November	December					
1	08:44		08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:02 (2)	08:19				
	16:15		17:06	14	08:56 (2)	18:02	20:00	20:55	21:45	22:00	20:18	19:05	16:54	26	08:28 (2)	16:10			
2	08:44		08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:02 (2)	08:21				
	16:16		17:08	17	08:57 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	26	08:28 (2)	16:09		
3	08:44		08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:01 (2)	08:22				
	16:17		17:10	20	08:58 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	27	08:28 (2)	16:08		
4	08:43		08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:01 (2)	08:24				
	16:18		17:12	22	08:58 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	27	08:28 (2)	16:08		
5	08:43		08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:02 (2)	08:25				
	16:20		17:14	24	08:58 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	26	08:28 (2)	16:07		
6	08:43		08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:04 (2)	08:27				
	16:21		17:16	27	08:59 (2)	18:11	20:08	21:05	21:51	21:58	21:16	20:06	18:53	16:44	24	08:28 (2)	16:07		
7	08:42		08:03	08:31 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:06 (2)	08:28				
	16:22		17:18	28	08:59 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	22	08:28 (2)	16:06		
8	08:42		08:01	08:32 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:09 (2)	08:29				
	16:24		17:20	27	08:59 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	19	08:28 (2)	16:06		
9	08:41		07:59	08:32 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:11 (2)	08:30				
	16:25		17:22	27	08:59 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	17	08:28 (2)	16:05		
10	08:41		07:57	08:32 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:13 (2)	08:32				
	16:27		17:24	26	08:58 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	14	08:27 (2)	16:05		
11	08:40		07:55	08:33 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:15 (2)	08:33				
	16:28		17:26	25	08:58 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	11	08:26 (2)	16:05		
12	08:39		07:53	08:34 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:17 (2)	08:34				
	16:30		17:28	23	08:57 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	8	08:25 (2)	16:05		
13	08:38		07:51	08:35 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:19 (2)	08:35				
	16:31		17:30	21	08:56 (2)	18:27	20:22	21:17	21:57	21:54	21:01	19:49	18:36	16:32	5	08:24 (2)	16:04		
14	08:37		07:49	08:36 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:21 (2)	08:36				
	16:33		17:32	18	08:54 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	2	08:23 (2)	16:05		
15	08:36		07:47	08:37 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37	12:22 (1)				
	16:34		17:34	16	08:53 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	11	12:33 (1)			
16	08:36		07:45	08:40 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38	12:20 (1)				
	16:36		17:36	10	08:50 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	13	12:33 (1)			
17	08:35		07:43	08:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39	12:20 (1)					
	16:38		17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	16:05	14	12:34 (1)				
18	08:33		07:41	08:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	12:21 (1)					
	16:40		17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:05	15	12:36 (1)				
19	08:32		07:39	08:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	12:21 (1)					
	16:41		17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	16	12:37 (1)				
20	08:31		07:37	08:32	06:16	05:18	04:56	05:20	06:12	07:06	08:01	08:01	08:41	12:21 (1)					
	16:43		17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:06	16	12:37 (1)				
21	08:30		07:34	08:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	12:22 (1)					
	16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	16	12:38 (1)				
22	08:29		07:32	08:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42	12:21 (1)					
	16:47		17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:07	17	12:38 (1)				
23	08:27		07:30	08:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	12:23 (1)					
	16:49		17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	16:07	16	12:39 (1)				
24	08:26		07:28	08:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43	12:23 (1)					
	16:51		17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:08	16	12:39 (1)				
25	08:25		07:25	08:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09	08:43	12:23 (1)					
	16:52		17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	16:08	16	12:39 (1)				
26	08:23		07:23	08:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:09 (2)	08:11	12:39 (1)					
	16:54		17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	11	08:20 (2)	16:15					
27	08:22		07:21	08:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13	08:43	12:26 (1)					
	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	17	08:23 (2)	16:14	16:10	13	12:39 (1)		
28	08:20		08:49 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:05 (2)	08:14	08:44	12:27 (1)			
	16:58	2	08:51 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	19	08:24 (2)	16:13	16:11	12	12:39 (1)	
29	08:19		08:47 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:03 (2)	08:16	08:44	12:29 (1)			
	17:00	5	08:52 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	22	08:25 (2)	16:12	16:11	9	12:38 (1)	
30	08:17		08:45 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:03 (2)	08:18	08:44	12:31 (1)			
	17:02	9	08:54 (2)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	24	08:27 (2)	16:11	16:12	6	12:37 (1)	
31	08:15		08:44 (2)		07:04		05:04		05:37	06:31		07:22	08:03 (2)		08:44				
	17:04	11	08:55 (2)		19:58		21:44		21:27	20:21		16:56	25	08:28 (2)		16:13			
Potential sun hours	250		273		367		420		494		510		512		460		382		328
Total, worst case	27		345										118		254				233
Sun reduction	0.24		0.23										0.29		0.27				0.21
Oper. time red.	1.00		1.00										1.00		1.00				1.00
Wind dir. red.	0.61		0.61										0.61		0.61				0.62
Total reduction	0.15		0.14										0.18		0.16				0.13
Total, real	4		49										21		41				30

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FA - H157

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
2	16:15	17:06	09:01 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:10
3	08:44	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
4	16:16	17:08	09:01 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
5	08:44	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
6	16:17	17:10	09:01 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:08
7	08:43	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
8	16:18	17:12	09:01 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
9	08:43	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25
10	16:20	17:14	09:02 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
11	08:43	08:05	08:35 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
12	16:21	17:16	09:02 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:07
13	08:42	08:03	08:35 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
14	16:22	17:18	09:01 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
15	08:42	08:01	08:35 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
16	16:24	17:20	09:01 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
17	08:41	07:59	08:36 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
18	16:25	17:22	09:01 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:05
19	08:41	07:57	08:37 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32
20	16:27	17:24	09:00 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
21	08:40	07:55	08:38 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
22	16:28	17:26	08:59 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
23	08:39	07:53	08:39 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34
24	16:30	17:28	08:58 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
25	08:38	07:51	08:41 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
26	16:31	17:30	08:57 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:05
27	08:37	07:49	08:43 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
28	16:33	17:32	08:53 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:05
29	08:36	07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
30	16:34	17:34		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
31	08:36	07:45		06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38
32	16:36	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
33	08:35	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
34	16:38	17:38		18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
35	08:33	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39
36	16:40	17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
37	08:32	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:40
38	16:41	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:05
39	08:31	07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:41
40	16:43	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:06
41	08:30	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:41
42	16:45	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:06
43	08:29	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
44	16:47	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:07
45	08:27	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
46	16:49	17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:07
47	08:26	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
48	16:51	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:08
49	08:25	07:25		06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:43
50	16:52	17:54		18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:08
51	08:23	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:44
52	16:54	17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:09
53	08:22	07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:44
54	16:56	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:10
55	08:20	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:44
56	16:58	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:11
57	08:19	07:18		07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:44
58	17:00	11		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:11
59	08:17	07:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:44
60	17:02	13		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:12
61	08:15	07:14		07:04		05:04		05:37	06:31		07:22	08:44
62	17:04	16		19:58	21:44	21:27	20:21	21:27	20:21	16:56	22	16:13
Potential sun hours	250	273		367	420	494	510	512	460	382	259	233
Total, worst case	55	309									72	
Sun reduction	0.24	0.23									0.29	
Oper. time red.	1.00	1.00									1.00	
Wind dir. red.	0.61	0.61									0.61	
Total reduction	0.15	0.14									0.18	
Total, real	8	44									13	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FB - H158

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	09:47 (3)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19	11:16 (1)
2	16:15	53 12:04 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:10	29 11:45 (1)
3	08:44	09:48 (3)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21	11:16 (1)
4	16:16	52 12:05 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	30 11:46 (1)
5	08:44	09:49 (3)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22	11:14 (1)
6	16:17	48 12:04 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	33 11:47 (1)
7	08:43	09:51 (3)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24	11:14 (1)
8	16:18	46 12:05 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	35 11:49 (1)
9	08:43	11:26 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25	11:14 (1)
10	16:20	38 12:04 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	35 11:49 (1)
11	08:43	11:28 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27	11:14 (1)
12	16:21	37 12:05 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	37 11:51 (1)
13	08:42	11:29 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28	11:13 (1)
14	16:22	35 12:04 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	38 11:51 (1)
15	08:42	11:29 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29	11:51 (1)
16	16:24	34 12:03 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	46 11:53 (1)
17	08:41	11:31 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30	11:58 (1)
18	16:25	33 12:04 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	48 11:53 (1)
19	08:41	11:32 (1)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32	11:53 (1)
20	16:27	31 12:03 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	51 11:54 (1)
21	08:40	11:34 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33	11:59 (1)
22	16:28	29 12:03 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	53 11:54 (1)
23	08:39	11:35 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34	11:58 (1)
24	16:30	27 12:02 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	55 11:56 (1)
25	08:38	11:37 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35	11:57 (1)
26	16:31	24 12:01 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	56 11:56 (1)
27	08:37	11:39 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36	11:57 (1)
28	16:33	20 11:59 (1)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31	58 11:57 (1)
29	08:36	11:42 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37	11:58 (1)
30	16:35	16 11:58 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	59 11:58 (1)
31	08:36	11:46 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38	11:59 (1)
1	16:36	8 11:54 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	60 11:57 (1)
2	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:41	09:26	11:58 (1)
3	16:38	17:38	22 08:31 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	61 11:58 (1)
4	08:33	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39	09:27	11:59 (1)
5	16:40	17:40	24 08:31 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	62 11:59 (1)
6	08:32	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:38	09:27	11:59 (1)
7	16:41	17:42	25 08:30 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	63 12:00 (1)
8	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:37	09:28	11:59 (1)
9	16:43	17:44	25 08:30 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	64 12:00 (1)
10	08:30	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:36	09:27	11:59 (1)
11	16:45	17:46	24 08:30 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:20	65 12:01 (1)
12	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:35	09:28	11:59 (1)
13	16:47	17:48	22 08:28 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	66 12:01 (1)
14	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:35	09:28	11:59 (1)
15	16:49	17:50	20 08:27 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	67 12:02 (1)
16	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:37	09:28	11:59 (1)
17	16:51	17:52	18 08:26 (2)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	68 12:02 (1)
18	08:25	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:37	09:29	11:59 (1)
19	16:52	17:54	15 08:24 (2)	18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:09	16:16	69 12:02 (1)
20	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:41	09:30	11:59 (1)
21	16:54	17:56	9 08:21 (2)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:15	70 12:03 (1)
22	08:22	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:43	09:32	11:59 (1)
23	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	16:59	16:14	71 12:03 (1)
24	08:20	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:45	09:34	11:59 (1)
25	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:57	16:13	72 12:04 (1)
26	08:19	07:18	07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:47	09:36	11:59 (1)
27	17:00	19:55	19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:57	16:12	73 12:04 (1)
28	08:17	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:19	09:15	10:11	11:07	74 12:04 (1)
29	17:02	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	7 07:57 (2)	16:11	27 11:43 (1)	75 12:04 (1)
30	08:15	07:04	05:04	04:57	05:37	06:31	07:22	08:17	09:13	10:09	11:05	12:01	76 12:04 (1)
31	17:04	19:58	21:44	22:33	23:27	24:21	25:15	26:09	27:03	28:00	29:00	30:00	77 12:04 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	1624
Total, worst case	531	277											1624
Sun reduction	0.24	0.23											0.21
Oper. time red.	1.00	1.00											1.00
Wind dir. red.	0.60	0.64											0.60
Total reduction	0.15	0.15											0.12
Total, real	77	41											201

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FC - H159

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FD - H160

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FE - H161

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
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6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FF - H162

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

6918 Kellystown

5 no. turbine Wind Farm, Co. Louth

Jennings O'Donovan

F91 RHH9 Sligo

+353719161416

Kathlyn Feeney / kfeeney@jodireland.com

Calculated

28/03/2025 11:16/4.0.552

Calculation: Kellystown N149 Worst Case Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FH - H164

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FI - H165

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FJ - H166

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:20 (5)	08:14	15:46 (4)	07:16	17:10 (3)	07:01	05:52	05:03		
	16:15	17	15:37 (5)	17:06	39	16:25 (4)	18:02	24	17:34 (3)	20:00	20:55
2	08:44	15:20 (5)	08:12	15:46 (4)	07:14	17:10 (3)	06:59		05:50	05:02	
	16:16	19	15:39 (5)	17:08	39	16:25 (4)	18:04	24	17:34 (3)	20:02	20:57
3	08:44	15:20 (5)	08:10	15:46 (4)	07:12	17:10 (3)	06:56		19:32 (2)	05:48	05:01
	16:17	19	15:39 (5)	17:10	39	16:25 (4)	18:06	23	17:33 (3)	20:04	20:59
4	08:43	15:21 (5)	08:08	15:47 (4)	07:09	17:11 (3)	06:54		19:27 (2)	05:46	05:00
	16:18	20	15:41 (5)	17:12	38	16:25 (4)	18:07	22	17:33 (3)	20:06	21:01
5	08:43	15:21 (5)	08:07	15:47 (4)	07:07	17:12 (3)	06:51		19:24 (2)	05:44	04:59
	16:19	21	15:42 (5)	17:14	37	16:24 (4)	18:09	19	17:31 (3)	20:07	21:03
6	08:43	15:22 (5)	08:05	15:48 (4)	07:04	17:14 (3)	06:49		19:22 (2)	05:42	04:59
	16:21	22	15:44 (5)	17:16	36	16:24 (4)	18:11	15	17:29 (3)	20:09	21:04
7	08:42	15:22 (5)	08:03	15:49 (4)	07:02	17:15 (3)	06:47		19:19 (2)	05:40	04:58
	16:22	22	15:44 (5)	17:18	34	16:23 (4)	18:13	11	17:26 (3)	20:11	21:06
8	08:42	15:22 (5)	08:01	15:49 (4)	07:00		06:44		19:18 (2)	05:38	04:57
	16:24	22	15:44 (5)	17:20	34	16:23 (4)	18:15		19:46 (2)	21:08	21:53
9	08:41	15:23 (5)	07:59	15:50 (4)	06:57		06:42		19:17 (2)	05:36	04:57
	16:25	23	15:46 (5)	17:22	32	16:22 (4)	18:17		20:15	31	19:48 (2)
10	08:40	15:24 (5)	07:57	15:52 (4)	06:55		06:39		19:15 (2)	05:34	04:56
	16:26	22	15:46 (5)	17:24	29	16:21 (4)	18:19		20:17	34	19:49 (2)
11	08:40	15:24 (5)	07:55	15:53 (4)	06:52		06:37		19:15 (2)	05:33	04:56
	16:28	22	15:46 (5)	17:26	27	16:20 (4)	18:21		20:19	35	19:50 (2)
12	08:39	15:25 (5)	07:53	15:55 (4)	06:50		06:35		19:14 (2)	05:31	04:55
	16:30	24	15:54 (4)	17:28	24	16:19 (4)	18:23		20:20	37	19:51 (2)
13	08:38	15:25 (5)	07:51	15:56 (4)	06:48		06:32		19:13 (2)	05:29	04:55
	16:31	26	15:55 (4)	17:30	20	16:16 (4)	18:25		20:22	37	19:50 (2)
14	08:37	15:26 (5)	07:49	16:00 (4)	06:45		06:30		19:13 (2)	05:27	04:55
	16:33	27	15:57 (4)	17:32	13	16:13 (4)	18:27		20:24	37	19:50 (2)
15	08:36	15:27 (5)	07:47		06:43		06:28		19:13 (2)	05:26	04:54
	16:34	29	15:59 (4)	17:34		18:28	20:26	37	19:50 (2)	21:20	21:58
16	08:35	15:27 (5)	07:45		06:40		06:25		19:13 (2)	05:24	04:54
	16:36	30	16:00 (4)	17:36		18:30	20:28	37	19:50 (2)	21:22	21:59
17	08:34	15:28 (5)	07:43		06:38		06:23		19:12 (2)	05:22	04:54
	16:38	32	16:02 (4)	17:38		18:32	20:30	37	19:49 (2)	21:23	21:59
18	08:33	15:30 (5)	07:41		06:35		06:21		19:12 (2)	05:21	04:54
	16:40	33	16:05 (4)	17:40		18:34	20:31	37	19:49 (2)	21:25	22:00
19	08:32	15:32 (5)	07:39		06:33		06:18		19:13 (2)	05:19	04:54
	16:41	33	16:07 (4)	17:42		18:36	20:33	36	19:49 (2)	21:27	22:00
20	08:31	15:33 (5)	07:36		06:31		06:16		19:13 (2)	05:18	04:54
	16:43	32	16:08 (4)	17:44		18:38	20:35	35	19:48 (2)	21:28	22:00
21	08:30	15:37 (5)	07:34	17:17 (3)	06:28		06:14		19:13 (2)	05:16	04:54
	16:45	28	16:11 (4)	17:46	1	17:18 (3)	18:40		20:37	34	19:47 (2)
22	08:29	15:45 (4)	07:32	17:14 (3)	06:26		06:12		19:13 (2)	05:15	04:55
	16:47	27	16:12 (4)	17:48	5	17:19 (3)	18:42		20:39	33	19:46 (2)
23	08:27	15:46 (4)	07:30	17:13 (3)	06:23		06:09		19:14 (2)	05:13	04:55
	16:49	29	16:15 (4)	17:50	9	17:22 (3)	18:43		20:41	31	19:45 (2)
24	08:26	15:45 (4)	07:28	17:12 (3)	06:21		06:07		19:15 (2)	05:12	04:55
	16:50	32	16:17 (4)	17:52	12	17:24 (3)	18:45		20:43	29	19:44 (2)
25	08:24	15:45 (4)	07:25	17:11 (3)	06:18		06:05		19:16 (2)	05:11	04:55
	16:52	34	16:19 (4)	17:54	15	17:26 (3)	18:47		20:44	27	19:43 (2)
26	08:23	15:45 (4)	07:23	17:11 (3)	06:16		06:03		19:18 (2)	05:09	04:56
	16:54	36	16:21 (4)	17:56	17	17:28 (3)	18:49		20:46	23	19:41 (2)
27	08:22	15:45 (4)	07:21	17:11 (3)	06:13		06:01		19:20 (2)	05:08	04:56
	16:56	38	16:23 (4)	17:58	20	17:31 (3)	18:51		20:48	19	19:39 (2)
28	08:20	15:45 (4)	07:18	17:10 (3)	06:11		05:58		19:22 (2)	05:07	04:57
	16:58	39	16:24 (4)	18:00	22	17:32 (3)	18:53		20:50	14	19:36 (2)
29	08:18	15:45 (4)			07:08		05:56		19:27 (2)	05:06	04:57
	17:00	39	16:24 (4)		19:54		20:52	5	19:32 (2)	21:41	22:01
30	08:17	15:45 (4)			07:06		05:54			05:05	04:58
	17:02	39	16:24 (4)		19:56		20:54			21:43	22:00
31	08:15	15:45 (4)			07:04					05:04	
	17:04	39	16:24 (4)		19:58					21:44	
Potential sun hours	250		273		367		420		494		510
Total, worst case	875		542		138		750				
Sun reduction	0.24		0.23		0.27		0.35				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.66		0.66		0.68		0.67				
Total reduction	0.16		0.15		0.18		0.23				
Total, real	140		84		25		176				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FJ - H166

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:14 (2) 19:05	07:26 16:54	15:21 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	19:14 (2) 19:02	07:28 16:52	15:20 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	19:14 (2) 19:00	07:28 16:50	15:19 (4) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	19:15 (2) 18:57	07:30 16:48	15:18 (4) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	19:16 (2) 18:55	07:32 16:46	15:17 (4) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	19:18 (2) 18:52	07:34 16:44	15:17 (4) 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	19:19 (2) 18:50	07:36 16:43	15:16 (4) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	19:21 (2) 18:48	07:38 16:41	15:16 (4) 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	19:22 (2) 18:45	07:40 16:39	15:16 (4) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	19:31 (2) 18:43	07:42 16:37	15:17 (4) 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:40 18:07 (3)	07:44 16:35	15:17 (4) 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:38 18:08 (3)	07:45 16:34	15:17 (4) 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:36 18:07 (3)	07:47 16:32	15:17 (4) 16:05
14	05:12 21:51	06:01 20:59	19:33 (2) 19:41 (2)	06:56 19:47	07:50 18:04 (3)	15:17 (4) 16:04
15	05:13 21:50	06:03 20:57	19:29 (2) 19:45 (2)	06:58 19:44	07:52 18:02 (3)	15:17 (4) 16:05
16	05:14 21:49	06:04 20:55	19:26 (2) 19:46 (2)	06:59 19:42	07:54 18:00 (3)	15:18 (4) 16:05
17	05:16 21:47	06:06 20:53	19:24 (2) 19:48 (2)	07:01 19:39	07:55 18:26	15:18 (4) 16:05
18	05:17 21:46	06:08 20:51	19:23 (2) 19:49 (2)	07:03 19:37	07:57 18:24	15:19 (4) 16:05
19	05:18 21:45	06:10 20:48	19:21 (2) 19:50 (2)	07:05 19:34	07:59 18:22	15:20 (4) 16:05
20	05:20 21:44	06:12 20:46	19:20 (2) 19:51 (2)	07:06 19:32	08:01 18:20	15:20 (4) 16:06
21	05:21 21:42	06:13 20:44	19:19 (2) 19:52 (2)	07:08 19:29	08:03 18:17	15:21 (5) 16:06
22	05:23 21:41	06:15 20:42	19:17 (2) 19:51 (2)	07:10 19:27	08:05 18:15	15:09 (5) 16:06
23	05:24 21:39	06:17 20:39	19:17 (2) 19:52 (2)	07:12 19:24	08:07 18:13	15:08 (5) 16:07
24	05:26 21:38	06:19 20:37	19:16 (2) 19:53 (2)	07:13 19:22	08:09 18:11	15:07 (5) 16:08
25	05:27 21:36	06:20 20:35	19:15 (2) 19:52 (2)	07:15 19:19	08:09 17:09	15:07 (5) 16:08
26	05:29 21:35	06:22 20:32	19:15 (2) 19:52 (2)	07:17 19:17	08:11 17:06	15:06 (5) 16:09
27	05:30 21:33	06:24 20:30	19:15 (2) 19:52 (2)	07:19 19:14	08:13 17:04	15:06 (5) 16:10
28	05:32 21:32	06:26 20:28	19:14 (2) 19:51 (2)	07:21 19:12	08:14 17:02	15:06 (5) 16:12
29	05:34 21:30	06:27 20:25	19:14 (2) 19:51 (2)	07:22 19:09	08:16 17:00	15:06 (5) 16:12
30	05:35 21:28	06:29 20:23	19:14 (2) 19:51 (2)	07:24 19:07	08:18 16:58	15:06 (5) 16:12
31	05:37 21:27	06:31 20:21	19:13 (2) 19:50 (2)	07:22 16:56	15:22 (4) 15:49 (4)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		552	207	335	1007	516
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.66
Total reduction		0.23	0.21	0.20	0.18	0.14
Total, real		125	44	66	177	70

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FK - H167

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		14:39 (4)	08:14		16:16 (3)	07:16		16:56 (2)	07:01		05:52			05:03		
	16:15	20	14:59 (4)	17:06	18	16:34 (3)	18:02	35	17:31 (2)	20:00		20:55			21:45		
2	08:44		14:41 (4)	08:12		16:16 (3)	07:14		16:54 (2)	06:59		20:50			05:02		
	16:16	18	14:59 (4)	17:08	21	16:37 (3)	18:04	36	17:30 (2)	20:02		20:57			21:46		
3	08:44		14:41 (4)	08:10		16:16 (3)	07:12		16:54 (2)	06:56		20:54			05:01		
	16:17	17	14:58 (4)	17:10	23	16:39 (3)	18:06	37	17:31 (2)	20:04		20:59			21:48		
4	08:43		14:43 (4)	08:08		16:17 (3)	07:09		16:54 (2)	06:54		20:56			05:00		
	16:18	16	14:59 (4)	17:12	22	16:39 (3)	18:07	37	17:31 (2)	20:06		21:01			21:49		
5	08:43		14:44 (4)	08:07		16:17 (3)	07:07		16:54 (2)	06:51		20:54			04:59		
	16:19	14	14:58 (4)	17:14	22	16:39 (3)	18:09	37	17:31 (2)	20:07		21:03			21:50		
6	08:43		14:46 (4)	08:05		16:18 (3)	07:04		16:54 (2)	06:49		20:52			04:58		
	16:21	12	14:58 (4)	17:16	20	16:38 (3)	18:11	37	17:31 (2)	20:09		21:04			21:51		
7	08:42		14:47 (4)	08:03		16:19 (3)	07:02		16:53 (2)	06:47		20:50			04:58		
	16:22	9	14:56 (4)	17:18	19	16:38 (3)	18:13	37	17:30 (2)	20:11		21:06			21:52		
8	08:42		14:51 (4)	08:01		16:20 (3)	07:00		16:54 (2)	06:44		20:53			04:57		
	16:24	2	14:53 (4)	17:20	17	16:37 (3)	18:15	36	17:30 (2)	20:13		21:08			21:53		
9	08:41			07:59		16:22 (3)	06:57		16:54 (2)	06:42		20:56			04:57		
	16:25			17:22	13	16:35 (3)	18:17	34	17:28 (2)	20:15		21:10			21:54		
10	08:40			07:57		16:24 (3)	06:55		16:55 (2)	06:39		20:54			04:56		
	16:26			17:24	9	16:33 (3)	18:19	33	17:28 (2)	20:17		21:11			21:55		
11	08:40			07:55			06:53		16:56 (2)	06:37		20:53			04:56		
	16:28			17:26			18:21	31	17:27 (2)	20:19		21:13			21:55		
12	08:39			07:53			06:50		16:56 (2)	06:35		20:51			04:55		
	16:30			17:28			18:23	29	17:25 (2)	20:20		21:15			21:56		
13	08:38			07:51			06:48		16:58 (2)	06:32		20:52			04:55		
	16:31			17:30			18:25	26	17:24 (2)	20:22		21:17			21:57		
14	08:37			07:49			06:45		16:59 (2)	06:30		20:52			04:55		
	16:33			17:32			18:27	23	17:22 (2)	20:24		21:18			21:58		
15	08:36			07:47			06:43		17:01 (2)	06:28		20:52			04:54		
	16:34			17:34			18:28	19	17:20 (2)	20:26		21:20			21:58		
16	08:35			07:45			06:40		17:04 (2)	06:25		20:54			04:54		
	16:36			17:36			18:30	11	17:15 (2)	20:28		21:22			21:59		
17	08:34			07:43			06:38			06:23		20:52			04:54		
	16:38			17:38			18:32			20:30		21:23			21:59		
18	08:33			07:41			06:35			06:21		20:51			04:54		
	16:40			17:40			18:34			20:31		21:25			22:00		
19	08:32			07:39			06:33			06:18		20:51			04:54		
	16:41			17:42			18:36			20:33		21:27			22:00		
20	08:31			07:36			06:31			06:16		20:51			04:54		
	16:43			17:44			18:38			20:35		21:28			22:00		
21	08:30			07:34		17:10 (2)	06:28			06:14		20:51			04:54		
	16:45			17:46	8	17:18 (2)	18:40			20:37		21:30			22:01		
22	08:29			07:32		17:05 (2)	06:26			06:12		20:51			04:55		
	16:47			17:48	14	17:19 (2)	18:42			20:39		21:31			22:01		
23	08:27			07:30		17:03 (2)	06:23			06:09		20:51			04:55		
	16:49			17:50	19	17:22 (2)	18:43			20:41		21:33			22:01		
24	08:26			07:28		17:02 (2)	06:21			06:07		20:51			04:55		
	16:50			17:52	22	17:24 (2)	18:45			20:43		21:34			22:01		
25	08:24			07:25		16:59 (2)	06:18			06:05		20:51			04:55		
	16:52			17:54	27	17:26 (2)	18:47			20:44		21:36			22:01		
26	08:23		16:18 (3)	07:23		16:58 (2)	06:16			06:03		20:50			04:56		
	16:54	3	16:21 (3)	17:56	30	17:28 (2)	18:49			20:46		21:37			22:01		
27	08:22		16:17 (3)	07:21		16:58 (2)	06:13			06:01		20:50			04:56		
	16:56	6	16:23 (3)	17:58	32	17:30 (2)	18:51			20:48		21:39			22:01		
28	08:20		16:17 (3)	07:18		16:56 (2)	06:11			05:58		20:50			04:57		
	16:58	9	16:26 (3)	18:00	34	17:30 (2)	18:53			20:50		21:40			22:01		
29	08:19		16:16 (3)				07:08			05:56		20:50			04:57		
	17:00	12	16:28 (3)				19:54			20:52		21:41			22:01		
30	08:17		16:16 (3)				07:06			05:54		20:50			04:58		
	17:02	13	16:29 (3)				19:56			20:54		21:43			22:00		
31	08:15		16:15 (3)				07:04					20:54					
	17:04	16	16:31 (3)				19:58					21:44					
Potential sun hours	250			273			367			420		494			510		
Total, worst case	167			370			498										
Sun reduction	0.24			0.23			0.27										
Oper. time red.	1.00			1.00			1.00										
Wind dir. red.	0.65			0.67			0.68										
Total reduction	0.16			0.16			0.18										
Total, real	26			57			91										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FK - H167

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:36 (2) 18:04 (2)	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:34 (2) 18:05 (2)	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:33 (2) 18:05 (2)	07:28 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:32 (2) 18:06 (2)	07:30 16:48
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:31 (2) 18:06 (2)	07:32 16:46
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:31 (2) 18:07 (2)	07:34 16:44
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:29 (2) 18:06 (2)	07:36 16:43
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:29 (2) 18:06 (2)	07:38 16:41
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:29 (2) 18:06 (2)	07:40 16:39
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:28 (2) 18:05 (2)	07:42 16:37
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:29 (2) 18:05 (2)	07:44 16:35
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:29 (2) 18:04 (2)	07:45 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:29 (2) 18:04 (2)	07:47 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:29 (2) 18:03 (2)	07:49 16:31
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:30 (2) 18:02 (2)	07:51 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:31 (2) 17:59 (2)	07:53 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:32 (2) 17:57 (2)	07:55 16:26
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:33 (2) 17:55 (2)	07:57 16:24
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:35 (2) 17:52 (2)	07:59 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:38 (2) 17:50 (2)	08:00 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:43 (2) 17:47 (2)	08:02 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:04 16:06
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:06 16:07
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:55 (2)	08:13 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:43 (2)	08:14 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 18:02 (2)	08:16 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 18:02 (2)	08:18 16:11	08:44 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case			70	624	245	554
Sun reduction			0.32	0.29	0.27	0.21
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.66	0.65
Total reduction			0.22	0.20	0.18	0.13
Total, real			15	123	43	75

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FL - H168

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		15:43 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19		15:25 (2)						
	16:15		17:06	24	16:07 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10		15:34 (2)	9					
2	08:44		08:12		15:44 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26		08:21		15:26 (2)						
	16:16		17:08	22	16:06 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09		15:32 (2)	6					
3	08:44		08:10		15:45 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22		15:29 (2)						
	16:17		17:10	20	16:05 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50		16:08		15:32 (2)	3					
4	08:43		08:08		15:46 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30		08:24		15:29 (2)						
	16:18		17:12	18	16:04 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48		16:08		15:32 (2)						
5	08:43		08:07		15:48 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25		15:30 (2)						
	16:19		17:14	14	16:02 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46		16:07		15:30 (2)	9					
6	08:43		08:05		15:51 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34		08:26		15:32 (2)						
	16:21		17:16	9	16:00 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44		16:07		15:32 (2)	14					
7	08:42		08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36		08:28		15:32 (2)						
	16:22		17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43		16:06		15:32 (2)	18					
8	08:42		08:01			07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38		08:29		15:32 (2)						
	16:23		17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41		16:06		15:32 (2)	20					
9	08:41		15:47 (2)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:30		15:32 (2)						
	16:25	2	15:49 (2)	17:22		18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39		16:05		15:32 (2)	22					
10	08:40		15:44 (2)	07:57		06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42		08:32		15:32 (2)						
	16:26	6	15:50 (2)	17:24		18:19	20:17	21:11	21:55	21:08	19:56	18:42	16:37	24		16:05		15:32 (2)	24					
11	08:40		15:43 (2)	07:55		06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44		08:33		15:32 (2)						
	16:28	9	15:52 (2)	17:26		18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35		16:05		15:32 (2)	26					
12	08:39		15:42 (2)	07:53		06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46		08:34		15:32 (2)						
	16:29	12	15:54 (2)	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34		16:05		15:32 (2)	26					
13	08:38		15:41 (2)	07:51		06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47		08:35		15:32 (2)						
	16:31	14	15:55 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32		16:04		15:32 (2)	28					
14	08:37		15:41 (2)	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49		08:36		15:32 (2)						
	16:33	16	15:57 (2)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31		16:04		15:32 (2)	28					
15	08:36		15:40 (2)	07:47		06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51		08:37		15:32 (2)						
	16:34	19	15:59 (2)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29		16:04		15:32 (2)	28					
16	08:35		15:39 (2)	07:45		06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53		08:38		15:32 (2)						
	16:36	21	16:00 (2)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27		16:05		15:32 (2)	28					
17	08:34		15:39 (2)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55		08:38		15:32 (2)						
	16:38	23	16:02 (2)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26		16:05		15:32 (2)	28					
18	08:33		15:39 (2)	07:41		06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57		08:39		15:32 (2)						
	16:40	24	16:03 (2)	17:40		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24		16:05		15:32 (2)	29					
19	08:32		15:39 (2)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59		08:40		15:32 (2)						
	16:41	25	16:04 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23		16:05		15:32 (2)	28					
20	08:31		15:38 (2)	07:36		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00		08:41		15:32 (2)						
	16:43	26	16:04 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22		16:06		15:32 (2)	28					
21	08:30		15:39 (2)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02		08:41		15:32 (2)						
	16:45	26	16:05 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20		16:06		15:32 (2)	27					
22	08:29		15:38 (2)	07:32		06:26	06:11	05:15	04:55	05:23	06:15	07:10	08:05	08:04		08:42		15:32 (2)						
	16:47	28	16:06 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19		16:06		15:32 (2)	25					
23	08:27		15:39 (2)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		08:42		15:32 (2)						
	16:49	28	16:07 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18		16:07		15:32 (2)	25					
24	08:26		15:39 (2)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08		08:43		15:32 (2)						
	16:50	28	16:07 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17		16:08		15:32 (2)	24					
25	08:25		15:39 (2)	07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09		08:43		15:32 (2)						
	16:52	28	16:07 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16		16:08		15:32 (2)	23					
26	08:23		15:39 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11		08:43		15:32 (2)						
	16:54	28	16:07 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14		16:09		15:32 (2)	21					
27	08:22		15:39 (2)	07:21		06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13		08:44		15:32 (2)						
	16:56	28	16:07 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13		16:10		15:32 (2)	19					
28	08:20		15:40 (2)	07:18		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14		08:44		15:32 (2)						
	16:58	28	16:08 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12		16:10		15:32 (2)	16					
29	08:19		15:40 (2)			07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16		08:44		15:32 (2)						
	17:00	28	16:08 (2)			19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11		16:11		15:32 (2)	14					
30	08:17		15:41 (2)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18		08:44		15:32 (2)						
	17:02	26	16:07 (2)			19:56																		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FM - H169

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March	April	May	June	July	August	September	October	November	December				
1	08:44	10:03 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	09:52 (2)				
2	16:15	72	15:20 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	67	15:06 (1)		
	08:44		10:04 (2)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21		09:52 (2)		
3	16:16	72	15:21 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	69	15:07 (1)		
	08:44		10:04 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22		09:52 (2)		
4	16:17	72	15:21 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08	69	15:07 (1)		
	08:43		10:05 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24		09:52 (2)		
5	16:18	70	15:21 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	70	15:08 (1)		
	08:43		10:05 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25		09:52 (2)		
6	16:20	70	15:21 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	70	15:08 (1)		
	08:43		10:06 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27		09:52 (2)		
7	16:21	70	15:22 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	16:07	71	15:09 (1)		
	08:42		10:07 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28		09:52 (2)		
8	16:22	70	15:23 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	71	15:09 (1)		
	08:42		10:07 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29		09:53 (2)		
9	16:24	70	15:23 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	72	15:10 (1)		
	08:41		10:08 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30		09:53 (2)		
10	16:25	70	15:24 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	72	15:10 (1)		
	08:40		10:09 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32		09:53 (2)		
11	16:27	69	15:24 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	72	15:10 (1)		
	08:40		10:10 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33		09:53 (2)		
12	16:28	67	15:24 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05	72	15:10 (1)		
	08:39		10:10 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34		09:53 (2)		
13	16:30	66	15:24 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	16:05	72	15:10 (1)		
	08:38		10:11 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47	08:35		09:55 (2)		
14	16:31	65	15:25 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05	71	15:11 (1)		
	08:37		10:12 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36		09:55 (2)		
15	16:33	64	15:25 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:05	72	15:12 (1)		
	08:36		10:13 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37		09:55 (2)		
16	16:34	62	15:25 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05	72	15:12 (1)		
	08:35		10:15 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38		09:55 (2)		
17	16:36	59	15:25 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	7	14:49 (1)	16:05	72	15:12 (1)
	08:34		10:15 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39		09:56 (2)		
18	16:38	56	15:24 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	14	14:53 (1)	16:05	72	15:12 (1)
	08:33		10:17 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39		09:56 (2)		
19	16:40	54	15:25 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	18	14:55 (1)	16:05	72	15:13 (1)
	08:32		10:19 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40		09:57 (2)		
20	16:41	50	15:25 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	20	14:56 (1)	16:05	72	15:14 (1)
	08:31		10:20 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:41		09:57 (2)		
21	16:43	45	15:24 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	33	14:58 (1)	16:06	72	15:14 (1)
	08:30		10:22 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41		09:58 (2)		
22	16:45	41	15:24 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	41	14:59 (1)	16:06	71	15:14 (1)
	08:29		10:25 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42		09:58 (2)		
23	16:47	33	15:23 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	45	15:00 (1)	16:06	71	15:14 (1)
	08:27		15:02 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42		09:59 (2)		
24	16:49	20	15:22 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	50	15:01 (1)	16:07	72	15:16 (1)
	08:26		15:03 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43		09:59 (2)		
25	16:51	18	15:21 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	54	15:02 (1)	16:08	72	15:16 (1)
	08:25		15:06 (1)	07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11	08:09	08:43		09:59 (2)		
26	16:52	14	15:20 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09	16:16	56	15:02 (1)	16:08	72	15:16 (1)
	08:23		15:10 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:43		09:53 (2)		
27	16:54	6	15:16 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:07	16:15	59	15:03 (1)	16:09	72	15:17 (1)
	08:22		15:07 (1)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13	08:44		09:53 (2)		
28	16:56		15:17 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	61	15:04 (1)	16:10	72	15:18 (1)
	08:20		15:08 (1)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14	08:44		09:52 (2)		
29	16:58		15:18 (1)	17:59	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	63	15:05 (1)	16:11	72	15:18 (1)
	08:19		15:09 (1)	07:18	06:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16	08:44		09:51 (2)		
30	17:00		15:10 (1)	07:17	06:06	05:52	21:42	22:01	21:30	20:25	19:10	18:00	16:12	65	15:05 (1)	16:11	73	15:19 (1)
	08:17		15:11 (1)	07:16	06:05	05:54	05:05	04:58	05:35	06:29	07:24	08:19	08:17	08:44		09:52 (2)		
31	17:02		15:12 (1)	07:17	06:06	05:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	65	15:05 (1)	16:12	72	15:19 (1)
	08:15		15:13 (1)	07:16	06:05	05:54	05:06	04:58	05:36	06:30	07:25	08:20	08:18	08:44		09:52 (2)		
Potential sun hours	17:04		15:14 (1)	07:18	06:07	05:56	21:44	22:01	21:27	20:21	18:00	16:15	16:13	73	15:19 (1)	16:13	73	15:19 (1)
	250		273	367	420	494	510	512	460	382	328	259	233	2214		2214		
Total, worst case	1425												651			2214		
Sun reduction	0.24												0.27			0.21		
Oper. time red.	1.00												1.00			1.00		
Wind dir. red.	0.62												0.62			0.61		
Total reduction	0.15												0.16			0.13		
Total, real	213												107			281		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FN - H170

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:24 (2)	08:14	15:28 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24			08:19						15:03 (2)		
2	16:15	15:36 (2)	17:06	15:54 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54			15:16 (2)						16:10	15:30 (2)	
	08:44	15:23 (2)	08:12	15:29 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26			08:21						15:04 (2)		
	16:16	15:38 (2)	17:08	15:53 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52			16:09						15:29 (2)		
3	08:44	15:23 (2)	08:10	15:30 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			08:22						15:05 (2)		
	16:17	15:39 (2)	17:10	15:52 (2)	18:06	20:04	20:59	21:48	21:56	21:21	20:13	19:00	16:50			16:08						15:29 (2)		
	08:43	15:23 (2)	08:08	15:32 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30			08:24						15:06 (2)		
4	16:18	15:40 (2)	17:12	15:51 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48			16:08						15:29 (2)		
	08:43	15:22 (2)	08:07	15:34 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32			15:07 (2)						15:07 (2)		
	16:19	15:41 (2)	17:14	15:49 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46			15:16 (2)						15:29 (2)		
5	08:43	15:22 (2)	08:05	15:38 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34			15:03 (2)						15:08 (2)		
	16:21	15:43 (2)	17:16	15:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44			15:19 (2)						15:29 (2)		
	08:42	15:22 (2)	08:03	15:36 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36			15:01 (2)						15:09 (2)		
6	16:22	15:43 (2)	17:18	15:48 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43			15:21 (2)						15:28 (2)		
	08:42	15:21 (2)	08:01	15:32 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38			15:00 (2)						15:10 (2)		
	16:24	15:44 (2)	17:20	15:49 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41			15:22 (2)						15:27 (2)		
7	08:41	15:22 (2)	07:59	15:36 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			14:59 (2)						15:12 (2)		
	16:25	15:46 (2)	17:22	15:50 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39			15:24 (2)						15:28 (2)		
	08:40	15:22 (2)	07:57	15:34 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42			14:58 (2)						15:12 (2)		
8	16:26	15:47 (2)	17:24	15:51 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:42	16:37			15:25 (2)						15:27 (2)		
	08:40	15:21 (2)	07:55	15:38 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44			14:58 (2)						15:14 (2)		
	16:28	15:48 (2)	17:26	15:52 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35			15:26 (2)						15:27 (2)		
9	08:39	15:21 (2)	07:53	15:36 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46			14:57 (2)						15:15 (2)		
	16:30	15:48 (2)	17:28	15:53 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34			15:26 (2)						15:26 (2)		
	08:38	15:21 (2)	07:51	15:38 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47			14:56 (2)						15:16 (2)		
10	16:31	15:49 (2)	17:30	15:54 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32			15:27 (2)						15:25 (2)		
	08:37	15:21 (2)	07:49	15:37 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49			14:56 (2)						15:18 (2)		
	16:33	15:50 (2)	17:32	15:55 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31			15:28 (2)						15:26 (2)		
11	08:36	15:21 (2)	07:47	15:39 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51			14:56 (2)						15:19 (2)		
	16:34	15:51 (2)	17:34	15:56 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29			15:28 (2)						15:24 (2)		
	08:35	15:20 (2)	07:45	15:35 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53			14:56 (2)						15:12 (2)		
12	16:36	15:51 (2)	17:36	15:56 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27			15:28 (2)						15:10 (2)		
	08:34	15:21 (2)	07:43	15:38 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55			14:56 (2)						15:08 (2)		
	16:38	15:52 (2)	17:38	15:57 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26			15:29 (2)						15:05 (2)		
13	08:33	15:21 (2)	07:41	15:37 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57			14:56 (2)						15:08 (2)		
	16:40	15:53 (2)	17:40	15:58 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24			15:29 (2)						15:05 (2)		
	08:32	15:21 (2)	07:39	15:36 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59			14:56 (2)						15:08 (2)		
14	16:41	15:54 (2)	17:42	15:59 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23			15:29 (2)						15:05 (2)		
	08:31	15:21 (2)	07:36	15:34 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00			14:56 (2)						15:08 (2)		
	16:43	15:54 (2)	17:44	15:59 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22			15:29 (2)						15:06 (2)		
15	08:30	15:21 (2)	07:34	15:36 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02			14:56 (2)						15:08 (2)		
	16:45	15:54 (2)	17:46	15:59 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20			15:29 (2)						15:06 (2)		
	08:29	15:21 (2)	07:32	15:38 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04			14:57 (2)						15:08 (2)		
16	16:47	15:54 (2)	17:48	15:59 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19			15:30 (2)						15:06 (2)		
	08:27	15:22 (2)	07:30	15:39 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06			14:57 (2)						15:08 (2)		
	16:49	15:55 (2)	17:50	15:59 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18			15:30 (2)						15:07 (2)		
17	08:26	15:22 (2)	07:28	15:39 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08			14:58 (2)						15:08 (2)		
	16:50	15:55 (2)	17:52	15:59 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17			15:30 (2)						15:08 (2)		
	08:25	15:23 (2)	07:25	15:40 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09			14:59 (2)						15:08 (2)		
18	16:52	15:56 (2)	17:54	15:59 (2)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16			15:30 (2)						15:08 (2)		
	08:23	15:23 (2)	07:23	15:41 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11			14:59 (2)						15:08 (2)		
	16:54	15:55 (2)	17:56	15:59 (2)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14			15:30 (2)						15:09 (2)		
19	08:22	15:23 (2)	07:21	15:42 (2)	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13			15:00 (2)						15:08 (2)		
	16:56	15:55 (2)	17:58	15:59 (2)	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13			15:30 (2)						15:10 (2)		
	08:20	15:24 (2)	07:19	15:43 (2)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14			15:01 (2)						15:08 (2)		
20	16:58	15:56 (2)	18:00	15:59 (2)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12			15:30 (2)						15:10 (2)		
	08:19	15:25 (2)		15:44 (2)	17:09	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16			15:01 (2)						15:08 (2)		
	17:00	15:55 (2)		15:55 (2)	19:55	05:52	21:41	22:0																

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FO - H171

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:11 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FP - H172

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FQ - H173

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FR - H174

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FS - H175

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	17:02 (4)	07:01	05:52
	16:15	17:06	18:02	18	17:20 (4)	20:00
2	08:44	08:12	07:14	17:03 (4)	06:59	20:55
	16:16	17:08	18:04	15	17:18 (4)	20:57
3	08:43	08:10	07:11	17:06 (4)	06:56	19:34 (2)
	16:17	17:10	18:05	9	17:15 (4)	20:04
4	08:43	08:08	07:09		06:54	19:32 (2)
	16:18	17:12	18:07		20:06	7
5	08:43	08:07	07:07		06:51	19:30 (2)
	16:19	17:14	18:09		20:07	10
6	08:42	08:05	07:04		06:49	19:29 (2)
	16:21	17:16	18:11		20:09	13
7	08:42	08:03	07:02		06:47	19:27 (2)
	16:22	17:18	18:13		20:11	16
8	08:42	08:01	07:00		06:44	19:27 (2)
	16:24	17:20	18:15		20:13	19
9	08:41	07:59	06:57		06:42	19:27 (2)
	16:25	17:22	18:17		20:15	21
10	08:40	07:57	06:55		06:39	19:26 (2)
	16:26	17:24	18:19		20:17	23
11	08:40	07:55	06:52		06:37	19:26 (2)
	16:28	17:26	18:21		20:18	23
12	08:39	07:53	06:50		06:35	19:26 (2)
	16:30	17:28	18:23		20:20	22
13	08:38	07:51	06:48		06:32	19:26 (2)
	16:31	17:30	18:25		20:22	21
14	08:37	07:49	06:45		06:30	19:27 (2)
	16:33	17:32	18:27		20:24	19
15	08:36	07:47	06:43		06:28	19:28 (2)
	16:34	17:34	18:28		20:26	17
16	08:35	07:45	17:05 (4)	06:40	06:25	19:29 (2)
	16:36	17:36	2	17:07 (4)	20:28	13
17	08:34	07:43	17:04 (4)	06:38	06:23	19:31 (2)
	16:38	17:38	5	17:09 (4)	20:30	9
18	08:33	07:41	17:02 (4)	06:35	06:21	05:21
	16:40	17:40	9	17:11 (4)	20:31	21:25
19	08:32	07:39	17:01 (4)	06:33	06:18	05:19
	16:41	17:42	12	17:13 (4)	20:33	21:27
20	08:31	07:36	17:00 (4)	06:31	06:16	05:18
	16:43	17:44	16	17:16 (4)	20:35	21:28
21	08:30	07:34	17:00 (4)	06:28	06:14	05:16
	16:45	17:46	18	17:18 (4)	20:37	21:30
22	08:28	07:32	16:59 (4)	06:26	06:11	05:15
	16:47	17:48	20	17:19 (4)	20:39	21:31
23	08:27	07:30	16:59 (4)	06:23	06:09	05:13
	16:49	17:50	23	17:22 (4)	20:41	21:33
24	08:26	07:28	16:59 (4)	06:21	06:07	05:12
	16:50	17:52	25	17:24 (4)	20:42	21:34
25	08:24	07:25	16:59 (4)	06:18	06:05	05:11
	16:52	17:54	25	17:24 (4)	20:44	21:36
26	08:23	07:23	16:59 (4)	06:16	06:03	05:09
	16:54	17:56	25	17:24 (4)	20:46	21:37
27	08:22	07:21	17:00 (4)	06:13	06:00	05:08
	16:56	17:58	23	17:23 (4)	20:48	21:39
28	08:20	07:18	17:01 (4)	06:11	05:58	05:07
	16:58	18:00	20	17:21 (4)	20:50	21:40
29	08:18			07:08	05:56	05:06
	17:00			19:54	20:52	21:41
30	08:17			07:06	05:54	05:05
	17:02			19:56	20:53	21:43
31	08:15			07:04		05:04
	17:04			19:58		21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case		223	42	236		
Sun reduction		0.23	0.27	0.35		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.67	0.67	0.67		
Total reduction		0.16	0.18	0.23		
Total, real		35	8	55		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FS - H175

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:25 (2) 19:48 (2)	07:26 19:05	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	19:25 (2) 19:48 (2)	07:28 19:02	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	19:24 (2) 19:45 (2)	07:30 19:00	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	19:24 (2) 19:43 (2)	07:31 18:57	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	19:24 (2) 19:41 (2)	07:33 18:55	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	19:25 (2) 19:39 (2)	07:35 18:52	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	19:25 (2) 19:35 (2)	07:37 18:50	08:28 16:06
8	05:05 21:56	05:50 21:11	06:45 20:01	19:26 (2) 19:33 (2)	07:39 18:48	08:29 16:06
9	05:06 21:55	05:52 21:09	06:47 19:59	19:28 (2) 19:31 (2)	07:41 18:45	08:30 16:05
10	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	16:39 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:39 (4) 17:51 (4)	08:33 16:35
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:36 (4) 17:53 (4)	08:34 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:35 (4) 17:54 (4)	08:35 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:33 (4) 17:55 (4)	08:36 16:31
15	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	17:32 (4) 17:56 (4)	08:37 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:31 (4) 17:56 (4)	08:38 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:31 (4) 17:56 (4)	08:38 16:26
18	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	17:31 (4) 17:55 (4)	08:39 16:24
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:30 (4) 17:52 (4)	08:40 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:30 (4) 17:50 (4)	08:41 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:30 (4) 17:48 (4)	08:42 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:31 (4) 17:45 (4)	08:43 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:31 (4) 17:43 (4)	08:44 16:18
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:32 (4) 17:41 (4)	08:43 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	16:33 (4) 16:38 (4)	08:09 16:16
26	05:29 21:35	06:22 20:32	19:34 (2) 19:43 (2)	07:17 17:13	16:35 (4) 16:36 (4)	16:16 16:14
27	05:30 21:33	06:24 20:30	19:31 (2) 19:45 (2)	07:19 17:04	16:36 (4) 16:13	16:09 16:10
28	05:32 21:32	06:26 20:28	19:29 (2) 19:46 (2)	07:21 17:02	16:14 16:12	16:08 16:10
29	05:34 21:30	06:27 20:25	19:28 (2) 19:47 (2)	07:22 17:00	16:16 16:11	16:08 16:11
30	05:35 21:28	06:29 20:23	19:27 (2) 19:48 (2)	07:24 16:58	16:18 16:11	16:08 16:12
31	05:37 21:26	06:31 20:21	19:25 (2) 19:47 (2)	07:22 16:56	16:11 16:13	16:12 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		102		137	269	
Sun reduction		0.34		0.32	0.29	
Oper. time red.		1.00		1.00	1.00	
Wind dir. red.		0.67		0.67	0.67	
Total reduction		0.23		0.21	0.20	
Total, real		23		29	53	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FT - H176

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May		June
1	08:44		15:15 (5)	08:14		15:40 (4)	07:16		17:05 (3)	07:01		19:04 (2)	05:52		05:03
	16:15	22	15:37 (5)	17:06	33	16:13 (4)	18:02	17	17:22 (3)	20:00	29	19:33 (2)	20:55		21:45
2	08:44		15:16 (5)	08:12		15:40 (4)	07:14		17:06 (3)	06:59		19:02 (2)	05:50		05:02
	16:16	22	15:38 (5)	17:08	32	16:12 (4)	18:04	14	17:20 (3)	20:02	33	19:35 (2)	20:57		21:46
3	08:44		15:16 (5)	08:10		15:41 (4)	07:12		17:09 (3)	06:56		19:02 (2)	05:48		05:01
	16:17	22	15:39 (4)	17:10	31	16:12 (4)	18:06	8	17:17 (3)	20:04	34	19:36 (2)	20:59		21:48
4	08:43		15:17 (5)	08:08		15:42 (4)	07:09			06:54		19:01 (2)	05:46		05:00
	16:18	24	15:41 (4)	17:12	29	16:11 (4)	18:07			20:06	36	19:37 (2)	21:01		21:49
5	08:43		15:17 (5)	08:07		15:44 (4)	07:07			06:51		19:00 (2)	05:44		04:59
	16:19	25	15:42 (4)	17:14	26	16:10 (4)	18:09			20:07	36	19:36 (2)	21:03		21:50
6	08:43		15:18 (5)	08:05		15:45 (4)	07:04			06:49		19:00 (2)	05:42		04:59
	16:21	26	15:44 (4)	17:16	23	16:08 (4)	18:11			20:09	37	19:37 (2)	21:04		21:51
7	08:42		15:18 (5)	08:03		15:47 (4)	07:02			06:47		18:59 (2)	05:40		04:58
	16:22	27	15:45 (4)	17:18	20	16:07 (4)	18:13			20:11	37	19:36 (2)	21:06		21:52
8	08:42		15:19 (5)	08:01		15:50 (4)	07:00			06:44		18:59 (2)	05:38		04:57
	16:24	27	15:46 (4)	17:20	15	16:05 (4)	18:15			20:13	37	19:36 (2)	21:08		21:53
9	08:41		15:20 (5)	07:59		15:54 (4)	06:57			06:42		18:59 (2)	05:36		04:57
	16:25	29	15:49 (4)	17:22	6	16:00 (4)	18:17			20:15	37	19:36 (2)	21:10		21:54
10	08:40		15:21 (5)	07:57			06:55			06:39		18:59 (2)	05:34		04:56
	16:26	29	15:50 (4)	17:24			18:19			20:17	35	19:34 (2)	21:11		21:55
11	08:40		15:21 (5)	07:55			06:52			06:37		18:59 (2)	05:33		04:56
	16:28	31	15:52 (4)	17:26			18:21			20:19	35	19:34 (2)	21:13		21:55
12	08:39		15:22 (5)	07:53			06:50			06:35		19:00 (2)	05:31		04:55
	16:30	32	15:54 (4)	17:28			18:23			20:20	34	19:34 (2)	21:15		21:56
13	08:38		15:23 (5)	07:51			06:48			06:32		19:00 (2)	05:29		04:55
	16:31	32	15:55 (4)	17:30			18:25			20:22	32	19:32 (2)	21:17		21:57
14	08:37		15:24 (5)	07:49			06:45			06:30		19:01 (2)	05:27		04:55
	16:33	33	15:57 (4)	17:32			18:27			20:24	30	19:31 (2)	21:18		21:58
15	08:36		15:26 (5)	07:47			06:43			06:28		19:02 (2)	05:26		04:54
	16:34	33	15:59 (4)	17:34			18:28			20:26	28	19:30 (2)	21:20		21:58
16	08:35		15:27 (5)	07:45			06:40			06:25		19:03 (2)	05:24		04:54
	16:36	33	16:00 (4)	17:36			18:30			20:28	26	19:29 (2)	21:22		21:59
17	08:34		15:29 (5)	07:43		17:08 (3)	06:38			06:23		19:04 (2)	05:22		04:54
	16:38	33	16:02 (4)	17:38	1	17:09 (3)	18:32			20:30	22	19:26 (2)	21:23		21:59
18	08:33		15:35 (4)	07:41		17:05 (3)	06:35			06:21		19:06 (2)	05:21		04:54
	16:40	30	16:05 (4)	17:40	6	17:11 (3)	18:34			20:31	18	19:24 (2)	21:25		22:00
19	08:32		15:36 (4)	07:39		17:05 (3)	06:33			06:18		19:09 (2)	05:19		04:54
	16:41	31	16:07 (4)	17:42	8	17:13 (3)	18:36			20:33	12	19:21 (2)	21:27		22:00
20	08:31		15:35 (4)	07:36		17:04 (3)	06:31			06:16			05:18		04:54
	16:43	33	16:08 (4)	17:44	12	17:16 (3)	18:38			20:35			21:28		22:00
21	08:30		15:35 (4)	07:34		17:04 (3)	06:28			06:14			05:16		04:54
	16:45	36	16:11 (4)	17:46	14	17:18 (3)	18:40			20:37			21:30		22:01
22	08:29		15:35 (4)	07:32		17:02 (3)	06:26			06:12			05:15		04:55
	16:47	36	16:11 (4)	17:48	17	17:19 (3)	18:42			20:39			21:31		22:01
23	08:27		15:36 (4)	07:30		17:02 (3)	06:23			06:09			05:13		04:55
	16:49	36	16:12 (4)	17:50	20	17:22 (3)	18:43			20:41			21:33		22:01
24	08:26		15:35 (4)	07:28		17:03 (3)	06:21			06:07			05:12		04:55
	16:50	37	16:12 (4)	17:52	21	17:24 (3)	18:45			20:43			21:34		22:01
25	08:24		15:36 (4)	07:25		17:02 (3)	06:18			06:05			05:11		04:55
	16:52	37	16:13 (4)	17:54	24	17:26 (3)	18:47			20:44			21:36		22:01
26	08:23		15:36 (4)	07:23		17:03 (3)	06:16			06:03			05:09		04:56
	16:54	37	16:13 (4)	17:56	22	17:25 (3)	18:49			20:46			21:37		22:01
27	08:22		15:36 (4)	07:21		17:03 (3)	06:13			06:01			05:08		04:56
	16:56	37	16:13 (4)	17:58	22	17:25 (3)	18:51	9	18:24 (2)	20:48			21:39		22:01
28	08:20		15:37 (4)	07:18		17:03 (3)	06:11		18:12 (2)	05:58			05:07		04:57
	16:58	36	16:13 (4)	18:00	20	17:23 (3)	18:53	14	18:26 (2)	20:50			21:40		22:01
29	08:18		15:37 (4)				07:08		19:09 (2)	05:56			05:06		04:57
	17:00	36	16:13 (4)				19:54	19	19:28 (2)	20:52			21:41		22:01
30	08:17		15:38 (4)				07:06		19:07 (2)	05:54			05:05		04:58
	17:02	35	16:13 (4)				19:56	23	19:30 (2)	20:54			21:43		22:00
31	08:15		15:38 (4)				07:04		19:05 (2)				05:04		
	17:04	34	16:12 (4)				19:58	26	19:31 (2)				21:44		
Potential sun hours	250			273			367			420			494		510
Total, worst case		971			402			130			588				
Sun reduction		0.24			0.23			0.27			0.35				
Oper. time red.		1.00			1.00			1.00			1.00				
Wind dir. red.		0.66			0.67			0.67			0.67				
Total reduction		0.16			0.16			0.18			0.24				
Total, real		156			62			24			140				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FT - H176
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:58 (2) 19:33 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:58 (2) 19:33 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:56 (2) 19:33 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:56 (2) 19:33 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:56 (2) 19:33 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:56 (2) 19:33 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:55 (2) 19:31 (2)	07:37 16:43	08:28 16:06
8	05:05 21:56	05:50 21:12	06:45 20:01	18:55 (2) 19:31 (2)	07:39 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	18:56 (2) 19:30 (2)	07:41 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:55 (2) 19:28 (2)	07:42 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:56 (2) 19:26 (2)	07:44 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:57 (2) 19:24 (2)	07:45 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:58 (2) 19:22 (2)	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:59 (2) 19:18 (2)	07:49 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	19:01 (2) 19:16 (2)	07:51 16:29	08:37 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	19:04 (2) 19:14 (2)	07:53 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	18:26 18:26	07:55 16:26	08:38 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	18:27 18:24	07:57 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	18:28 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	18:29 18:20	08:00 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	18:20 18:17	08:02 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	18:05 18:15	08:04 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	07:12 19:24	18:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	19:12 (2) 19:25 (2)	07:13 19:22	18:09 18:11	08:43 16:08
25	05:27 21:36	06:20 20:35	19:08 (2) 19:27 (2)	07:15 19:19	17:41 (3) 16:17	08:43 16:08
26	05:29 21:35	06:22 20:32	19:06 (2) 19:29 (2)	07:17 19:17	16:16 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	19:05 (2) 19:31 (2)	07:19 19:14	08:13 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	19:02 (2) 19:31 (2)	07:21 19:12	08:14 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	19:01 (2) 19:32 (2)	07:22 19:09	08:16 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	19:00 (2) 19:33 (2)	07:24 19:07	08:18 16:11	08:44 16:12
31	05:37 21:27	06:31 20:21	18:59 (2) 19:32 (2)	07:22 16:56		08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		207	482	228	907	664
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.66
Total reduction		0.23	0.22	0.20	0.18	0.14
Total, real		48	104	45	159	90

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FU - H177

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		15:10 (5)	08:14		15:33 (4)	07:16		17:04 (3)	07:01		18:59 (2)	05:52		05:03		
	16:15	27	15:37 (4)	17:06	28	16:01 (4)	18:02	11	17:15 (3)	20:00	34	19:33 (2)	20:55		21:45		
2	08:44		15:11 (5)	08:12		15:34 (4)	07:14			06:59		18:58 (2)	05:50		05:02		
	16:16	28	15:39 (4)	17:08	26	16:00 (4)	18:04			20:02	36	19:34 (2)	20:57		21:46		
3	08:44		15:11 (5)	08:10		15:36 (4)	07:12			06:56		18:57 (2)	05:48		05:01		
	16:17	28	15:39 (4)	17:10	22	15:58 (4)	18:06			20:04	37	19:34 (2)	20:59		21:48		
4	08:43		15:12 (5)	08:08		15:38 (4)	07:09			06:54		18:57 (2)	05:46		05:00		
	16:18	29	15:41 (4)	17:12	19	15:57 (4)	18:07			20:06	38	19:35 (2)	21:01		21:49		
5	08:43		15:12 (5)	08:07		15:40 (4)	07:07			06:51		18:56 (2)	05:44		04:59		
	16:19	30	15:42 (4)	17:14	14	15:54 (4)	18:09			20:07	38	19:34 (2)	21:03		21:50		
6	08:43		15:13 (5)	08:05		15:47 (4)	07:04			06:49		18:56 (2)	05:42		04:59		
	16:21	31	15:44 (4)	17:16	1	15:48 (4)	18:11			20:09	38	19:34 (2)	21:04		21:51		
7	08:42		15:14 (5)	08:03			07:02			06:47		18:55 (2)	05:40		04:58		
	16:22	31	15:45 (4)	17:18			18:13			20:11	38	19:33 (2)	21:06		21:52		
8	08:42		15:14 (5)	08:01			07:00			06:44		18:55 (2)	05:38		04:57		
	16:24	32	15:46 (4)	17:20			18:15			20:13	38	19:33 (2)	21:08		21:53		
9	08:41		15:16 (5)	07:59			06:57			06:42		18:55 (2)	05:36		04:57		
	16:25	33	15:49 (4)	17:22			18:17			20:15	38	19:33 (2)	21:10		21:54		
10	08:40		15:17 (5)	07:57			06:55			06:39		18:55 (2)	05:34		04:56		
	16:26	33	15:50 (4)	17:24			18:19			20:17	37	19:32 (2)	21:11		21:55		
11	08:40		15:18 (5)	07:55			06:53			06:37		18:55 (2)	05:33		04:56		
	16:28	34	15:52 (4)	17:26			18:21			20:19	36	19:31 (2)	21:13		21:55		
12	08:39		15:19 (5)	07:53			06:50			06:35		18:56 (2)	05:31		04:55		
	16:30	35	15:54 (4)	17:28			18:23			20:20	35	19:31 (2)	21:15		21:56		
13	08:38		15:21 (5)	07:51			06:48			06:32		18:56 (2)	05:29		04:55		
	16:31	34	15:55 (4)	17:30			18:25			20:22	33	19:29 (2)	21:17		21:57		
14	08:37		15:23 (5)	07:49			06:45			06:30		18:57 (2)	05:27		04:55		
	16:33	34	15:57 (4)	17:32			18:27			20:24	31	19:28 (2)	21:18		21:58		
15	08:36		15:24 (4)	07:47		17:03 (3)	06:43			06:28		18:58 (2)	05:26		04:54		
	16:34	35	15:59 (4)	17:34	2	17:05 (3)	18:28			20:26	29	19:27 (2)	21:20		21:58		
16	08:35		15:23 (4)	07:45		17:01 (3)	06:40			06:25		19:00 (2)	05:24		04:54		
	16:36	37	16:00 (4)	17:36	6	17:07 (3)	18:30			20:28	26	19:26 (2)	21:22		21:59		
17	08:34		15:23 (4)	07:43		17:01 (3)	06:38			06:23		19:01 (2)	05:22		04:54		
	16:38	38	16:01 (4)	17:38	8	17:09 (3)	18:32			20:30	22	19:23 (2)	21:23		21:59		
18	08:33		15:24 (4)	07:41		16:59 (3)	06:35			06:21		19:03 (2)	05:21		04:54		
	16:40	38	16:02 (4)	17:40	12	17:11 (3)	18:34			20:31	18	19:21 (2)	21:25		22:00		
19	08:32		15:25 (4)	07:39		16:58 (3)	06:33			06:18		19:07 (2)	05:19		04:54		
	16:41	37	16:02 (4)	17:42	15	17:13 (3)	18:36			20:33	10	19:17 (2)	21:27		22:00		
20	08:31		15:24 (4)	07:36		16:58 (3)	06:31			06:16			05:18		04:54		
	16:43	38	16:02 (4)	17:44	18	17:16 (3)	18:38			20:35			21:28		22:00		
21	08:30		15:25 (4)	07:34		16:58 (3)	06:28			06:14			05:16		04:54		
	16:45	38	16:03 (4)	17:46	20	17:18 (3)	18:40			20:37			21:30		22:01		
22	08:29		15:25 (4)	07:32		16:57 (3)	06:26			06:12			05:15		04:55		
	16:47	38	16:03 (4)	17:48	22	17:19 (3)	18:42			20:39			21:31		22:01		
23	08:27		15:26 (4)	07:30		16:58 (3)	06:23			06:09			05:13		04:55		
	16:49	37	16:03 (4)	17:50	24	17:22 (3)	18:43			20:41			21:33		22:01		
24	08:26		15:26 (4)	07:28		16:58 (3)	06:21			06:07			05:12		04:55		
	16:50	37	16:03 (4)	17:52	24	17:22 (3)	18:45			20:43			21:34		22:01		
25	08:24		15:27 (4)	07:25		16:58 (3)	06:18		18:17 (2)	06:05			05:11		04:55		
	16:52	36	16:03 (4)	17:54	23	17:21 (3)	18:47	3	18:20 (2)	20:44			21:36		22:01		
26	08:23		15:27 (4)	07:23		16:59 (3)	06:16		18:11 (2)	06:03			05:09		04:56		
	16:54	36	16:03 (4)	17:56	21	17:20 (3)	18:49	12	18:23 (2)	20:46			21:37		22:01		
27	08:22		15:27 (4)	07:21		17:00 (3)	06:13		18:07 (2)	06:01			05:08		04:56		
	16:56	36	16:03 (4)	17:58	19	17:19 (3)	18:51	17	18:24 (2)	20:48			21:39		22:01		
28	08:20		15:29 (4)	07:18		17:01 (3)	06:11		18:05 (2)	05:58			05:07		04:57		
	16:58	34	16:03 (4)	18:00	16	17:17 (3)	18:53	21	18:26 (2)	20:50			21:40		22:01		
29	08:19		15:29 (4)				07:09		19:03 (2)	05:56			05:06		04:57		
	17:00	33	16:02 (4)				19:54	25	19:28 (2)	20:52			21:41		22:01		
30	08:17		15:30 (4)				07:06		19:02 (2)	05:54			05:05		04:58		
	17:02	32	16:02 (4)				19:56	28	19:30 (2)	20:54			21:43		22:00		
31	08:15		15:31 (4)				07:04		19:00 (2)				05:04				
	17:04	30	16:01 (4)				19:58	31	19:31 (2)				21:44				
Potential sun hours	250			273		367			420			494		510			
Total, worst case	1049			340		148			612								
Sun reduction	0.24			0.23		0.27			0.35								
Oper. time red.	1.00			1.00		1.00			1.00								
Wind dir. red.	0.66			0.67		0.67			0.67								
Total reduction	0.16			0.16		0.18			0.24								
Total, real	168			53		27			145								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FU - H177

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:54 (2) 19:30 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:54 (2) 19:31 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:52 (2) 19:30 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:52 (2) 19:30 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:52 (2) 19:30 (2)	07:33 16:46	15:14 (4) 15:20 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	18:52 (2) 19:30 (2)	07:34 16:44	15:10 (4) 15:24 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	18:51 (2) 19:29 (2)	07:36 16:43	15:07 (4) 15:27 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	18:51 (2) 19:29 (2)	07:39 16:41	15:05 (4) 15:28 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	18:51 (2) 19:29 (2)	07:40 16:39	15:04 (4) 15:30 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	18:51 (2) 19:27 (2)	07:42 16:37	15:04 (4) 15:32 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	18:51 (2) 19:26 (2)	07:44 16:35	15:03 (4) 15:33 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	18:52 (2) 19:24 (2)	07:46 17:39 (3)	15:02 (4) 15:34 (3)
13	05:10 21:52	05:59 21:01	06:54 19:49	18:53 (2) 19:22 (2)	07:48 17:49 (3)	15:01 (4) 15:34 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	18:53 (2) 19:18 (2)	07:50 17:51 (3)	15:01 (4) 15:35 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	18:54 (2) 19:16 (2)	07:51 17:52 (3)	15:00 (4) 15:35 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	18:56 (2) 19:14 (2)	07:53 17:53 (3)	15:00 (4) 15:36 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	18:58 (2) 19:11 (2)	07:55 17:53 (3)	15:00 (4) 15:36 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	19:02 (2) 19:08 (2)	07:57 17:53 (3)	15:00 (4) 15:37 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	19:09 (2) 18:22 (2)	07:59 17:52 (3)	15:00 (4) 15:37 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	19:10 (2) 18:20 (2)	08:00 17:50 (3)	15:00 (4) 15:38 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	19:11 (2) 18:17 (2)	08:02 17:48 (3)	15:00 (4) 15:38 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	19:12 (2) 18:15 (2)	08:04 17:45 (3)	15:00 (4) 15:38 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	19:13 (2) 18:13 (2)	08:06 17:43 (3)	15:01 (4) 15:38 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	19:14 (2) 18:11 (2)	08:08 17:41 (3)	15:01 (4) 15:39 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	19:15 (2) 17:09 (2)	08:09 16:38 (3)	15:02 (4) 15:39 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	19:16 (2) 17:06 (2)	08:11 16:31 (3)	15:02 (4) 15:39 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	19:17 (2) 17:04 (2)	08:13 16:33 (3)	15:03 (4) 15:38 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	19:18 (2) 17:02 (2)	08:14 16:12 (3)	15:03 (4) 15:37 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	19:19 (2) 17:00 (2)	08:16 16:12 (3)	15:01 (5) 15:36 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	19:20 (2) 16:58 (2)	08:18 16:11 (3)	15:00 (5) 15:35 (4)
31	05:37 21:27	06:31 20:21	18:55 (2) 19:30 (2)	07:22 16:56 (2)	08:44 16:13 (3)	08:44 16:13 (3)
Potential sun hours	512	460	382	328	259	233
Total, worst case		205	555	245	829	834
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.65
Total reduction		0.23	0.22	0.20	0.17	0.14
Total, real		47	120	48	145	113

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FV - H178

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		15:07 (5)	08:14		15:30 (4)	07:16		07:01		18:54 (2)	05:52		05:03			
	16:15	30	15:37 (4)	17:06	22	15:52 (4)	18:02		20:00	38	19:32 (2)	20:55		21:45			
2	08:44		15:08 (5)	08:12		15:32 (4)	07:14		06:59		18:53 (2)	05:50		05:02			
	16:16	31	15:39 (4)	17:08	18	15:50 (4)	18:04		20:02	38	19:31 (2)	20:57		21:46			
3	08:44		15:08 (5)	08:10		15:35 (4)	07:12		06:56		18:53 (2)	05:48		05:01			
	16:17	31	15:39 (4)	17:10	13	15:48 (4)	18:06		20:04	39	19:32 (2)	20:59		21:48			
4	08:43		15:09 (5)	08:08			07:09		06:54		18:53 (2)	05:46		05:00			
	16:18	32	15:41 (4)	17:12			18:07		20:06	39	19:32 (2)	21:01		21:49			
5	08:43		15:09 (5)	08:07			07:07		06:51		18:52 (2)	05:44		04:59			
	16:19	33	15:42 (4)	17:14			18:09		20:07	39	19:31 (2)	21:03		21:50			
6	08:43		15:11 (5)	08:05			07:04		06:49		18:52 (2)	05:42		04:59			
	16:21	33	15:44 (4)	17:16			18:11		20:09	39	19:31 (2)	21:04		21:51			
7	08:42		15:11 (5)	08:03			07:02		06:47		18:51 (2)	05:40		04:58			
	16:22	34	15:45 (4)	17:18			18:13		20:11	39	19:30 (2)	21:06		21:52			
8	08:42		15:12 (5)	08:01			07:00		06:44		18:51 (2)	05:38		04:57			
	16:24	34	15:46 (4)	17:20			18:15		20:13	39	19:30 (2)	21:08		21:53			
9	08:41		15:14 (5)	07:59			06:57		06:42		18:52 (2)	05:36		04:57			
	16:25	35	15:49 (4)	17:22			18:17		20:15	38	19:30 (2)	21:10		21:54			
10	08:40		15:15 (5)	07:57			06:55		06:39		18:52 (2)	05:34		04:56			
	16:26	35	15:50 (4)	17:24			18:19		20:17	36	19:28 (2)	21:11		21:55			
11	08:40		15:16 (4)	07:55			06:53		06:37		18:52 (2)	05:33		04:56			
	16:28	36	15:52 (4)	17:26			18:21		20:19	36	19:28 (2)	21:13		21:55			
12	08:39		15:16 (4)	07:53			06:50		06:35		18:53 (2)	05:31		04:55			
	16:30	38	15:54 (4)	17:28			18:23		20:20	34	19:27 (2)	21:15		21:56			
13	08:38		15:16 (4)	07:51			06:48		06:32		18:53 (2)	05:29		04:55			
	16:31	38	15:54 (4)	17:30			18:25		20:22	32	19:25 (2)	21:17		21:57			
14	08:37		15:17 (4)	07:49		16:58 (3)	06:45		06:30		18:55 (2)	05:27		04:55			
	16:33	38	15:55 (4)	17:32	4	17:02 (3)	18:27		20:24	29	19:24 (2)	21:18		21:58			
15	08:36		15:17 (4)	07:47		16:57 (3)	06:43		06:28		18:56 (2)	05:26		04:54			
	16:34	38	15:55 (4)	17:34	8	17:05 (3)	18:28		20:26	26	19:22 (2)	21:20		21:58			
16	08:35		15:17 (4)	07:45		16:57 (3)	06:40		06:25		18:58 (2)	05:24		04:54			
	16:36	38	15:55 (4)	17:36	10	17:07 (3)	18:30		20:28	23	19:21 (2)	21:22		21:59			
17	08:34		15:17 (4)	07:43		16:56 (3)	06:38		06:23		18:59 (2)	05:22		04:54			
	16:38	38	15:55 (4)	17:38	13	17:09 (3)	18:32		20:30	18	19:17 (2)	21:23		21:59			
18	08:33		15:18 (4)	07:41		16:55 (3)	06:35		06:21		19:03 (2)	05:21		04:54			
	16:40	38	15:56 (4)	17:40	16	17:11 (3)	18:34		20:31	11	19:14 (2)	21:25		22:00			
19	08:32		15:18 (4)	07:39		16:55 (3)	06:33		06:18			05:19		04:54			
	16:41	39	15:57 (4)	17:42	18	17:13 (3)	18:36		20:33			21:27		22:00			
20	08:31		15:18 (4)	07:36		16:55 (3)	06:31		06:16			05:18		04:54			
	16:43	38	15:56 (4)	17:44	21	17:16 (3)	18:38		20:35			21:28		22:00			
21	08:30		15:19 (4)	07:34		16:55 (3)	06:28		06:14			05:16		04:54			
	16:45	38	15:57 (4)	17:46	23	17:18 (3)	18:40		20:37			21:30		22:01			
22	08:29		15:19 (4)	07:32		16:54 (3)	06:26		06:12			05:15		04:55			
	16:47	37	15:56 (4)	17:48	25	17:19 (3)	18:42		20:39			21:31		22:01			
23	08:27		15:20 (4)	07:30		16:55 (3)	06:23		06:09			05:13		04:55			
	16:49	37	15:57 (4)	17:50	24	17:19 (3)	18:43		20:41			21:33		22:01			
24	08:26		15:20 (4)	07:28		16:56 (3)	06:21		06:07		18:10 (2)		05:12		04:55		
	16:50	36	15:56 (4)	17:52	22	17:18 (3)	18:45	8	18:18 (2)		20:43		21:34		22:01		
25	08:24		15:22 (4)	07:25		16:56 (3)	06:18		06:05		18:06 (2)		05:11		04:55		
	16:52	35	15:57 (4)	17:54	21	17:17 (3)	18:47	15	18:21 (2)		20:44		21:36		22:01		
26	08:23		15:22 (4)	07:23		16:57 (3)	06:16		06:03		18:04 (2)		05:09		04:56		
	16:54	34	15:56 (4)	17:56	19	17:16 (3)	18:49	19	18:23 (2)		20:46		21:37		22:01		
27	08:22		15:23 (4)	07:21		16:59 (3)	06:13		06:01		18:01 (2)		05:08		04:56		
	16:56	32	15:55 (4)	17:58	15	17:14 (3)	18:51	23	18:24 (2)		20:48		21:39		22:01		
28	08:20		15:24 (4)	07:18		17:01 (3)	06:11		05:58		18:00 (2)		05:07		04:57		
	16:58	32	15:56 (4)	18:00	10	17:11 (3)	18:53	26	18:26 (2)		20:50		21:40		22:01		
29	08:19		15:25 (4)				07:09		05:56		18:57 (2)		05:06		04:57		
	17:00	30	15:55 (4)				19:54	31	19:28 (2)		20:52		21:41		22:01		
30	08:17		15:26 (4)				07:06		05:54		18:57 (2)		05:05		04:58		
	17:02	28	15:54 (4)				19:56	33	19:30 (2)		20:54		21:43		22:00		
31	08:15		15:27 (4)				07:04		05:52		18:55 (2)		05:04				
	17:04	25	15:52 (4)				19:58	36	19:31 (2)				21:44				
Potential sun hours	250			273		367			420			494		510			
Total, worst case	1071			302		191			593								
Sun reduction	0.24			0.23		0.27			0.35								
Oper. time red.	1.00			1.00		1.00			1.00								
Wind dir. red.	0.66			0.67		0.67			0.67								
Total reduction	0.16			0.16		0.18			0.24								
Total, real	171			47		35			141								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FV - H178

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:51 (2) 19:27 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:51 (2) 19:27 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:49 (2) 19:27 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:49 (2) 19:27 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:48 (2) 19:27 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:48 (2) 19:27 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:47 (2) 19:26 (2)	07:37 16:43	08:28 15:12 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	18:47 (2) 19:26 (2)	07:39 16:41	08:29 15:18 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	18:47 (2) 19:26 (2)	07:41 16:39	08:30 15:20 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	18:46 (2) 19:25 (2)	07:42 16:37	08:31 15:23 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	18:47 (2) 19:24 (2)	07:44 16:35	08:33 15:24 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	18:47 (2) 19:23 (2)	07:46 16:34	08:34 15:26 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	18:48 (2) 19:22 (2)	07:48 16:32	08:35 15:27 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	18:48 (2) 19:18 (2)	07:50 16:31	08:36 15:27 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	18:49 (2) 19:16 (2)	07:51 16:29	08:37 15:28 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	18:50 (2) 19:14 (2)	07:53 16:27	08:38 15:29 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	18:51 (2) 19:11 (2)	07:55 16:26	08:38 15:30 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	18:53 (2) 19:08 (2)	07:57 16:24	08:39 15:30 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	18:56 (2) 19:06 (2)	07:59 16:23	08:40 15:31 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 17:25 (3)	08:41 15:34 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 17:25 (3)	08:41 15:32 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 17:25 (3)	08:42 15:32 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 17:25 (3)	08:42 15:33 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 17:25 (3)	08:43 15:33 (4)
25	05:27 21:36	06:20 20:35	19:05 (2) 19:17 (2)	07:15 17:09	08:09 16:26 (3)	08:43 15:33 (4)
26	05:29 21:35	06:22 20:32	19:02 (2) 19:21 (2)	07:17 17:06	08:11 16:26 (3)	08:43 15:34 (4)
27	05:30 21:33	06:24 20:30	19:00 (2) 19:23 (2)	07:19 17:04	08:13 16:27 (3)	08:44 15:34 (4)
28	05:32 21:32	06:26 20:28	18:57 (2) 19:23 (2)	07:21 17:02	08:14 16:28 (3)	08:44 15:35 (4)
29	05:34 21:30	06:27 20:25	18:55 (2) 19:25 (2)	07:22 19:09	08:16 16:12	08:44 15:34 (4)
30	05:35 21:28	06:29 20:23	18:54 (2) 19:26 (2)	07:24 19:07	08:18 16:11	08:44 15:35 (4)
31	05:37 21:27	06:31 20:21	18:52 (2) 19:26 (2)	07:22 16:56	08:44 16:13	08:44 15:35 (4)
Potential sun hours	512	460	382	328	259	233
Total, worst case		176	615	255	763	926
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.65
Total reduction		0.23	0.22	0.20	0.17	0.14
Total, real		41	133	50	133	125

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FW - H179

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44		14:41 (4)	08:14			07:16			07:01		18:32 (2)	05:52			05:03		
	16:15	39	15:20 (4)	17:06			18:02			20:00	43	19:15 (2)	20:55			21:45		
2	08:44		14:42 (4)	08:12			07:14			06:59		18:31 (2)	05:50			05:02		
	16:16	38	15:20 (4)	17:08			18:04			20:02	43	19:14 (2)	20:57			21:46		
3	08:44		14:42 (4)	08:10			07:12			06:56		18:32 (2)	05:48			05:01		
	16:17	38	15:20 (4)	17:10			18:06			20:04	42	19:14 (2)	20:59			21:48		
4	08:43		14:43 (4)	08:08			07:09			06:54		18:33 (2)	05:46			05:00		
	16:18	38	15:21 (4)	17:12			18:07			20:06	40	19:13 (2)	21:01			21:49		
5	08:43		14:43 (4)	08:07			07:07			06:51		18:33 (2)	05:44			04:59		
	16:19	38	15:21 (4)	17:14			18:09			20:07	38	19:11 (2)	21:03			21:50		
6	08:43		14:44 (4)	08:05			16:41 (3)			06:49		18:34 (2)	05:42			04:59		
	16:21	38	15:22 (4)	17:16	4		16:45 (3)			20:09	37	19:11 (2)	21:04			21:51		
7	08:42		14:44 (4)	08:03			16:40 (3)			06:47		18:34 (2)	05:40			04:58		
	16:22	37	15:21 (4)	17:18	7		16:47 (3)			20:11	35	19:09 (2)	21:06			21:52		
8	08:42		14:45 (4)	08:01			16:40 (3)			06:44		18:35 (2)	05:38			04:57		
	16:24	36	15:21 (4)	17:20	10		16:50 (3)			20:13	32	19:07 (2)	21:08			21:53		
9	08:41		14:46 (4)	07:59			16:39 (3)			06:42		18:37 (2)	05:36			04:57		
	16:25	36	15:22 (4)	17:22	13		16:52 (3)			20:15	29	19:06 (2)	21:10			21:54		
10	08:40		14:47 (4)	07:57			16:38 (3)			06:39		18:38 (2)	05:34			04:56		
	16:26	35	15:22 (4)	17:24	16		16:54 (3)			20:17	25	19:03 (2)	21:11			21:55		
11	08:40		14:47 (4)	07:55			16:38 (3)			06:37		18:41 (2)	05:33			04:56		
	16:28	35	15:22 (4)	17:26	18		16:56 (3)			20:19	20	19:01 (2)	21:13			21:55		
12	08:39		14:48 (4)	07:53			16:38 (3)			06:35		18:44 (2)	05:31			04:55		
	16:30	34	15:22 (4)	17:28	21		16:59 (3)			20:20	13	18:57 (2)	21:15			21:56		
13	08:38		14:49 (4)	07:51			16:37 (3)			06:32			05:29			04:55		
	16:31	33	15:22 (4)	17:30	23		17:00 (3)			20:22			21:17			21:57		
14	08:37		14:50 (4)	07:49			16:37 (3)			06:30			05:27			04:55		
	16:33	32	15:22 (4)	17:32	25		17:02 (3)			20:24			21:18			21:58		
15	08:36		14:51 (4)	07:47			16:38 (3)			06:28			05:26			04:54		
	16:34	31	15:22 (4)	17:34	26		17:04 (3)			20:26			21:20			21:58		
16	08:35		14:51 (4)	07:45			16:38 (3)			06:25			05:24			04:54		
	16:36	30	15:21 (4)	17:36	25		17:03 (3)		13	18:04 (2)			21:22			21:59		
17	08:34		14:53 (4)	07:43			16:39 (3)			06:23			05:22			04:54		
	16:38	28	15:21 (4)	17:38	24		17:03 (3)		19	18:06 (2)			21:23			21:59		
18	08:33		14:54 (4)	07:41			16:39 (3)			06:21			05:21			04:54		
	16:40	27	15:21 (4)	17:40	23		17:02 (3)		23	18:07 (2)			21:25			22:00		
19	08:32		14:56 (4)	07:39			16:40 (3)			06:18			05:19			04:54		
	16:41	24	15:20 (4)	17:42	21		17:01 (3)		28	18:10 (2)			21:27			22:00		
20	08:31		14:57 (4)	07:36			16:42 (3)			06:16			05:18			04:54		
	16:43	22	15:19 (4)	17:44	18		17:00 (3)		31	18:11 (2)			21:28			22:00		
21	08:30		14:59 (4)	07:34			16:44 (3)			06:14			05:16			04:54		
	16:45	19	15:18 (4)	17:46	14		16:58 (3)		34	18:13 (2)			21:30			22:01		
22	08:29		15:01 (4)	07:32			16:46 (3)			06:12			05:15			04:55		
	16:47	15	15:16 (4)	17:48	8		16:54 (3)		38	18:15 (2)			21:31			22:01		
23	08:27		15:05 (4)	07:30			06:23			06:09			05:13			04:55		
	16:49	8	15:13 (4)	17:50			18:43		40	18:16 (2)			21:33			22:01		
24	08:26			07:28			06:21			06:07			05:12			04:55		
	16:50			17:52			18:45		41	18:16 (2)			21:34			22:01		
25	08:24			07:25			06:18			06:05			05:11			04:55		
	16:52			17:54			18:47		43	18:17 (2)			21:36			22:01		
26	08:23			07:23			06:16			06:03			05:09			04:56		
	16:54			17:56			18:49		43	18:17 (2)			21:37			22:01		
27	08:22			07:21			06:13			06:01			05:08			04:56		
	16:56			17:58			18:51		44	18:17 (2)			21:39			22:01		
28	08:20			07:18			06:11			05:58			05:07			04:57		
	16:58			18:00			18:53		44	18:17 (2)			21:40			22:01		
29	08:19						07:09			05:56			05:06			04:57		
	17:00						19:55		44	19:16 (2)			21:41			22:01		
30	08:17						07:06			05:54			05:05			04:58		
	17:02						19:56		44	19:16 (2)			21:43			22:00		
31	08:15						07:04			05:54			05:04					
	17:04						19:58		44	19:15 (2)			21:44					
Potential sun hours	250			273			367			420			494			510		
Total, worst case	711			296			573			397								
Sun reduction	0.24			0.23			0.27			0.35								
Oper. time red.	1.00			1.00			1.00			1.00								
Wind dir. red.	0.65			0.66			0.68			0.68								
Total reduction	0.16			0.15			0.18			0.24								
Total, real	112			45			105			95								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FW - H179

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:40 (2) 19:00 (2)	07:26 19:05	
2	04:59 22:00	05:40 21:23	06:35 20:16	18:37 (2) 19:02 (2)	07:28 19:02	16:08 (3) 16:23 (3)
3	05:00 21:59	05:42 21:21	06:36 20:13	18:35 (2) 19:04 (2)	07:30 19:00	16:10 (3) 16:09 (3)
4	05:01 21:59	05:44 21:19	06:38 20:11	18:33 (2) 19:04 (2)	07:31 18:57	16:10 (3) 16:17 (3)
5	05:02 21:58	05:45 21:17	06:40 20:09	18:31 (2) 19:06 (2)	07:33 18:55	16:11 (3) 16:15 (3)
6	05:03 21:58	05:47 21:15	06:42 20:06	18:30 (2) 19:07 (2)	07:35 18:52	16:07 16:44
7	05:04 21:57	05:49 21:14	06:43 20:04	18:28 (2) 19:06 (2)	07:37 18:50	16:07 16:43
8	05:05 21:56	05:51 21:12	06:45 20:01	18:27 (2) 19:07 (2)	07:39 18:48	16:08 16:41
9	05:06 21:55	05:52 21:10	06:47 19:59	18:26 (2) 19:08 (2)	07:41 18:45	16:08 16:39
10	05:07 21:55	05:54 21:08	06:49 19:56	18:25 (2) 19:07 (2)	07:42 18:43	16:09 16:37
11	05:08 21:54	05:56 21:05	06:50 19:54	18:24 (2) 19:07 (2)	07:44 18:40	16:09 16:35
12	05:09 21:53	05:57 21:03	06:52 19:51	18:24 (2) 19:08 (2)	07:46 18:38	16:09 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	18:23 (2) 19:08 (2)	07:48 18:36	16:10 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	18:22 (2) 19:07 (2)	07:50 18:33	16:11 16:31
15	05:13 21:50	06:03 20:57	06:58 19:44	18:22 (2) 19:06 (2)	07:52 18:31	16:12 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	18:22 (2) 19:06 (2)	07:54 18:29	16:13 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	18:21 (2) 19:05 (2)	07:55 18:26	16:14 16:26
18	05:17 21:46	06:08 20:51	07:03 19:37	18:22 (2) 19:04 (2)	07:57 18:24	16:15 16:24
19	05:18 21:45	06:10 20:48	07:05 19:34	18:22 (2) 19:04 (2)	07:59 18:22	16:16 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	18:23 (2) 19:03 (2)	08:00 18:20	16:17 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	18:22 (2) 19:01 (2)	08:03 18:17	16:18 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	18:23 (2) 18:58 (2)	08:05 18:15	16:19 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	18:24 (2) 18:56 (2)	08:07 18:13	16:20 16:18
24	05:26 21:38	06:19 20:37	07:13 19:22	18:26 (2) 18:54 (2)	08:09 18:11	16:19 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	18:26 (2) 18:51 (2)	08:09 17:09	16:18 16:16
26	05:29 21:35	06:22 20:32	07:17 19:17	18:28 (2) 18:48 (2)	07:13 17:06	16:16 16:14
27	05:30 21:33	06:24 20:30	07:19 19:14	18:31 (2) 18:46 (2)	07:15 17:04	16:13 16:13
28	05:32 21:32	06:26 20:28	07:21 19:12	18:36 (2) 18:43 (2)	07:16 17:02	16:14 16:12
29	05:34 21:30	06:28 20:25	07:22 19:09		07:18 17:00	16:15 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07		07:20 16:58	16:16 16:11
31	05:37 21:27	06:31 20:21	18:43 (2) 18:56 (2)		07:22 16:56	16:17 (3) 16:25 (3)
Potential sun hours	512	460	382	328	259	233
Total, worst case		13	973	248	351	1184
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.68	0.68	0.66	0.65	0.65
Total reduction		0.23	0.22	0.19	0.17	0.13
Total, real		3	210	48	60	159

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FX - H180

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	14:41 (4)	08:14	16:13 (3)	07:16	16:48 (2)	07:01	05:52	05:03		
	16:15	11	14:52 (4)	17:06	21	16:34 (3)	18:02	37	17:25 (2)	20:00	21:45
2	08:44	14:43 (4)	08:12	16:13 (3)	07:14	16:48 (2)	06:59	05:50	05:02		
	16:16	9	14:52 (4)	17:08	22	16:35 (3)	18:04	36	17:24 (2)	20:02	21:46
3	08:44	14:44 (4)	08:10	16:14 (3)	07:12	16:48 (2)	06:56	05:48	05:01		
	16:17	6	14:50 (4)	17:10	21	16:35 (3)	18:06	36	17:24 (2)	20:04	21:48
4	08:43		08:08	16:14 (3)	07:09	16:49 (2)	06:54	05:46	05:00		
	16:18		17:12	20	16:34 (3)	18:07	35	17:24 (2)	20:06	21:01	21:49
5	08:43		08:07	16:15 (3)	07:07	16:48 (2)	06:51	05:44	04:59		
	16:19		17:14	19	16:34 (3)	18:09	35	17:23 (2)	20:07	21:03	21:50
6	08:43		08:05	16:16 (3)	07:04	16:49 (2)	06:49	05:42	04:58		
	16:21		17:16	17	16:33 (3)	18:11	33	17:22 (2)	20:09	21:04	21:51
7	08:42		08:03	16:18 (3)	07:02	16:49 (2)	06:47	05:40	04:58		
	16:22		17:18	13	16:31 (3)	18:13	32	17:21 (2)	20:11	21:06	21:52
8	08:42		08:01	16:20 (3)	07:00	16:50 (2)	06:44	05:38	04:57		
	16:24		17:20	9	16:29 (3)	18:15	30	17:20 (2)	20:13	21:08	21:53
9	08:41		07:59		06:57	16:51 (2)	06:42	05:36	04:57		
	16:25		17:22		18:17	17:18 (2)	20:15	21:10	21:54		
10	08:40		07:57		06:55	16:53 (2)	06:39	05:34	04:56		
	16:26		17:24		18:19	17:17 (2)	20:17	21:11	21:55		
11	08:40		07:55		06:53	16:55 (2)	06:37	05:33	04:56		
	16:28		17:26		18:21	17:15 (2)	20:19	21:13	21:55		
12	08:39		07:53		06:50	16:57 (2)	06:35	05:31	04:55		
	16:30		17:28		18:23	17:11 (2)	20:20	21:15	21:56		
13	08:38		07:51		06:48		06:32	05:29	04:55		
	16:31		17:30		18:25		20:22	21:17	21:57		
14	08:37		07:49		06:45		06:30	05:27	04:55		
	16:33		17:32		18:27		20:24	21:18	21:58		
15	08:36		07:47		06:43		06:28	05:26	04:54		
	16:34		17:34		18:28		20:26	21:20	21:58		
16	08:35		07:45		06:40		06:25	05:24	04:54		
	16:36		17:36		18:30		20:28	21:22	21:59		
17	08:34		07:43		06:38		06:23	05:22	04:54		
	16:38		17:38		18:32		20:30	21:23	21:59		
18	08:33		07:41	17:00 (2)	06:35		06:21	05:21	04:54		
	16:40		17:40	11	17:11 (2)	18:34	20:31	21:25	22:00		
19	08:32		07:39	16:58 (2)	06:33		06:18	05:19	04:54		
	16:41		17:42	15	17:13 (2)	18:36	20:33	21:27	22:00		
20	08:31		07:36	16:56 (2)	06:31		06:16	05:18	04:54		
	16:43		17:44	20	17:16 (2)	18:38	20:35	21:28	22:00		
21	08:30		07:34	16:55 (2)	06:28		06:14	05:16	04:54		
	16:45		17:46	23	17:18 (2)	18:40	20:37	21:30	22:01		
22	08:29		07:32	16:53 (2)	06:26		06:12	05:15	04:55		
	16:47		17:48	26	17:19 (2)	18:42	20:39	21:31	22:01		
23	08:27	16:14 (3)	07:30	16:52 (2)	06:23		06:09	05:13	04:55		
	16:49	1	16:15 (3)	17:50	30	17:22 (2)	18:43	20:41	21:33	22:01	
24	08:26	16:13 (3)	07:28	16:51 (2)	06:21		06:07	05:12	04:55		
	16:50	4	16:17 (3)	17:52	33	17:24 (2)	18:45	20:43	21:34	22:01	
25	08:24	16:13 (3)	07:25	16:50 (2)	06:18		06:05	05:11	04:55		
	16:52	6	16:19 (3)	17:54	34	17:24 (2)	18:47	20:44	21:36	22:01	
26	08:23	16:12 (3)	07:23	16:49 (2)	06:16		06:03	05:09	04:56		
	16:54	9	16:21 (3)	17:56	35	17:24 (2)	18:49	20:46	21:37	22:01	
27	08:22	16:12 (3)	07:21	16:49 (2)	06:13		06:00	05:08	04:56		
	16:56	11	16:23 (3)	17:58	36	17:25 (2)	18:51	20:48	21:39	22:01	
28	08:20	16:12 (3)	07:18	16:48 (2)	06:11		05:58	05:07	04:57		
	16:58	14	16:26 (3)	18:00	36	17:24 (2)	18:53	20:50	21:40	22:01	
29	08:19	16:12 (3)			07:08		05:56	05:06	04:57		
	17:00	16	16:28 (3)		19:54		20:52	21:41	22:01		
30	08:17	16:12 (3)			07:06		05:54	05:05	04:58		
	17:02	17	16:29 (3)		19:56		20:54	21:43	22:00		
31	08:15	16:12 (3)			07:04			05:04			
	17:04	19	16:31 (3)		19:58			21:44			
Potential sun hours	250		273		367		420	494	510		
Total, worst case	123		441		359						
Sun reduction	0.24		0.23		0.27						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.66		0.67		0.67						
Total reduction	0.16		0.16		0.18						
Total, real	20		69		66						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: FX - H180

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:38 (2) 17:48 (2)	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:34 (2) 17:52 (2)	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:32 (2) 17:54 (2)	07:28 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:30 (2) 17:55 (2)	07:30 16:48
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:28 (2) 17:56 (2)	07:32 16:46
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:27 (2) 17:57 (2)	07:34 16:44
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:25 (2) 17:57 (2)	07:36 16:43
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:24 (2) 17:58 (2)	07:38 16:41
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:23 (2) 17:58 (2)	07:40 16:39
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:22 (2) 17:58 (2)	07:42 16:37
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:22 (2) 17:58 (2)	07:44 16:35
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:22 (2) 17:58 (2)	07:45 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:21 (2) 17:58 (2)	07:47 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:21 (2) 17:57 (2)	07:49 16:31
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:21 (2) 17:57 (2)	07:51 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:22 (2) 17:56 (2)	07:53 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:22 (2) 17:56 (2)	07:55 16:26
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:23 (2) 17:55 (2)	07:57 16:24
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:23 (2) 17:52 (2)	07:59 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:24 (2) 17:50 (2)	08:00 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:25 (2) 17:48 (2)	08:02 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:27 (2) 17:45 (2)	08:04 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:29 (2) 17:43 (2)	08:06 16:18
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:32 (2) 17:41 (2)	08:08 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:09 16:16
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:11 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:13 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:14 16:10
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:16 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:18 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case				670	237	354
Sun reduction				0.29	0.27	0.21
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.66	0.65
Total reduction				0.20	0.18	0.13
Total, real				132	42	48

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn.Feeney@jodireland.com Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Assumptions for shadow calculations

Shadow receptor: FY - H181

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	16:04 (3)	07:16	16:33 (2)	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	08:44	17:06	10 16:14 (3)	18:02	17:00	20:00	20:55	21:45	22:00	21:25	20:18	19:05
3	08:44	08:12	17:08	07:14	16:36 (2)	06:59	05:50	05:02	04:59	05:40	06:35	07:28
4	08:44	08:10	17:08	07:12	16:45 (2)	20:02	20:57	21:46	22:00	21:23	20:16	19:02
5	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
6	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
7	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
8	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
9	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
10	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
11	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
12	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
13	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
14	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
15	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
16	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
17	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
18	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
19	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
20	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
21	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
22	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
23	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
24	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
25	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
26	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
27	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
28	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
29	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
30	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
31	08:44	08:08	17:10	07:06	16:54	05:48	05:01	05:00	05:42	06:36	07:30	08:22
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	254	671	26							610	347	
Sun reduction	0.24	0.23	0.27							0.29	0.27	
Oper. time red.	1.00	1.00	1.00							1.00	1.00	
Wind dir. red.	0.66	0.66	0.66							0.66	0.66	
Total reduction	0.16	0.15	0.18							0.19	0.18	
Total, real	41	103	5							117	61	

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: FZ - H182

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		15:10 (3)	08:14		15:24 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24			06:33	07:26	07:24		08:19		14:59 (3)	
	16:15	23	15:33 (2)	17:06	33	15:57 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54			20:18	19:05	16:54		16:10	30	15:29 (2)	
2	08:44		15:11 (3)	08:12		15:25 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26			06:35	07:28	07:26		15:08 (2)		14:59 (3)	
	16:16	24	15:35 (2)	17:08	31	15:56 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	7		20:16	19:02	16:52	7	15:15 (2)	16:09	15:28 (2)	
3	08:44		15:11 (3)	08:10		15:26 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			06:36	07:30	07:28		15:04 (2)		14:59 (3)	
	16:17	26	15:37 (2)	17:10	30	15:56 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	15		20:13	19:00	16:50	15	15:19 (2)	16:08	15:28 (2)	
4	08:43		15:12 (3)	08:08		15:27 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30			06:38	07:31	07:30		15:01 (2)		14:59 (3)	
	16:18	27	15:39 (2)	17:12	28	15:55 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	20		20:11	18:57	16:48	20	15:21 (2)	16:08	15:29 (2)	
5	08:43		15:12 (3)	08:07		15:28 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32			06:40	07:33	07:32		14:59 (2)		14:59 (3)	
	16:19	27	15:39 (2)	17:14	26	15:54 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	23		20:09	18:55	16:46	23	15:22 (2)	16:07	15:28 (2)	
6	08:43		15:13 (3)	08:05		15:30 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34			06:42	07:35	07:34		14:58 (2)		15:00 (3)	
	16:21	28	15:41 (2)	17:16	23	15:53 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	26		20:06	18:52	16:44	26	15:24 (2)	16:07	15:28 (2)	
7	08:42		15:14 (3)	08:03		15:32 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36			06:43	07:37	07:36		14:57 (2)		14:59 (3)	
	16:22	28	15:42 (2)	17:18	19	15:51 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	28		20:04	18:50	16:43	28	15:25 (2)	16:06	15:27 (2)	
8	08:42		15:14 (3)	08:01		15:35 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38			06:45	07:39	07:38		14:56 (2)		14:59 (3)	
	16:24	29	15:43 (2)	17:20	14	15:49 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	29		20:01	18:48	16:41	29	15:25 (2)	16:06	15:26 (2)	
9	08:41		15:16 (3)	07:59		15:40 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			06:47	07:41	07:40		14:56 (2)		15:00 (3)	
	16:25	29	15:45 (2)	17:22	4	15:44 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	31		19:59	18:45	16:39	31	15:27 (2)	16:05	15:26 (2)	
10	08:40		15:16 (3)	07:57		15:46 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42			06:49	07:42	07:42		14:55 (2)		15:00 (3)	
	16:26	30	15:46 (2)	17:24		18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:42	16:37	33		19:56	18:42	16:37	33	15:28 (2)	16:05	15:25 (2)		
11	08:40		15:17 (3)	07:55		18:21	20:19	21:13	21:53	21:55	21:05	19:54	18:40	16:35	33		19:54	18:40	16:35	33	15:28 (2)	16:05	15:23 (2)		
	16:28	30	15:47 (2)	17:26		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	35		19:51	18:38	16:34	35	15:29 (2)	16:05	15:21 (3)		
12	08:39		15:18 (3)	07:53		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	35		19:51	18:38	16:34	35	15:29 (2)	16:05	15:21 (3)		
	16:30	30	15:48 (2)	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	35		19:51	18:38	16:34	35	15:29 (2)	16:05	15:21 (3)		
13	08:38		15:19 (3)	07:51		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	35		19:49	18:36	16:32	35	15:29 (2)	16:05	15:23 (2)		
	16:31	30	15:49 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	35		19:49	18:36	16:32	35	15:29 (2)	16:05	15:23 (2)		
14	08:37		15:21 (3)	07:49		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	35		19:47	18:33	16:31	35	15:29 (2)	16:04	15:24 (2)		
	16:33	29	15:50 (2)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	35		19:47	18:33	16:31	35	15:29 (2)	16:04	15:24 (2)		
15	08:36		15:21 (3)	07:47		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	36		19:44	18:31	16:29	36	15:30 (2)	16:04	15:24 (2)		
	16:34	30	15:51 (2)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	36		19:44	18:31	16:29	36	15:30 (2)	16:04	15:24 (2)		
16	08:35		15:20 (2)	07:45		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	36		19:42	18:29	16:27	36	15:30 (2)	16:05	15:24 (2)		
	16:36	31	15:51 (2)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	36		19:42	18:29	16:27	36	15:30 (2)	16:05	15:24 (2)		
17	08:34		15:20 (2)	07:43		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	36		19:39	18:26	16:26	36	15:30 (2)	16:05	15:25 (2)		
	16:38	32	15:52 (2)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	36		19:39	18:26	16:26	36	15:30 (2)	16:05	15:25 (2)		
18	08:33		15:20 (2)	07:41		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	36		19:37	18:24	16:24	36	15:30 (2)	16:05	15:25 (2)		
	16:40	33	15:53 (2)	17:40		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	36		19:37	18:24	16:24	36	15:30 (2)	16:05	15:25 (2)		
19	08:32		15:21 (2)	07:39		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	35		19:34	18:22	16:23	35	15:30 (2)	16:05	15:26 (2)		
	16:41	33	15:54 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	35		19:34	18:22	16:23	35	15:30 (2)	16:05	15:26 (2)		
20	08:31		15:20 (2)	07:36		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	35		19:32	18:20	16:22	35	15:30 (2)	16:06	15:26 (2)		
	16:43	34	15:54 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	35		19:32	18:20	16:22	35	15:30 (2)	16:06	15:26 (2)		
21	08:30		15:20 (2)	07:34		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	35		19:29	18:17	16:20	35	15:30 (2)	16:06	15:27 (2)		
	16:45	35	15:55 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	35		19:29	18:17	16:20	35	15:30 (2)	16:06	15:27 (2)		
22	08:29		15:20 (2)	07:32		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	34		19:27	18:15	16:19	34	15:30 (2)	16:06	15:27 (2)		
	16:47	35	15:55 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	34		19:27	18:15	16:19	34	15:30 (2)	16:06	15:27 (2)		
23	08:27		15:21 (2)	07:30		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	33		19:24	18:13	16:18	33	15:30 (2)	16:07	15:28 (2)		
	16:49	35	15:56 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	33		19:24	18:13	16:18	33	15:30 (2)	16:07	15:28 (2)		
24	08:26		15:20 (2)	07:28		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	33		19:22	18:11	16:17	33	15:30 (2)	16:08	15:28 (2)		
	16:50	36	15:56 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	33		19:22	18:11	16:17	33	15:30 (2)	16:08	15:28 (2)		
25	08:25		15:21 (2)	07:25		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	32		19:19	17:09	16:16	32	15:30 (2)	16:08	15:28 (2)		
	16:52	36	15:57 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	32		19:19	17:09	16:16	32	15:30 (2)	16:08	15:28 (2)		
26	08:23		15:21 (2)	07:23		18:49	20:46	21:37	22:01	21:35	20:32	19:													

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GA - H183

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:07 (3)	08:14		15:20 (2)	07:16	07:01	05:52		05:03	04:59	05:39	06:33	07:26	07:24					08:19		14:57 (2)	
	16:15	27	15:34 (2)	17:06	32	15:52 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54							16:10	29	15:26 (2)
2	08:44		15:08 (3)	08:12		15:21 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26							08:21		14:56 (3)
	16:16	27	15:35 (2)	17:08	30	15:51 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52							16:09	30	15:26 (2)
3	08:44		15:08 (3)	08:10		15:22 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28				15:01 (2)		08:22		14:56 (3)	
	16:17	28	15:36 (2)	17:10	29	15:51 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	11	15:12 (2)		15:12 (2)		16:08	30	15:26 (2)	
4	08:43		15:09 (3)	08:08		15:23 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30				14:58 (2)		08:24		14:57 (3)	
	16:18	28	15:37 (2)	17:12	27	15:50 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	17	15:15 (2)		15:15 (2)		16:08	29	15:26 (2)	
5	08:43		15:09 (3)	08:07		15:24 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32				14:56 (2)		08:25		14:56 (3)	
	16:19	29	15:38 (2)	17:14	24	15:48 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	21	15:17 (2)		15:17 (2)		16:07	29	15:25 (2)	
6	08:43		15:11 (3)	08:05		15:26 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34				14:54 (2)		08:26		14:57 (3)	
	16:21	29	15:40 (2)	17:16	21	15:47 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	24	15:18 (2)		15:18 (2)		16:07	29	15:26 (2)	
7	08:42		15:11 (3)	08:03		15:29 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				14:52 (2)		08:28		14:57 (3)	
	16:22	29	15:40 (2)	17:18	16	15:45 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	27	15:19 (2)		15:19 (2)		16:06	28	15:25 (2)	
8	08:42		15:12 (3)	08:01		15:32 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38				14:51 (2)		08:29		14:56 (3)	
	16:24	29	15:41 (2)	17:20	9	15:41 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	29	15:20 (2)		15:20 (2)		16:06	28	15:24 (2)	
9	08:41		15:13 (3)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				14:51 (2)		08:30		14:57 (3)	
	16:25	30	15:43 (2)	17:22			18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	31	15:22 (2)		15:22 (2)		16:05	28	15:25 (2)	
10	08:40		15:14 (3)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42				14:51 (2)		08:32		14:57 (3)	
	16:26	30	15:44 (2)	17:24			18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	32	15:23 (2)		15:23 (2)		16:05	27	15:24 (2)	
11	08:40		15:15 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44				14:50 (2)		08:33		14:57 (3)	
	16:28	29	15:44 (2)	17:26			18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	33	15:23 (2)		15:23 (2)		16:05	27	15:24 (2)	
12	08:39		15:15 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46				14:50 (2)		08:34		14:58 (3)	
	16:30	30	15:45 (2)	17:28			18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	34	15:24 (2)		15:24 (2)		16:05	26	15:24 (2)	
13	08:38		15:15 (2)	07:51			06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47				14:49 (2)		08:35		14:58 (3)	
	16:31	31	15:46 (2)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	35	15:24 (2)		15:24 (2)		16:05	25	15:23 (2)	
14	08:37		15:15 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				14:49 (2)		08:36		14:59 (3)	
	16:33	32	15:47 (2)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	36	15:25 (2)		15:25 (2)		16:04	25	15:24 (2)	
15	08:36		15:15 (2)	07:47			06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51				14:49 (2)		08:37		14:59 (3)	
	16:34	33	15:48 (2)	17:34			18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	36	15:25 (2)		15:25 (2)		16:04	24	15:23 (2)	
16	08:35		15:14 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53				14:49 (2)		08:38		14:59 (3)	
	16:36	34	15:48 (2)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	36	15:25 (2)		15:25 (2)		16:05	24	15:23 (2)	
17	08:34		15:14 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55				14:49 (2)		08:39		15:00 (3)	
	16:38	35	15:49 (2)	17:38			18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	37	15:26 (2)		15:26 (2)		16:05	23	15:23 (2)	
18	08:33		15:14 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				14:49 (2)		08:39		15:00 (3)	
	16:40	36	15:50 (2)	17:40			18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	37	15:26 (2)		15:26 (2)		16:05	23	15:23 (2)	
19	08:32		15:15 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				14:49 (2)		08:40		15:01 (3)	
	16:41	35	15:50 (2)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	37	15:26 (2)		15:26 (2)		16:05	22	15:23 (2)	
20	08:31		15:14 (2)	07:36			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00				14:49 (2)		08:41		15:01 (3)	
	16:43	36	15:50 (2)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	37	15:26 (2)		15:26 (2)		16:06	22	15:23 (2)	
21	08:30		15:15 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				14:50 (2)		08:41		15:02 (3)	
	16:45	36	15:51 (2)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	36	15:26 (2)		15:26 (2)		16:06	22	15:24 (2)	
22	08:29		15:14 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04				14:50 (2)		08:42		15:02 (3)	
	16:47	37	15:51 (2)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	36	15:26 (2)		15:26 (2)		16:06	22	15:24 (2)	
23	08:27		15:15 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				14:51 (2)		08:42		15:03 (3)	
	16:49	37	15:52 (2)	17:50			18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	36	15:27 (2)		15:27 (2)		16:07	22	15:25 (2)	
24	08:26		15:15 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08				14:51 (2)		08:43		15:03 (3)	
	16:50	37	15:52 (2)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	36	15:27 (2)		15:27 (2)		16:08	22	15:25 (2)	
25	08:25		15:16 (2)	07:25			06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09				14:52 (2)		08:43		15:03 (3)	
	16:52	37	15:53 (2)	17:54			18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	35	15:27 (2)		15:27 (2)		16:08	23	15:26 (2)	
26	08:23		15:16 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11				14:53 (2)		08:43		15:04 (3)	
	16:54	36	15:52 (2)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	34	15:27 (2)		15:27 (2)		16:09	23	15:27 (2)	
27	08:22		15:16 (2)	07:21			06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13				14:54 (2)		08:44		15:05 (3)	
	16:56	36	15:52 (2)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	33	15:27 (2)		15:27 (2)		16:10	23	15:28 (2)	
28	08:20		15:17 (2)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14									

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GB - H184
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:06 (3)	08:14	15:18 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:54 (2)								
2	08:44	15:33 (2)	17:06	15:50 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	15:08 (2)	16:10	31	15:25 (2)						
3	08:44	15:07 (3)	08:12	15:19 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	14:54 (2)								
4	08:43	15:35 (2)	17:08	15:49 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	15:01 (2)	16:08	30	15:24 (2)						
5	08:43	15:07 (3)	08:10	15:20 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	15:12 (2)	16:08	29	15:25 (2)						
6	08:43	15:35 (2)	17:10	15:48 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	15:08 (2)	16:08	30	15:25 (2)						
7	08:43	15:08 (3)	08:08	15:21 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	14:57 (2)	16:08	29	15:25 (2)						
8	08:43	15:36 (2)	17:12	15:47 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	15:16 (2)	16:08	29	15:25 (2)						
9	08:43	15:08 (3)	08:07	15:23 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	14:54 (2)	16:08	29	15:25 (2)						
10	08:43	15:37 (2)	17:14	15:46 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	15:14 (2)	16:07	29	15:24 (2)						
11	08:43	15:10 (3)	08:05	15:25 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	14:52 (2)	16:07	29	15:24 (2)						
12	08:42	15:39 (2)	17:16	15:44 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	15:12 (2)	16:07	29	15:25 (2)						
13	08:42	15:10 (3)	08:03	15:28 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	14:51 (2)	16:08	29	15:24 (2)						
14	08:42	15:39 (2)	17:18	15:42 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	15:12 (2)	16:06	29	15:24 (2)						
15	08:42	15:11 (3)	08:01	15:33 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	14:50 (2)	16:08	29	15:24 (2)						
16	08:42	15:40 (2)	17:20	15:37 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	15:18 (2)	16:06	29	15:24 (2)						
17	08:41	15:12 (3)	07:59	15:22 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
18	08:41	15:42 (2)	17:22	15:42 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
19	08:41	15:12 (3)	07:59	15:22 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
20	08:40	15:42 (2)	17:24	15:42 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
21	08:40	15:12 (3)	07:55	15:22 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
22	08:40	15:42 (2)	17:24	15:42 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
23	08:40	15:12 (3)	07:55	15:22 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
24	08:39	15:42 (2)	17:24	15:42 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
25	08:39	15:12 (3)	07:55	15:22 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
26	08:39	15:42 (2)	17:24	15:42 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
27	08:39	15:12 (3)	07:55	15:22 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
28	08:39	15:42 (2)	17:24	15:42 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
29	08:39	15:12 (3)	07:55	15:22 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
30	08:39	15:42 (2)	17:24	15:42 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
31	08:39	15:12 (3)	07:55	15:22 (2)	18:15	20:11	21:06	21:51	21:54	21:10	19:59	18:45	16:39	15:16 (2)	16:05	28	15:24 (2)						
Potential sun hours	250	273	367	420	494	510	512	460	382	259	890	814	0.21	1.00	0.65	0.14	0.10	0.11	0.12	0.13	0.14	0.15	0.16
Total, worst case	1026	176	276	367	494	510	512	460	382	259	890	814	0.21	1.00	0.65	0.14	0.10	0.11	0.12	0.13	0.14	0.15	0.16
Sun reduction	0.24	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Total reduction	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Total, real	163	27	367	420	494	510	512	460	382	259	890	814	0.21	1.00	0.65	0.14	0.10	0.11	0.12	0.13	0.14	0.15	0.16

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GC - H185

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GD - H186

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1 08:44	11:00 (2) 08:14	15:41 (1) 07:16	07:01 05:52	05:03 04:59	05:39 06:33	07:26 07:24	08:19 10:51 (2)						
2 08:44	11:01 (2) 08:12	15:42 (1) 07:14	06:59 05:50	05:02 04:59	05:40 06:35	07:28 07:26	08:21 10:51 (2)						
3 08:44	11:02 (2) 08:10	15:43 (1) 07:12	06:56 05:48	05:01 05:00	05:42 06:36	07:30 07:28	08:22 10:51 (2)						
4 08:43	11:03 (2) 08:09	15:44 (1) 07:09	06:54 05:46	05:00 05:01	05:44 06:38	07:32 07:30	08:24 10:51 (2)						
5 08:43	11:04 (2) 08:07	15:45 (1) 07:07	06:51 05:44	04:59 05:02	05:45 06:40	07:33 07:32	08:25 10:52 (2)						
6 08:43	11:04 (2) 08:05	15:46 (1) 07:05	06:49 05:42	04:59 05:03	05:47 06:42	07:34 07:33	08:26 10:52 (2)						
7 08:42	11:05 (2) 08:03	15:47 (1) 07:03	06:47 05:40	04:58 05:04	05:49 06:43	07:37 07:36	08:28 10:53 (2)						
8 08:42	11:06 (2) 08:01	15:48 (1) 07:01	06:44 05:38	04:57 05:05	05:51 06:45	07:39 07:38	08:29 10:54 (2)						
9 08:41	11:07 (2) 07:59	15:49 (1) 06:59	06:42 05:36	04:56 05:06	05:52 06:47	07:41 07:40	08:30 10:55 (2)						
10 08:40	11:08 (2) 07:57	15:50 (1) 06:57	06:40 05:34	04:55 05:07	05:54 06:49	07:43 07:42	08:32 10:56 (2)						
11 08:40	11:09 (2) 07:55	15:51 (1) 06:55	06:38 05:32	04:54 05:08	05:56 06:51	07:45 07:44	08:34 10:57 (2)						
12 08:39	11:10 (2) 07:53	15:52 (1) 06:53	06:36 05:30	04:53 05:09	05:58 06:53	07:47 07:46	08:36 10:58 (2)						
13 08:38	11:11 (2) 07:51	15:53 (1) 06:51	06:34 05:28	04:52 05:11	05:59 06:54	07:49 07:48	08:38 10:59 (2)						
14 08:37	11:12 (2) 07:49	15:54 (1) 06:49	06:32 05:26	04:51 05:12	06:01 06:56	07:51 07:50	08:40 11:00 (2)						
15 08:36	11:13 (2) 07:47	15:55 (1) 06:47	06:30 05:24	04:50 05:13	06:03 06:58	07:53 07:52	08:42 11:02 (2)						
16 08:35	11:14 (2) 07:45	15:56 (1) 06:45	06:28 05:22	04:49 05:14	06:05 06:59	07:55 07:54	08:44 11:04 (2)						
17 08:34	11:15 (2) 07:43	15:57 (1) 06:43	06:26 05:20	04:48 05:15	06:07 07:01	07:57 07:56	08:46 11:06 (2)						
18 08:33	11:16 (2) 07:41	15:58 (1) 06:41	06:24 05:18	04:47 05:16	06:09 07:03	07:59 07:58	08:48 11:08 (2)						
19 08:32	11:17 (2) 07:39	15:59 (1) 06:39	06:22 05:16	04:46 05:17	06:11 07:05	07:59 07:59	08:50 11:10 (2)						
20 08:31	11:18 (2) 07:37	16:00 (1) 06:37	06:20 05:14	04:45 05:18	06:13 07:07	07:59 07:59	08:52 11:12 (2)						
21 08:30	11:19 (2) 07:35	16:01 (1) 06:35	06:18 05:12	04:44 05:19	06:15 07:09	07:59 07:59	08:54 11:14 (2)						
22 08:29	11:20 (2) 07:33	16:02 (1) 06:33	06:16 05:10	04:43 05:20	06:17 07:11	07:59 07:59	08:56 11:16 (2)						
23 08:27	11:21 (2) 07:31	16:03 (1) 06:31	06:14 05:08	04:42 05:21	06:19 07:13	07:59 07:59	08:58 11:18 (2)						
24 08:26	11:22 (2) 07:29	16:04 (1) 06:29	06:12 05:06	04:41 05:22	06:21 07:15	07:59 07:59	09:00 11:20 (2)						
25 08:25	11:23 (2) 07:27	16:05 (1) 06:27	06:10 05:04	04:40 05:23	06:23 07:17	07:59 07:59	09:02 11:22 (2)						
26 08:23	11:24 (2) 07:25	16:06 (1) 06:25	06:08 05:02	04:39 05:24	06:25 07:19	07:59 07:59	09:04 11:24 (2)						
27 08:22	11:25 (2) 07:23	16:07 (1) 06:23	06:06 05:00	04:38 05:25	06:27 07:21	07:59 07:59	09:06 11:26 (2)						
28 08:20	11:26 (2) 07:21	16:08 (1) 06:21	06:04 04:58	04:37 05:26	06:29 07:23	07:59 07:59	09:08 11:28 (2)						
29 08:19	11:27 (2) 07:19	16:09 (1) 06:19	06:02 04:56	04:36 05:27	06:31 07:25	07:59 07:59	09:10 11:30 (2)						
30 08:17	11:28 (2) 07:17	16:10 (1) 06:17	06:00 04:54	04:35 05:28	06:33 07:27	07:59 07:59	09:12 11:32 (2)						
31 08:15	11:29 (2) 07:15	16:11 (1) 06:15	05:58 04:52	04:34 05:29	06:35 07:29	07:59 07:59	09:14 11:34 (2)						
Potential sun hours	250	273	367	420	494	510	512	460	382	259	134	157	
Total, worst case	1062	135											
Sun reduction	0.24	0.23											
Oper. time red.	1.00	1.00											
Wind dir. red.	0.63	0.66											
Total reduction	0.15	0.15											
Total, real	163	21											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GE - H187

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	09:26 (2)	08:14	09:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	09:11 (2)								
2	08:44	09:26 (2)	08:12	09:44 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	09:12 (2)								
3	08:44	09:26 (2)	08:10	09:46 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	09:11 (2)								
4	08:43	09:27 (2)	08:09	09:49 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	09:12 (2)								
5	08:43	09:27 (2)	08:07	09:49 (2)	07:07	06:52	05:44	05:00	05:02	05:45	06:40	07:33	07:32	08:25	09:12 (2)								
6	08:43	09:27 (2)	08:05	09:49 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	09:14 (2)								
7	08:42	09:27 (2)	08:03	09:49 (2)	07:03	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	09:14 (2)								
8	08:42	09:27 (2)	08:01	09:49 (2)	07:01	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	09:15 (2)								
9	08:41	09:28 (2)	07:59	09:50 (2)	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	09:15 (2)								
10	08:40	09:28 (2)	07:57	09:50 (2)	06:56	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32	09:16 (2)								
11	08:40	09:29 (2)	07:55	09:51 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	09:16 (2)								
12	08:39	09:29 (2)	07:53	09:51 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	09:16 (2)								
13	08:38	09:29 (2)	07:51	09:52 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47	08:35	09:18 (2)								
14	08:37	09:29 (2)	07:49	09:52 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	09:19 (2)								
15	08:36	09:30 (2)	07:47	09:53 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37	09:19 (2)								
16	08:35	09:30 (2)	07:45	09:53 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38	09:19 (2)								
17	08:34	09:30 (2)	07:43	09:54 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39	09:20 (2)								
18	08:33	09:31 (2)	07:41	09:54 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	09:20 (2)								
19	08:32	09:31 (2)	07:39	09:55 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	09:21 (2)								
20	08:31	09:31 (2)	07:37	09:55 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:41	09:21 (2)								
21	08:30	09:32 (2)	07:34	09:56 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	09:22 (2)								
22	08:29	09:32 (2)	07:32	09:56 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42	09:22 (2)								
23	08:27	09:33 (2)	07:30	09:57 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	09:23 (2)								
24	08:26	09:33 (2)	07:28	09:57 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43	09:23 (2)								
25	08:25	09:35 (2)	07:25	09:58 (2)	06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09	08:43	09:23 (2)								
26	08:23	09:35 (2)	07:23	09:58 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43	09:24 (2)								
27	08:22	09:36 (2)	07:21	09:59 (2)	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:17	08:13	08:44	09:25 (2)								
28	08:20	09:37 (2)	07:19	09:59 (2)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14	08:44	09:25 (2)								
29	08:19	09:38 (2)		09:59 (2)	06:09	05:56	05:06	04:57	05:34	06:28	07:23	07:18	08:16	08:44	09:25 (2)								
30	08:17	09:39 (2)		09:59 (2)	06:07	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44	09:26 (2)								
31	08:15	09:40 (2)		09:59 (2)	06:05	05:52	05:04	04:57	05:37	06:31	07:22	07:22	08:16	08:44	09:25 (2)								
Potential sun hours	250	273		367	420	494		510	512	460	382	259	1371	224	295								
Total, worst case	2137		76										0.27		2291								
Sun reduction	0.24		0.23										0.27		0.21								
Oper. time red.	1.00		1.00										1.00		1.00								
Wind dir. red.	0.62		0.59										0.61		0.62								
Total reduction	0.15		0.14										0.16		0.13								
Total, real	321		11										224		295								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GF - H188

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44		11:00 (2)	08:14		15:37 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24						08:19			10:57 (2)		
	16:15	46	15:37 (1)	17:06		15:46 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54								16:10	36	15:30 (1)	
2	08:44		11:01 (2)	08:12			07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26						08:21			10:55 (2)		
	16:16	46	15:38 (1)	17:08			18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52						16:09	41		15:31 (1)		
3	08:44		11:02 (2)	08:10			07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28						08:22			10:53 (2)		
	16:17	45	15:39 (1)	17:10			18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50						16:08	43		15:30 (1)		
4	08:43		11:03 (2)	08:09			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30						08:24			10:53 (2)		
	16:18	47	15:41 (1)	17:12			18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48						16:08	43		15:30 (1)		
5	08:43		11:04 (2)	08:07			07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32						08:25			10:52 (2)		
	16:20	46	15:42 (1)	17:14			18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46						16:07	45		15:30 (1)		
6	08:43		11:05 (2)	08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34						08:27			10:52 (2)		
	16:21	47	15:44 (1)	17:16			18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44						16:07	46		15:30 (1)		
7	08:42		11:06 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36						08:28			10:51 (2)		
	16:22	46	15:45 (1)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43						16:06	46		15:29 (1)		
8	08:42		11:08 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38						08:29			10:51 (2)		
	16:24	43	15:45 (1)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41						16:06	47		15:29 (1)		
9	08:41		11:10 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40						08:30			10:51 (2)		
	16:25	43	15:47 (1)	17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39						16:05	45		15:28 (1)		
10	08:40		11:12 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42						15:08 (1)			10:52 (2)		
	16:26	41	15:48 (1)	17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37						9		15:17 (1)	16:05	46	15:28 (1)
11	08:40		11:14 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44						15:05 (1)			10:53 (2)		
	16:28	37	15:48 (1)	17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36						15		15:20 (1)	16:05	46	15:27 (1)
12	08:39		15:22 (1)	07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46						15:04 (1)			10:54 (2)		
	16:30	27	15:49 (1)	17:28			18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34						17		15:21 (1)	16:05	45	15:27 (1)
13	08:38		15:22 (1)	07:51			06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47						15:02 (1)			10:53 (2)		
	16:31	28	15:50 (1)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32						21		15:23 (1)	16:05	44	15:27 (1)
14	08:37		15:23 (1)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49						15:01 (1)			10:53 (2)		
	16:33	27	15:50 (1)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31						23		15:24 (1)	16:05	45	15:27 (1)
15	08:36		15:23 (1)	07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51						15:01 (1)			10:53 (2)		
	16:34	28	15:51 (1)	17:34			18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29						24		15:25 (1)	16:05	43	15:27 (1)
16	08:35		15:23 (1)	07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53						15:00 (1)			10:53 (2)		
	16:36	29	15:52 (1)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27						25		15:25 (1)	16:05	43	15:26 (1)
17	08:34		15:23 (1)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55						15:00 (1)			10:53 (2)		
	16:38	28	15:51 (1)	17:38			18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:26	16:26						26		15:26 (1)	16:05	43	15:27 (1)
18	08:33		15:23 (1)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57						14:59 (1)			10:53 (2)		
	16:40	29	15:52 (1)	17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25						28		15:27 (1)	16:05	43	15:27 (1)
19	08:32		15:24 (1)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59						14:59 (1)			10:53 (2)		
	16:41	29	15:53 (1)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23						28		15:27 (1)	16:05	43	15:28 (1)
20	08:31		15:24 (1)	07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01						14:59 (1)			10:53 (2)		
	16:43	28	15:52 (1)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22						29		15:28 (1)	16:06	42	15:27 (1)
21	08:30		15:24 (1)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02						14:59 (1)			10:54 (2)		
	16:45	29	15:53 (1)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20						29		15:28 (1)	16:06	41	15:28 (1)
22	08:29		15:24 (1)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04						15:00 (1)			10:53 (2)		
	16:47	29	15:53 (1)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19						28		15:28 (1)	16:06	42	15:28 (1)
23	08:27		15:25 (1)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06						15:00 (1)			10:55 (2)		
	16:49	28	15:53 (1)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18						29		15:29 (1)	16:07	42	15:29 (1)
24	08:26		15:25 (1)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08						15:00 (1)			10:55 (2)		
	16:51	28	15:53 (1)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17						29		15:29 (1)	16:08	42	15:29 (1)
25	08:25		15:27 (1)	07:25			06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09						15:01 (1)			10:55 (2)		
	16:52	26	15:53 (1)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16						28		15:29 (1)	16:08	43	15:30 (1)
26	08:23		15:27 (1)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:13						15:01 (1)			10:56 (2)		
	16:54	25	15:52 (1)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15						29		15:30 (1)	16:09	43	15:31 (1)
27	08:22		15:28 (1)	07:21			06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13						15:02 (1)			10:57 (2)		
	16:56	24	15:52 (1)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13						28		15:30 (1)	16:10	43	15:32 (1)
28	08:20		15:29 (1)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14						15:03 (1)			10:57 (2)		
	16:58	23	15:52 (1)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12						27		15:30 (1)	16:11	44	15:33 (1)
29	08:19		15:30 (1)				07:09	05:56	05:06	04:57	05:34	06:28	07:22	07:18	08:16						15:02 (1)			10:58 (2)		
	17:00	21	15:51 (1)				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12						28		15:30 (1)	16:11	45	15:34 (1)
30	08:17		15:3:																							

Table layout: For each day in each month the following matrix apply

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: GG - H189

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		11:36 (2)	08:14		15:48 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19							
2	16:15	29	12:05 (2)	17:06	25	16:13 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10							
3	08:44		11:37 (2)	08:12		15:49 (1)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26		08:21							11:34 (2)
4	16:16	29	12:06 (2)	17:08	23	16:12 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09	8						11:42 (2)
5	08:44		11:38 (2)	08:10		15:50 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22							11:31 (2)
6	16:17	27	12:05 (2)	17:10	21	16:11 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50		16:08	13						11:44 (2)
7	08:43		11:39 (2)	08:09		15:51 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24							11:30 (2)
8	16:18	26	12:05 (2)	17:12	19	16:10 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	7	15:27 (1)	16:08	17					11:47 (2)
9	08:43		11:40 (2)	08:07		15:52 (1)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25							11:28 (2)
10	16:19	24	12:04 (2)	17:14	17	16:09 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	13	15:37 (1)	16:07	20					11:48 (2)
11	08:43		11:42 (2)	08:05		15:55 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:26							11:28 (2)
12	16:21	22	12:04 (2)	17:16	12	16:07 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	17	15:39 (1)	16:07	22					11:50 (2)
13	08:42		11:43 (2)	08:03		15:58 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36		08:28							11:27 (2)
14	16:22	20	12:03 (2)	17:18	6	16:04 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	20	15:40 (1)	16:06	24					11:51 (2)
15	08:42		11:45 (2)	08:01		16:00	06:44	06:38	05:38	04:57	05:05	05:51	06:45	07:39	07:38		08:29							11:27 (2)
16	16:24	17	12:02 (2)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:41	22	15:41 (1)	16:06	26					11:53 (2)
17	08:41		11:48 (2)	07:59		16:57	06:42	06:36	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:30							11:27 (2)
18	16:25	13	12:01 (2)	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:39	23	15:43 (1)	16:05	27					11:54 (2)
19	08:40		11:51 (2)	07:57		16:55	06:39	06:34	04:56	05:07	05:54	06:49	07:43	07:42	07:42		08:32							11:26 (2)
20	16:26	8	11:59 (2)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:37	24	15:43 (1)	16:05	29					11:55 (2)
21	08:40		11:55	07:55		16:53	06:37	06:33	04:56	05:08	05:56	06:51	07:44	07:44	07:44		08:33							11:26 (2)
22	16:28		11:57	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36	16:36	26	15:44 (1)	16:05	30					11:56 (2)
23	08:39		11:58	07:53		16:50	06:35	06:31	04:55	05:09	05:57	06:52	07:46	07:46	07:46		08:34							11:26 (2)
24	16:30		11:59	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	16:34	26	15:44 (1)	16:05	30					11:56 (2)
25	08:38		11:55 (1)	07:51		16:48	06:32	06:29	04:55	05:10	05:59	06:54	07:48	07:47	07:47		08:35							11:27 (2)
26	16:31	5	11:55 (1)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:32	27	15:45 (1)	16:05	31					11:58 (2)
27	08:37		11:54 (1)	07:49		16:45	06:30	06:27	04:55	05:12	06:01	06:56	07:50	07:49	07:49		08:36							11:27 (2)
28	16:33	8	11:57 (1)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:31	27	15:45 (1)	16:05	32					11:59 (2)
29	08:36		11:58 (1)	07:47		16:43	06:28	06:26	04:55	05:13	06:03	06:58	07:52	07:51	07:51		08:37							11:27 (2)
30	16:34	11	11:59 (1)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:29	27	15:45 (1)	16:05	33					12:00 (2)
31	08:35		11:58 (1)	07:45		16:40	06:25	06:24	04:54	05:14	06:05	06:59	07:54	07:53	07:53		08:38							11:27 (2)
32	16:36	13	16:01 (1)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:27	27	15:45 (1)	16:05	32					11:59 (2)
33	08:34		11:56 (1)	07:43		16:38	06:23	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55		08:39							11:27 (2)
34	16:38	16	16:02 (1)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:26	27	15:45 (1)	16:05	33					12:00 (2)
35	08:33		11:54 (1)	07:41		16:36	06:21	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57		08:39							11:28 (2)
36	16:40	19	16:05 (1)	17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:25	26	15:45 (1)	16:05	33					12:01 (2)
37	08:32		11:54 (1)	07:39		16:33	06:18	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59		08:40							11:28 (2)
38	16:41	21	16:07 (1)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:23	26	15:45 (1)	16:05	34					12:02 (2)
39	08:31		11:54 (1)	07:37		16:31	06:16	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01		08:41							11:28 (2)
40	16:43	23	16:08 (1)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:22	25	15:45 (1)	16:06	34					12:02 (2)
41	08:30		11:54 (1)	07:34		16:28	06:14	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:03		08:41							11:29 (2)
42	16:45	25	16:10 (1)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:20	25	15:45 (1)	16:06	34					12:03 (2)
43	08:29		11:54 (1)	07:32		16:26	06:12	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		08:42							11:29 (2)
44	16:47	25	16:10 (1)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:19	23	15:44 (1)	16:06	34					12:03 (2)
45	08:27		11:54 (1)	07:30		16:23	06:09	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		08:42							11:30 (2)
46	16:49	26	16:11 (1)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:18	21	15:43 (1)	16:07	34					12:04 (2)
47	08:26		11:54 (1)	07:28		16:21	06:07	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08		08:43							11:30 (2)
48	16:51	26	16:11 (1)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:17	19	15:42 (1)	16:08	34					12:04 (2)
49	08:25		11:54 (1)	07:25		16:18	06:05	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09		08:43							11:30 (2)
50	16:52	27	16:12 (1)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	16:16	17	15:41 (1)	16:08	34					12:04 (2)
51	08:23		11:54 (1)	07:23		16:16	06:03	06:03	04:56	05:29	06:22	07:17	08:13	08:11	08:11		08:43							11:32 (2)
52	16:54	27	16:12 (1)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:14	16:14	13	15:39 (1)	16:09	33					12:05 (2)
53	08:22		11:54 (1)	07:21		16:13	06:01	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13		08:44							11:32 (2)
54	16:56	27	16:12 (1)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:13	11	15:38 (1)	16:10	33					12:05 (2)
55	08:20		11:54 (1)	07:19		16:11	05:58	05:57	04:57	05:32	06:26	07:21	07:17	08:14	08:14		08:44							11:33 (2)
56	16:58	27	16:13 (1)	18:00		18:53	20:50	21:40																

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GH - H190

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:04
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:11 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:41	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** GI - H191

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:00 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:50 (2)										
2	16:15	22	15:22 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	16	15:06 (2)								
3	08:44	15:01 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	14:49 (2)										
4	16:16	22	15:23 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	17	15:06 (2)								
5	08:44	15:01 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	14:49 (2)										
6	16:17	22	15:23 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	18	15:07 (2)								
7	08:43	15:02 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	14:50 (2)										
8	16:18	21	15:23 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	19	15:09 (2)								
9	08:43	15:02 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	14:49 (2)										
10	16:19	21	15:23 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	20	15:09 (2)								
11	08:43	15:04 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	14:50 (2)										
12	16:21	20	15:24 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:07	20	15:10 (2)								
13	08:42	15:04 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	14:50 (2)										
14	16:22	20	15:24 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	20	15:10 (2)								
15	08:42	15:05 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	14:49 (2)										
16	16:23	19	15:24 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	22	15:11 (2)								
17	08:41	15:06 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	14:50 (2)										
18	16:25	18	15:24 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	22	15:12 (2)								
19	08:40	15:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	14:50 (2)										
20	16:26	17	15:24 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	22	15:12 (2)								
21	08:40	15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33	14:50 (2)										
22	16:28	16	15:24 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05	22	15:12 (2)								
23	08:39	15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	14:51 (2)										
24	16:29	14	15:23 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	22	15:13 (2)								
25	08:38	15:11 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	14:51 (2)										
26	16:31	12	15:23 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04	22	15:13 (2)								
27	08:37	15:13 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	14:52 (2)										
28	16:33	9	15:22 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04	23	15:15 (2)								
29	08:36	15:16 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37	14:52 (2)										
30	16:34	3	15:19 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	22	15:14 (2)								
31	08:35	15:07 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	14:52 (2)										
32	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	15:15 (2)											
33	08:34	15:07 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39	14:53 (2)										
34	16:38	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05	15:16 (2)											
35	08:33	15:07 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	14:54 (2)										
36	16:39	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05	15:16 (2)											
37	08:32	15:07 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	14:54 (2)										
38	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	15:17 (2)											
39	08:31	15:06 (2)	07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00	08:41	14:54 (2)										
40	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05	15:17 (2)											
41	08:30	15:05 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	14:55 (2)										
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	15:18 (2)											
43	08:29	15:03 (2)	07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42	14:55 (2)										
44	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06	15:18 (2)											
45	08:27	15:01 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	14:56 (2)										
46	16:49	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07	15:19 (2)											
47	08:26	15:00 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43	14:56 (2)										
48	16:50	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07	15:19 (2)											
49	08:25	15:00 (2)	07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	08:11	08:09	08:43	14:56 (2)										
50	16:52	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:15	16:08	15:19 (2)											
51	08:23	15:00 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:43	14:57 (2)										
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14	16:09	15:19 (2)											
53	08:22	15:00 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13	14:55 (2)	08:44										
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	16:10	15:21 (2)											
55	08:20	15:00 (2)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	14:53 (2)	08:44										
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	16:10	15:22 (2)											
57	08:19	15:00 (2)	07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16	14:51 (2)	08:44											
58	17:00	19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	12	15:03 (2)	16:11	23	15:22 (2)									
59	08:17	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	14:50 (2)	08:44												
60	17:02	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	14	15:04 (2)	16:12	22	15:22 (2)									
61	08:15	07:04	05:54	05:04	04:57	05:37	06:31	07:22	08:18	08:16	14:51 (2)	08:44			</									

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** GJ - H192

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:00 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19		14:50 (2)							
2	16:15	21	15:21 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10	14	15:04 (2)							
3	08:44		15:01 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26		08:21		14:49 (2)							
4	16:16	21	15:22 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09	15	15:04 (2)							
5	08:44		15:01 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22		14:49 (2)							
6	16:17	20	15:21 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50		16:08	17	15:06 (2)							
7	08:43		15:02 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30		08:24		14:49 (2)							
8	16:18	20	15:22 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48		16:08	18	15:07 (2)							
9	08:43		15:02 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25		14:49 (2)							
10	16:19	20	15:22 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46		16:07	18	15:07 (2)							
11	08:43		15:03 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34		08:26		14:49 (2)							
12	16:21	20	15:23 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44		16:06	20	15:09 (2)							
13	08:42		15:04 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36		08:28		14:49 (2)							
14	16:22	18	15:22 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:42		16:06	20	15:09 (2)							
15	08:42		15:04 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38		08:29		14:49 (2)							
16	16:23	18	15:22 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41		16:06	20	15:09 (2)							
17	08:41		15:06 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:30		14:50 (2)							
18	16:25	17	15:23 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39		16:05	21	15:11 (2)							
19	08:40		15:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42		08:32		14:50 (2)							
20	16:26	15	15:22 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37		16:05	21	15:11 (2)							
21	08:40		15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44		08:33		14:50 (2)							
22	16:28	14	15:22 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35		16:05	21	15:11 (2)							
23	08:39		15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46		08:34		14:50 (2)							
24	16:29	12	15:21 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34		16:05	22	15:12 (2)							
25	08:38		15:11 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47		08:35		14:50 (2)							
26	16:31	9	15:20 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32		16:04	22	15:12 (2)							
27	08:37		15:14 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49		08:36		14:52 (2)							
28	16:33	4	15:18 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30		16:04	22	15:14 (2)							
29	08:36		15:13 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51		08:37		14:51 (2)							
30	16:34		15:14 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29		16:04	22	15:13 (2)							
31	08:35		15:15 (2)	07:48	06:44	06:29	05:26	04:54	05:14	06:04	06:59	07:54	07:53		08:38		14:52 (2)							
32	16:36		15:16 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27		16:05	22	15:14 (2)							
33	08:34		15:17 (2)	07:49	06:45	06:30	05:27	04:54	05:16	06:06	07:01	07:55	07:55		08:39		14:52 (2)							
34	16:38		15:18 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26		16:05	22	15:14 (2)							
35	08:33		15:19 (2)	07:49	06:45	06:30	05:27	04:54	05:17	06:08	07:03	07:57	07:57		08:39		14:53 (2)							
36	16:39		15:20 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24		16:05	22	15:15 (2)							
37	08:32		15:21 (2)	07:49	06:46	06:31	05:28	04:54	05:18	06:10	07:05	07:59	07:59		08:40		14:54 (2)							
38	16:41		15:22 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23		16:05	22	15:16 (2)							
39	08:31		15:23 (2)	07:49	06:46	06:31	05:28	04:54	05:20	06:12	07:06	08:01	08:00		08:41		14:53 (2)							
40	16:43		15:24 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22		16:05	23	15:16 (2)							
41	08:30		15:25 (2)	07:49	06:46	06:31	05:28	04:54	05:21	06:13	07:08	08:03	08:02		08:41		14:54 (2)							
42	16:45		15:26 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20		16:06	23	15:17 (2)							
43	08:29		15:27 (2)	07:49	06:46	06:31	05:28	04:54	05:23	06:15	07:10	08:05	08:04		08:42		14:54 (2)							
44	16:47		15:28 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19		16:06	23	15:17 (2)							
45	08:27		15:29 (2)	07:49	06:46	06:31	05:28	04:54	05:24	06:17	07:12	08:07	08:06		08:42		14:55 (2)							
46	16:49		15:30 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18		16:07	23	15:18 (2)							
47	08:26		15:31 (2)	07:49	06:46	06:31	05:28	04:55	05:26	06:19	07:13	08:09	08:08		08:43		14:55 (2)							
48	16:50		15:32 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17		16:07	23	15:18 (2)							
49	08:25		15:33 (2)	07:49	06:46	06:31	05:28	04:55	05:27	06:20	07:15	08:11	08:09		08:43		14:56 (2)							
50	16:52		15:34 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:15		16:08	22	15:18 (2)							
51	08:23		15:35 (2)	07:49	06:46	06:31	05:28	04:56	05:29	06:22	07:17	08:13	08:11		08:43		14:56 (2)							
52	16:54		15:36 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14		16:09	22	15:18 (2)							
53	08:22		15:37 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13		08:44		14:57 (2)							
54	16:56		15:38 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13		16:10	23	15:20 (2)							
55	08:20		15:39 (2)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14		08:44		14:58 (2)							
56	16:58		15:40 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	4	14:58 (2)		15:20 (2)							
57	08:19		15:41 (2)	07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16	14:51 (2)	08:44		14:58 (2)								
58	17:00		15:42 (2)	19:54	20:52	21:41	22:01	21:30	20:25	19:09	18:00	16:11	15:00 (2)	9	16:11	22	15:20 (2)							
59	08:17		15:43 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	14:51 (2)	08:44		14:59 (2)								
60	17:02		15:44 (2)	19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:58	16:11	11	15:02 (2)		15:21 (2)							

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GK - H193

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GL - H194

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GM - H195

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GN - H196

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March		April	May	June	July	August	September	October		November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	3	07:41 (1) 07:44 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18		08:11 (1) 08:20 (1)	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	7	07:39 (1) 07:46 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	9	08:07 (1) 08:21 (1)	07:26 16:52
3	08:44 16:16	08:10 17:10	07:12 18:06	10	07:36 (1) 07:46 (1)	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	14	08:06 (1) 08:22 (1)	07:28 16:50
4	08:43 16:18	08:09 17:12	07:09 18:08	13	07:34 (1) 07:47 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	16	08:05 (1) 08:23 (1)	07:30 16:48
5	08:43 16:20	08:07 17:14	07:07 18:10	16	07:31 (1) 07:47 (1)	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	18	08:04 (1) 08:23 (1)	07:32 16:46
6	08:43 16:21	08:05 17:16	07:05 18:12	18	07:29 (1) 07:47 (1)	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	19	08:03 (1) 08:24 (1)	07:34 16:45
7	08:42 16:22	08:03 17:18	07:02 18:13	21	07:27 (1) 07:48 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	20	08:04 (1) 08:24 (1)	07:36 16:43
8	08:42 16:24	08:01 17:20	07:00 18:15	20	07:27 (1) 07:47 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	17	08:06 (1) 08:23 (1)	07:38 16:41
9	08:41 16:25	07:59 17:22	06:58 18:17	19	07:27 (1) 07:46 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	15	08:07 (1) 08:22 (1)	07:40 16:39
10	08:41 16:27	07:57 17:24	06:55 18:19	18	07:27 (1) 07:45 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	12	08:09 (1) 08:21 (1)	07:42 16:37
11	08:40 16:28	07:55 17:26	06:53 18:21	15	07:29 (1) 07:44 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	9	08:11 (1) 08:20 (1)	07:44 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	11	07:30 (1) 07:41 (1)	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	5	08:13 (1) 08:18 (1)	07:46 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	2	07:35 (1) 07:37 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49		07:48 18:36	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27			06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47		07:50 18:34	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29			06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44		07:52 18:31	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31			06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42		07:54 18:29	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32			06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39		07:56 18:27	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34			06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37		07:58 18:24	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36			06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34		07:59 18:22	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38			06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32		08:01 18:20	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40			06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29		08:03 18:18	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42			06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27		08:05 18:15	08:43 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44			06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24		08:07 18:13	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45			06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22		08:09 18:11	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47			06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20		08:10 17:09	08:44 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49			06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17		08:11 17:07	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51			06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15		08:13 17:05	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53			05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12		08:15 17:02	08:44 16:11
29	08:19 17:00		07:09 19:55			05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10		08:16 17:00	08:44 16:12
30	08:17 17:02		07:06 19:57			05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07		08:18 16:58	08:44 16:13
31	08:16 17:04		07:04 19:58			05:54 21:44	05:04 21:44	04:57 21:27	05:37 20:21	06:31 20:21	07:23 16:56		08:19 16:56	08:44 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328		259	233
Total, worst case			173								175			
Sun reduction			0.27								0.29			
Oper. time red.			1.00								1.00			
Wind dir. red.			0.65								0.65			
Total reduction			0.18								0.19			
Total, real			30								33			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GO - H197

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	19 08:00 (1)	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	07:40 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20 08:00 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	07:40 (1)	06:57	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22		
	16:17	17:10	18:06	19 07:59 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:09		
4	08:44	08:09	07:09	07:41 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24		
	16:18	17:12	18:08	17 07:58 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	07:41 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32	08:25		
	16:20	17:14	18:10	16 07:57 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07		
6	08:43	08:05	07:05	07:42 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:24 (1)	07:34	08:27	
	16:21	17:16	18:12	13 07:55 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	2 08:26 (1)	16:45	16:07	
7	08:42	08:03	07:02	07:45 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:19 (1)	16:45	16:07	
	16:22	17:18	18:13	8 07:53 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	11 08:30 (1)	16:43	16:06	
8	08:42	08:01	07:00		06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:18 (1)	16:41	16:06	
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:12	20:02	18:48	14 08:32 (1)	16:41	16:06	
9	08:41	07:59	06:58		06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:15 (1)	16:40	16:06	
	16:25	17:22	18:17		20:15	21:10	21:54	21:56	21:10	19:59	18:45	17 08:32 (1)	16:39	16:06	
10	08:41	07:57	06:55		06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:14 (1)	16:42	08:32	
	16:27	17:24	18:19		20:17	21:12	21:55	21:55	21:08	19:57	18:43	19 08:33 (1)	16:37	16:05	
11	08:40	07:55	06:53		06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:14 (1)	16:44	08:33	
	16:28	17:26	18:21		20:19	21:13	21:56	21:54	21:06	19:54	18:41	19 08:33 (1)	16:36	16:05	
12	08:39	07:53	06:50		06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:13 (1)	16:46	08:34	
	16:30	17:28	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	20 08:33 (1)	16:34	16:05	
13	08:38	07:51	06:48		06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:15 (1)	16:48	08:35	
	16:31	17:30	18:25		20:22	21:17	21:57	21:52	21:02	19:49	18:36	18 08:33 (1)	16:32	16:05	
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:17 (1)	16:50	08:36	
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	15 08:32 (1)	16:31	16:05	
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:19 (1)	16:51	08:37	
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	13 08:32 (1)	16:29	16:05	
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:21 (1)	16:53	08:38	
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	10 08:31 (1)	16:28	16:05	
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:23 (1)	16:55	08:39	
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	6 08:29 (1)	16:26	16:05	
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:25 (1)	16:57	08:39	
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	2 08:27 (1)	16:25	16:05	
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59		16:59	08:40	
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22		16:23	16:05	
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01		16:23	16:05	
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20		16:22	16:06	
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03		16:22	16:06	
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18		16:21	16:06	
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05		16:21	16:06	
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15		16:19	16:07	
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07		16:18	16:07	
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13		16:18	16:07	
24	08:26	07:28	06:21	07:53 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		16:18	16:08
	16:51	17:52	4 07:57 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11		16:17	16:08	
25	08:25	07:26	07:51 (1)	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11		16:17	16:08	
	16:53	17:54	8 07:59 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09		16:16	16:08	
26	08:23	07:23	07:48 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		16:16	16:08	
	16:54	17:56	11 07:59 (1)	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07		16:15	16:09	
27	08:22	07:21	07:46 (1)	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15		16:15	16:09	
	16:56	17:58	14 08:00 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05		16:14	16:10	
28	08:20	07:19	07:43 (1)	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17		16:15	16:10	
	16:58	18:00	16 07:59 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02		16:13	16:11	
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	08:19		16:16	16:11	
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17:00		16:12	16:12	
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	08:21		16:18	16:12	
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	16:58		16:11	16:13	
31	08:16		07:04			05:04		05:37	06:31	07:23			16:11	16:13	
	17:04		19:58			21:44		21:27	20:21	16:56			16:14	16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382	328	259	233		
Total, worst case		53	112								166				
Sun reduction		0.23	0.27								0.29				
Oper. time red.		1.00	1.00								1.00				
Wind dir. red.		0.65	0.65								0.65				
Total reduction		0.15	0.18								0.19				
Total, real		8	20								31				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GP - H198

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GQ - H199

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:40 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** GR - H200

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (1)
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	08:16 (1)
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	07:56 (1)
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	08:16 (1)
3	08:44	08:10	08:38 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:58 (1)
	16:17	17:10	3	08:41 (1)	18:06	20:04	20:59	21:48	21:21	20:14	19:00	08:16 (1)
4	08:43	08:09	08:36 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:00 (1)
	16:18	17:12	7	08:43 (1)	18:08	20:06	21:01	21:49	21:19	20:11	18:57	08:15 (1)
5	08:43	08:07	08:34 (1)	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:02 (1)
	16:20	17:14	10	08:44 (1)	18:10	20:08	21:03	21:50	21:18	20:09	18:55	08:14 (1)
6	08:43	08:05	08:32 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:04 (1)
	16:21	17:16	13	08:45 (1)	18:12	20:10	21:05	21:51	21:16	20:06	18:53	08:13 (1)
7	08:42	08:03	08:30 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:06 (1)
	16:22	17:18	15	08:45 (1)	18:13	20:11	21:06	21:52	21:14	20:04	18:50	08:12 (1)
8	08:42	08:01	08:28 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:09 (1)
	16:24	17:20	18	08:46 (1)	18:15	20:13	21:08	21:53	21:12	20:02	18:48	08:12 (1)
9	08:41	07:59	08:26 (1)	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:10 (1)
	16:25	17:22	20	08:46 (1)	18:17	20:15	21:10	21:54	21:10	19:59	18:45	08:11 (1)
10	08:41	07:57	08:24 (1)	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:12 (1)
	16:27	17:24	23	08:47 (1)	18:19	20:17	21:12	21:55	21:08	19:57	18:43	08:13 (1)
11	08:40	07:55	08:24 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:14 (1)
	16:28	17:26	23	08:47 (1)	18:21	20:19	21:13	21:56	21:06	19:54	18:41	08:15 (1)
12	08:39	07:53	08:24 (1)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:16 (1)
	16:30	17:28	23	08:47 (1)	18:23	20:21	21:15	21:56	21:04	19:52	18:38	08:17 (1)
13	08:38	07:51	08:25 (1)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:18 (1)
	16:31	17:30	21	08:46 (1)	18:25	20:22	21:17	21:57	21:02	19:49	18:36	08:19 (1)
14	08:37	07:49	08:25 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:20 (1)
	16:33	17:32	20	08:45 (1)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	08:21 (1)
15	08:37	07:47	08:26 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:22 (1)
	16:35	17:34	18	08:44 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	08:23 (1)
16	08:36	07:45	08:27 (1)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:24 (1)
	16:36	17:36	16	08:43 (1)	18:31	20:28	21:22	21:59	21:49	20:55	19:42	08:25 (1)
17	08:35	07:43	08:29 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:26 (1)
	16:38	17:38	12	08:41 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	08:27 (1)
18	08:34	07:41	08:32 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:28 (1)
	16:40	17:40	7	08:39 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	08:29 (1)
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59	08:30 (1)
	16:41	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23	08:31 (1)
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01	08:32 (1)
	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	08:33 (1)
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:02	08:34 (1)
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	08:35 (1)
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:36 (1)
	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	08:37 (1)
23	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:38 (1)
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	08:39 (1)
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:40 (1)
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	9	09:09 (1)
25	08:25	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	07:11	07:58 (1)	08:10 (1)
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	13	08:11 (1)
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	07:56 (1)	08:11 (1)
	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	17	08:13 (1)
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	07:15	07:55 (1)	08:13 (1)
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	19	08:14 (1)
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17	07:54 (1)	08:15 (1)
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	21	08:15 (1)
29	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	07:53 (1)	08:16 (1)
	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	22	08:15 (1)
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21	07:54 (1)	08:18 (1)
	17:02		19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	22	08:16 (1)
31	08:16		07:04	05:53	05:04	04:57	05:37	06:31	07:22	07:18	07:53 (1)	08:19 (1)
	17:04		19:58	21:44	21:44	21:27	20:21	16:56	23	08:16 (1)	259	105
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	105
Total, worst case												105
Sun reduction												0.27
Oper. time red.												1.00
Wind dir. red.												0.62
Total reduction												0.16
Total, real												17

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GS - H201

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GT - H202

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GU - H203

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GV - H204

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GW - H205

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GX - H206

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GY - H207

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: GZ - H208

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HA - H209

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HB - H210

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Total reduction												
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HC - H211

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HD - H212

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HE - H213

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HF - H214

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HG - H215

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HH - H216

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HI - H217

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HJ - H218

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HK - H219

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HL - H220

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HM - H221

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HN - H222

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HO - H223

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HP - H224

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HQ - H225

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HR - H226

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	05:33 (5)	04:59	05:32 (5)	05:39	06:33	07:26	07:24	08:19
2	08:44	08:12	07:14	06:59	05:50	05:02	05:33 (5)	05:00	05:33 (5)	05:40	06:35	07:28	07:26	08:21
3	08:44	08:10	07:12	06:56	05:48	05:01	05:32 (5)	05:00	05:33 (5)	05:42	06:36	07:30	07:28	08:22
4	08:43	08:08	07:09	06:54	05:46	05:00	05:31 (5)	05:01	05:34 (5)	05:44	06:38	07:32	07:30	08:24
5	08:43	08:07	07:07	06:52	05:44	04:59	05:31 (5)	05:02	05:35 (5)	05:46	06:40	07:33	07:32	08:25
6	08:43	08:05	07:05	06:49	05:42	04:59	05:30 (5)	05:03	05:36 (5)	05:47	06:42	07:35	07:34	08:26
7	08:42	08:03	07:02	06:47	05:40	04:58	05:30 (5)	05:04	05:37 (5)	05:49	06:44	07:37	07:36	08:28
8	08:42	08:01	07:00	06:44	05:38	04:57	05:29 (5)	05:05	05:38 (5)	05:51	06:45	07:39	07:38	08:29
9	08:41	07:59	06:57	06:42	05:36	04:57	05:29 (5)	05:06	05:39 (5)	05:52	06:47	07:41	07:40	08:30
10	08:40	07:57	06:55	06:40	05:35	04:56	05:28 (5)	05:07	05:40 (5)	05:54	06:49	07:43	07:42	08:31
11	08:40	07:55	06:53	06:37	05:33	04:56	05:28 (5)	05:08	05:41 (5)	05:56	06:51	07:44	07:44	08:33
12	08:39	07:53	06:50	06:35	05:31	04:56	05:28 (5)	05:09	05:42 (5)	05:58	06:52	07:46	07:46	08:34
13	08:38	07:51	06:48	06:32	05:29	04:55	05:27 (5)	05:11	05:43 (5)	05:59	06:54	07:48	07:47	08:35
14	08:37	07:49	06:45	06:30	05:27	04:55	05:27 (5)	05:12	05:44 (5)	06:01	06:56	07:50	07:49	08:36
15	08:36	07:47	06:43	06:28	05:26	04:55	05:27 (5)	05:13	05:45 (5)	06:03	06:58	07:52	07:51	08:37
16	08:35	07:45	06:40	06:25	05:24	04:55	05:27 (5)	05:14	05:47 (5)	06:05	06:59	07:54	07:53	08:38
17	08:34	07:43	06:38	06:23	05:22	04:54	05:27 (5)	05:16	05:48 (5)	06:06	07:01	07:56	07:55	08:38
18	08:33	07:41	06:36	06:21	05:21	04:54	05:27 (5)	05:17	05:49 (5)	06:08	07:03	07:57	07:57	08:39
19	08:32	07:39	06:33	06:18	05:19	04:54	05:27 (5)	05:19	05:50 (5)	06:10	07:05	07:59	07:59	08:40
20	08:31	07:37	06:31	06:16	05:18	04:54	05:27 (5)	05:20	05:52 (5)	06:12	07:06	08:01	08:00	08:41
21	08:30	07:34	06:28	06:14	05:16	04:55	05:27 (5)	05:21	05:53 (5)	06:13	07:08	08:03	08:02	08:41
22	08:29	07:32	06:26	06:12	05:15	04:55	05:28 (5)	05:23	05:55 (5)	06:15	07:10	08:05	08:04	08:42
23	08:27	07:30	06:23	06:09	05:13	04:55	05:28 (5)	05:24	05:56 (5)	06:17	07:12	08:07	08:06	08:42
24	08:26	07:28	06:21	06:07	05:12	04:55	05:28 (5)	05:26	05:58 (5)	06:19	07:14	08:09	08:08	08:43
25	08:25	07:25	06:18	06:05	05:11	04:56	05:29 (5)	05:27	06:01 (5)	06:21	07:15	08:11	08:09	08:43
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29 (5)	05:29	06:05 (5)	06:22	07:17	08:13	08:11	08:43
27	08:22	07:21	06:14	06:01	05:08	04:57	05:30 (5)	05:31	06:06 (5)	06:24	07:19	08:15	08:13	08:44
28	08:20	07:19	06:11	05:59	05:07	04:57	05:30 (5)	05:32	06:08 (5)	06:26	07:21	08:17	08:14	08:44
29	08:19	07:18	06:10	05:58	05:06	04:56	05:31 (5)	05:33	06:09 (5)	06:27	07:22	08:18	08:16	08:44
30	08:17	07:16	06:08	05:56	05:05	04:55	05:31 (5)	05:35	06:10 (5)	06:28	07:23	08:19	08:17	08:44
31	08:15	07:14	06:06	05:54	05:04	04:54	05:32 (5)	05:37	06:11 (5)	06:29	07:24	08:20	08:18	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case					151	989	489							
Sun reduction					0.38	0.32	0.32							
Oper. time red.					1.00	1.00	1.00							
Wind dir. red.					0.66	0.66	0.66							
Total reduction					0.25	0.21	0.21							
Total, real					38	208	104							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: HS - H227

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	06:18 (4) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	06:16 (4) 21:47
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	06:14 (4) 21:48
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	06:12 (4) 21:49
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	06:13 (4) 21:50
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	06:15 (4) 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	07:14 (5) 20:20	05:31 21:15	04:56 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	07:12 (5) 20:22	05:29 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	07:09 (5) 20:24	05:27 21:18	04:55 21:58
15	08:36 16:35	07:47 17:34	06:43 18:29	07:07 (5) 20:26	05:26 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	07:04 (5) 20:28	05:24 21:22	04:55 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	07:02 (5) 20:30	05:22 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:36 18:34	06:59 (5) 20:32	05:21 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:57 (5) 20:33	05:19 21:27	04:54 22:00
20	08:31 16:43	07:37 17:44	06:31 18:38	06:54 (5) 20:35	05:18 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:52 (5) 20:37	05:16 21:30	04:55 22:01
22	08:29 16:47	07:32 17:48	06:26 18:42	06:50 (5) 20:39	05:15 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:47 (5) 20:41	05:13 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:47 (5) 20:43	05:12 21:34	04:55 22:01
25	08:25 16:53	07:25 17:54	06:18 18:47	06:46 (5) 20:44	05:11 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:47 (5) 20:46	05:09 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:14 18:51	06:47 (5) 20:48	05:08 21:39	04:57 22:01
28	08:20 16:58	07:19 18:00	06:11 18:53	06:49 (5) 20:50	05:07 21:40	04:57 22:01
29	08:19 17:00		07:09 19:55	07:49 (5) 20:52	05:06 21:41	04:58 22:01
30	08:17 17:02		07:06 19:56	07:51 (5) 20:54	05:05 21:43	04:58 22:00
31	08:15 17:04		07:04 19:58	07:53 (5) 20:56	05:04 21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case			429	44	81	179
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.68	0.68	0.66
Total reduction			0.18	0.24	0.26	0.21
Total, real			78	10	21	38

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HS - H227

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33		07:26	07:52 (5)	07:24	08:19		
	22:00	6	05:38 (3)	21:25	20:18	19:05	3	07:55 (5)	16:54	16:10	
2	05:00	05:33 (3)	05:40	06:35		07:28		07:26	08:21		
	22:00	5	05:38 (3)	21:23	20:16	19:02		16:52	16:09		
3	05:00	05:33 (3)	05:42	06:36		07:30		07:28	08:22		
	21:59	5	05:38 (3)	21:21	20:14	19:00		16:50	16:09		
4	05:01	05:34 (3)	05:44	06:38		07:32		07:30	08:24		
	21:59	4	05:38 (3)	21:19	20:11	18:57		16:48	16:08		
5	05:02	05:35 (3)	05:46	06:40		07:33		07:32	08:25		
	21:58	3	05:38 (3)	21:17	20:09	18:55		16:46	16:07		
6	05:03	05:36 (3)	05:47	06:42		07:35		07:34	08:26		
	21:58	2	05:38 (3)	21:16	4	06:31 (4)	20:06	18:53	16:45	16:07	
7	05:04	05:37 (3)	05:49	06:44		07:37		07:36	08:28		
	21:57	1	05:38 (3)	21:14	11	06:35 (4)	20:04	18:50	16:43	16:06	
8	05:05	05:51	06:45			07:39		07:38	08:29		
	21:56	21:12	14	06:36 (4)	20:01	18:48		16:41	16:06		
9	05:06	05:52	06:47			07:41		07:40	08:30		
	21:55	21:10	16	06:38 (4)	19:59	18:45		16:39	16:06		
10	05:07	05:54	06:49			07:43		07:42	08:32		
	21:55	21:08	15	06:39 (4)	19:57	18:43		16:37	16:05		
11	05:08	05:56	06:51			07:44		07:44	08:33		
	21:54	21:06	14	06:39 (4)	19:54	18:41		16:36	16:05		
12	05:09	05:58	06:52			07:46 (5)	07:46	07:46	08:34		
	21:53	21:03	13	06:40 (4)	19:52	12	07:58 (5)	18:38	16:34	16:05	
13	05:11	05:59	06:54			07:43 (5)	07:48	07:47	08:35		
	21:52	21:01	11	06:39 (4)	19:49	18	08:01 (5)	18:36	16:32	16:05	
14	05:12	06:01	06:56			07:40 (5)	07:50	07:49	08:36		
	21:51	20:59	10	06:40 (4)	19:47	22	08:02 (5)	18:34	16:31	16:05	
15	05:13	06:03	06:58			07:38 (5)	07:52	07:51	08:37		
	21:50	20:57	8	06:40 (4)	19:44	26	08:04 (5)	18:31	16:29	16:05	
16	05:14	06:05	06:59			07:37 (5)	07:54	07:53	08:38		
	21:49	20:55	6	06:39 (4)	19:42	28	08:05 (5)	18:29	16:28	16:05	
17	05:16	06:06	07:01			07:36 (5)	07:56	07:55	08:39		
	21:47	20:53	4	06:39 (4)	19:39	30	08:06 (5)	18:27	16:26	16:05	
18	05:17	06:08	07:03			07:34 (5)	07:57	07:57	08:39		
	21:46	20:51	2	06:39 (4)	19:37	31	08:05 (5)	18:24	16:25	16:05	
19	05:19	06:10	07:05			07:33 (5)	07:59	07:59	08:40		
	21:45	20:48	33	08:06 (5)	18:22			16:23	16:05		
20	05:20	06:12	07:06			07:33 (5)	08:01	08:01	08:41		
	21:44	20:46	33	08:06 (5)	18:20			16:22	16:06		
21	05:21	06:13	07:08			07:35 (5)	08:03	08:02	08:41		
	21:42	20:44	31	08:06 (5)	18:18			16:21	16:06		
22	05:23	06:15	07:10			07:36 (5)	08:05	08:04	08:42		
	21:41	20:42	29	08:05 (5)	18:15			16:19	16:07		
23	05:24	06:17	07:12			07:38 (5)	08:07	08:06	08:42		
	21:39	20:39	27	08:05 (5)	18:13			16:18	16:07		
24	05:26	06:19	07:14			07:40 (5)	08:09	08:08	08:43		
	21:38	20:37	25	08:05 (5)	18:11			16:17	16:08		
25	05:27	06:21	07:15			07:42 (5)	07:11	08:09	08:43		
	21:36	20:35	22	08:04 (5)	17:09			16:16	16:08		
26	05:29	06:22	07:17			07:43 (5)	07:13	08:11	08:43		
	21:35	20:32	19	08:02 (5)	17:07			16:15	16:09		
27	05:31	06:24	07:19			07:45 (5)	07:15	08:13	08:44		
	21:33	20:30	17	08:02 (5)	17:05			16:14	16:10		
28	05:32	06:26	07:21			07:47 (5)	07:17	08:14	08:44		
	21:32	20:28	14	08:01 (5)	17:02			16:13	16:11		
29	05:34	06:28	07:23			07:49 (5)	07:18	08:16	08:44		
	21:30	20:25	10	07:59 (5)	17:00			16:12	16:12		
30	05:35	06:29	07:24			07:51 (5)	07:20	08:18	08:44		
	21:28	20:23	7	07:58 (5)	16:58			16:11	16:13		
31	05:37	06:31				07:22			08:44		
	21:27	20:21				16:56			16:14		
Potential sun hours	512	460	382	328	259	233					
Total, worst case	26	128	434	3							
Sun reduction	0.32	0.34	0.32	0.29							
Oper. time red.	1.00	1.00	1.00	1.00							
Wind dir. red.	0.66	0.68	0.67	0.67							
Total reduction	0.21	0.23	0.21	0.20							
Total, real	6	30	93	1							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HT - H228

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	07:25 (5)	05:52
	16:15	17:06	18:02	20:00	4 07:29 (5)	20:55
2	08:44	08:12	07:14	06:59	07:23 (5)	05:50
	16:16	17:08	18:04	20:02	7 07:30 (5)	20:57
3	08:44	08:10	07:12	06:56	07:20 (5)	05:48
	16:17	17:10	18:06	20:04	9 07:29 (5)	20:59
4	08:43	08:09	07:09	06:54	07:18 (5)	05:46
	16:18	17:12	18:08	20:06	12 07:30 (5)	21:01
5	08:43	08:07	07:07	06:52	07:15 (5)	05:44
	16:20	17:14	18:10	20:08	14 07:29 (5)	21:03
6	08:43	08:05	07:05	06:49	07:13 (5)	05:42
	16:21	17:16	18:11	20:09	16 07:29 (5)	21:04
7	08:42	08:03	07:02	06:47	07:11 (5)	05:40
	16:22	17:18	18:13	20:11	18 07:29 (5)	21:06
8	08:42	08:01	07:00	06:44	07:08 (5)	05:38
	16:24	17:20	18:15	20:13	19 07:27 (5)	21:08
9	08:41	07:59	06:57	06:42	07:07 (5)	05:36
	16:25	17:22	18:17	20:15	19 07:26 (5)	21:10
10	08:40	07:57	06:55	06:40	07:07 (5)	05:35
	16:27	17:24	18:19	20:17	17 07:24 (5)	21:12
11	08:40	07:55	06:53	06:37	07:08 (5)	05:33
	16:28	17:26	18:21	20:19	15 07:23 (5)	21:13
12	08:39	07:53	06:50	06:35	07:10 (5)	05:31
	16:30	17:28	18:23	20:21	11 07:21 (5)	21:15
13	08:38	07:51	06:48	06:32		05:29
	16:31	17:30	18:25	20:22		21:17
14	08:37	07:49	06:45	06:30		05:27
	16:33	17:32	18:27	20:24		21:18
15	08:36	07:47	06:43	06:28		05:26
	16:35	17:34	18:29	20:26		21:20
16	08:35	07:45	06:41	06:25		05:24
	16:36	17:36	18:30	20:28		21:22
17	08:34	07:43	06:38	06:23		05:22
	16:38	17:38	18:32	20:30		21:23
18	08:33	07:41	06:36	06:21		05:21
	16:40	17:40	18:34	20:32		21:25
19	08:32	07:39	06:33	06:19		05:19
	16:42	17:42	18:36	20:33		21:27
20	08:31	07:37	06:31	06:16		05:18
	16:43	17:44	18:38	20:35		21:28
21	08:30	07:34	06:28	06:14		05:16
	16:45	17:46	18:40	20:37		21:30
22	08:29	07:32	06:26	06:12		05:15
	16:47	17:48	18:42	20:39		21:31
23	08:27	07:30	06:23	06:09		05:13
	16:49	17:50	18:44	20:41		21:33
24	08:26	07:28	06:21	06:07		05:12
	16:51	17:52	18:45	20:43		21:34
25	08:25	07:25	06:18	06:05		05:11
	16:53	17:54	18:47	20:44		21:36
26	08:23	07:23	06:16	06:03		05:10
	16:54	17:56	18:49	20:46		21:37
27	08:22	07:21	06:14	06:01		05:08
	16:56	17:58	18:51	20:48		21:39
28	08:20	07:19	06:11	05:59		05:07
	16:58	18:00	18:53	20:50		21:40
29	08:19		07:09	05:56		05:06
	17:00		19:55	20:52		21:41
30	08:17		07:06	05:54		05:05
	17:02		19:56	20:54		21:43
31	08:15		07:04			05:04
	17:04		19:58			21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case				161		12
Sun reduction				0.35		0.38
Oper. time red.				1.00		1.00
Wind dir. red.				0.67		0.66
Total reduction				0.24		0.21
Total, real				38		82

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HT - H228

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 13	05:32 (3) 05:45 (3) 21:25	06:33 20:18 15	07:07 (5) 07:22 (5) 19:05	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 13	05:33 (3) 05:46 (3) 21:23	06:35 20:16 17	07:06 (5) 07:23 (5) 19:02	07:28 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 12	05:33 (3) 05:45 (3) 21:21	06:37 20:14 19	07:05 (5) 07:24 (5) 19:00	07:30 16:50 16:09	08:22 16:09 16:09
4	05:01 21:59 12	05:34 (3) 05:46 (3) 21:19	06:38 20:11 19	07:05 (5) 07:24 (5) 18:57	07:30 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 11	05:35 (3) 05:46 (3) 21:17	06:40 20:09 18	07:07 (5) 07:25 (5) 18:55	07:32 16:46 16:07	08:25 16:07 16:07
6	05:03 21:58 11	05:36 (3) 05:47 (3) 21:16	06:42 20:06 16	07:09 (5) 07:25 (5) 18:53	07:35 16:45 16:07	08:26 16:07 16:07
7	05:04 21:57 10	05:37 (3) 05:47 (3) 21:14	06:44 20:04 14	07:10 (5) 07:24 (5) 18:50	07:37 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 9	05:38 (3) 05:47 (3) 21:12	06:45 20:01 12	07:12 (5) 07:24 (5) 18:48	07:39 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 8	05:39 (3) 05:47 (3) 21:10	06:47 19:59 9	07:14 (5) 07:23 (5) 18:45	07:41 16:39 16:06	08:30 16:06 16:06
10	05:07 21:55 7	05:40 (3) 05:47 (3) 21:08	06:49 19:57 7	07:16 (5) 07:23 (5) 18:43	07:43 16:37 16:05	08:32 16:05 16:05
11	05:08 21:54 6	05:41 (3) 05:47 (3) 21:06	06:51 19:54 4	07:17 (5) 07:21 (5) 18:41	07:44 16:36 16:05	08:33 16:05 16:05
12	05:10 21:53 5	05:42 (3) 05:47 (3) 21:03	06:52 19:52 1	07:19 (5) 07:20 (5) 18:38	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 4	05:43 (3) 05:47 (3) 21:01	06:54 19:49 1	07:20 (5) 18:36 16:32	07:47 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 3	05:44 (3) 05:47 (3) 20:59	06:56 19:47 1	07:21 (5) 18:34 16:31	07:49 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 2	05:45 (3) 05:47 (3) 20:57	06:58 19:44 1	07:22 (5) 18:31 16:29	07:51 16:29 16:05	08:37 16:05 16:05
16	05:15 21:49 1	06:05 20:55 1	06:59 19:42 1	07:54 18:29 16:28	07:53 16:28 16:05	08:38 16:05 16:05
17	05:16 21:47 1	06:06 20:53 1	07:01 19:39 1	07:56 18:27 16:26	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 1	06:08 20:51 1	07:03 19:37 1	07:57 18:24 16:25	07:57 16:25 16:05	08:39 16:05 16:05
19	05:19 21:45 1	06:10 20:48 1	07:05 19:34 1	07:59 18:22 16:23	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44 1	06:12 20:46 1	07:07 19:32 1	08:01 18:20 16:22	08:01 16:22 16:06	08:41 16:06 16:06
21	05:21 21:42 1	06:14 20:44 1	07:08 19:29 1	08:03 18:18 16:21	08:02 16:21 16:06	08:41 16:06 16:06
22	05:23 21:41 1	06:15 20:42 1	07:10 19:27 1	08:05 18:15 16:19	08:04 16:19 16:07	08:42 16:07 16:07
23	05:24 21:39 1	06:17 20:39 1	07:12 19:24 1	08:07 18:13 16:18	08:06 16:18 16:07	08:42 16:07 16:07
24	05:26 21:38 1	06:19 20:37 1	07:14 19:22 1	08:09 18:11 16:17	08:08 16:17 16:08	08:43 16:08 16:08
25	05:28 21:36 1	06:21 20:35 1	07:15 19:19 1	07:11 17:09 16:16	08:09 16:16 16:08	08:43 16:08 16:08
26	05:29 21:35 1	06:22 20:33 1	07:17 19:17 1	07:13 17:07 16:15	08:11 16:15 16:09	08:43 16:09 16:09
27	05:31 21:33 1	06:24 20:30 1	07:19 19:15 1	07:15 17:05 16:14	08:13 16:14 16:10	08:44 16:10 16:10
28	05:32 21:32 1	06:26 20:28 1	07:21 19:12 1	07:17 17:02 16:13	08:14 16:13 16:11	08:44 16:11 16:11
29	05:34 21:30 1	06:28 20:25 1	07:23 19:10 1	07:19 17:00 16:12	08:16 16:12 16:12	08:44 16:12 16:12
30	05:35 21:28 1	06:29 20:23 1	07:24 19:07 1	07:20 16:58 16:11	08:18 16:11 16:13	08:44 16:13 16:13
31	05:37 21:27 1	06:31 20:21 11	07:10 (5) 07:21 (5)	07:22 16:56 16:14	08:44 16:14 16:14	08:44 16:14 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	126	11	151			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.67	0.67			
Total reduction	0.21	0.23	0.22			
Total, real	27	3	33			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HU - H229

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December					
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:27 (1)	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:56	17	06:35 (1)	21:45	22:00	21:25	11	06:38 (1)	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:40	06:26 (1)	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	19	06:35 (1)	21:47	22:00	21:23	14	06:40 (1)	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48	06:14 (1)	05:01	05:00	05:42	06:24 (1)	06:37	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	21	06:35 (1)	21:48	21:59	21:21	17	06:41 (1)	20:14	19:00	16:50	16:09	
4	08:43	08:09	07:09	06:54	05:46	06:12 (1)	05:00	05:01	05:44	06:23 (1)	06:38	07:32	07:30	08:24			
	16:18	17:12	18:08	20:06	21:01	22	06:34 (1)	21:49	21:59	21:19	19	06:42 (1)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44	06:11 (1)	04:59	05:02	05:46	06:23 (1)	06:40	07:33	07:32	08:25			
	16:20	17:14	18:10	20:08	21:03	23	06:34 (1)	21:50	21:58	21:18	20	06:43 (1)	20:09	18:55	16:46	16:07	
6	08:43	08:05	07:05	06:49	05:42	06:12 (1)	04:59	05:03	05:47	06:22 (1)	06:42	07:35	07:34	08:27			
	16:21	17:16	18:12	20:09	21:05	22	06:34 (1)	21:51	21:58	21:16	21	06:43 (1)	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40	06:13 (1)	04:58	05:04	05:49	06:22 (1)	06:44	07:37	07:36	08:28			
	16:22	17:18	18:13	20:11	21:06	21	06:34 (1)	21:52	21:57	21:14	22	06:44 (1)	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38	06:13 (1)	04:57	05:05	05:51	06:21 (1)	06:45	07:39	07:38	08:29			
	16:24	17:20	18:15	20:13	21:08	20	06:33 (1)	21:53	21:56	21:12	22	06:43 (1)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	05:36	06:13 (1)	04:57	05:06	05:52	06:22 (1)	06:47	07:41	07:40	08:30			
	16:25	17:22	18:17	20:15	21:10	18	06:31 (1)	21:54	21:56	21:10	22	06:44 (1)	19:59	18:45	16:39	16:06	
10	08:41	07:57	06:55	06:40	05:35	06:15 (1)	04:56	05:07	05:54	06:24 (1)	06:49	07:43	07:42	08:32			
	16:27	17:24	18:19	20:17	21:12	16	06:31 (1)	21:55	21:55	21:08	20	06:44 (1)	19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33	06:16 (1)	04:56	05:08	05:56	06:25 (1)	06:51	07:44	07:44	08:33			
	16:28	17:26	18:21	20:19	21:13	13	06:29 (1)	21:56	21:54	21:06	18	06:43 (1)	19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31	06:17 (1)	04:56	05:10	05:58	06:27 (1)	06:52	07:46	07:46	08:34			
	16:30	17:28	18:23	20:21	21:15	10	06:27 (1)	21:56	21:53	21:04	16	06:43 (1)	19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:33	05:29	06:21 (1)	04:55	05:11	05:59	06:29 (1)	06:54	07:48	07:48	08:35			
	16:31	17:30	18:25	20:22	21:17	3	06:24 (1)	21:57	21:52	21:01	14	06:43 (1)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:30 (1)	06:56	07:50	07:49	08:36			
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	12	06:42 (1)	19:47	18:34	16:31	16:05		
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:32 (1)	06:58	07:52	07:51	08:37			
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	9	06:41 (1)	19:44	18:31	16:29	16:05		
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	06:34 (1)	07:00	07:54	07:53	08:38			
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	6	06:40 (1)	19:42	18:29	16:28	16:05		
17	08:35	07:43	06:38	06:23	05:22		04:54	05:16	06:06	06:35 (1)	07:01	07:56	07:55	08:39			
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	3	06:38 (1)	19:39	18:27	16:26	16:05		
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08		07:03	07:58	07:57	08:39			
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51		19:37	18:24	16:25	16:05			
19	08:32	07:39	06:33	06:19	05:19		04:54	05:19	06:10		07:05	07:59	07:59	08:40			
	16:42	17:42	18:36	20:34	21:27		22:00	21:45	20:49		19:34	18:22	16:23	16:05			
20	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12		07:07	08:01	08:01	08:41			
	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46		19:32	18:20	16:22	16:06			
21	08:30	07:34	06:28	06:14	05:16		04:55	05:21	06:14		07:08	08:03	08:02	08:41			
	16:45	17:46	18:40	20:37	21:30		22:01	21:42	20:44		19:29	18:18	16:21	16:06			
22	08:29	07:32	06:26	06:12	05:15		04:55	05:23	06:15		07:10	08:05	08:04	08:42			
	16:47	17:48	18:42	20:39	21:31		22:01	21:41	20:42		19:27	18:15	16:19	16:07			
23	08:27	07:30	06:23	06:10	05:13		04:55	05:24	06:17		07:12	08:07	08:06	08:42			
	16:49	17:50	18:44	20:41	21:33		22:01	21:40	20:39		19:24	18:13	16:18	16:07			
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26	06:19		07:14	08:09	08:08	08:43			
	16:51	17:52	18:45	20:43	21:35		22:01	21:38	20:37		19:22	18:11	16:17	16:08			
25	08:25	07:26	06:19	06:05	05:11		04:56	05:28	06:21		07:15	07:11	08:09	08:43			
	16:53	17:54	18:47	20:45	21:36		22:01	21:37	20:35		19:20	17:09	16:16	16:08			
26	08:23	07:23	06:16	06:03	05:10	06:28 (1)	04:56	05:29	06:22		07:17	07:13	08:11	08:44			
	16:55	17:56	18:49	20:46	4	06:32 (1)	21:37	21:35	20:33		19:17	17:07	16:15	16:09			
27	08:22	07:21	06:14	06:01	05:08	06:26 (1)	04:57	05:31	06:24		07:19	07:15	08:13	08:44			
	16:56	17:58	18:51	20:48	7	06:33 (1)	21:39	22:01	20:30		19:15	17:05	16:14	16:10			
28	08:20	07:19	06:11	05:59	05:07	06:24 (1)	04:57	05:32	06:26		07:21	07:17	08:15	08:44			
	16:58	18:00	18:53	20:50	10	06:34 (1)	21:40	22:01	20:28		19:12	17:02	16:13	16:11			
29	08:19		07:09	05:56	05:06	06:22 (1)	04:58	05:34	06:28		07:23	07:19	08:16	08:44			
	17:00		19:55	20:52	12	06:34 (1)	21:42	22:01	20:26		19:10	17:00	16:12	16:12			
30	08:17		07:06	05:54	05:05	06:20 (1)	04:58	05:36	06:29		07:24	07:21	08:18	08:44			
	17:02		19:57	20:54	15	06:35 (1)	21:43	22:00	20:23		19:07	16:58	16:11	16:13			
31	08:15		07:04		05:04			05:37				07:22		08:44			
	17:04		19:58		21:44		21:27	7	06:30 (1)	06:37 (1)	20:21	16:56		16:14			
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233					
Total, worst case				48	225			7	266								
Sun reduction				0.35	0.38			0.32	0.34								
Oper. time red.				1.00	1.00			1.00	1.00								
Wind dir. red.				0.68	0.68			0.68	0.68								
Total reduction				0.24	0.26			0.22	0.23								
Total, real				11	58			2	61								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HV - H230

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (1) 5 07:30 (1)	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:09 (1) 19 07:28 (1)	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (1) 9 07:32 (1)	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:08 (1) 21 07:29 (1)	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	07:20 (1) 12 07:32 (1)	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:08 (1) 22 07:30 (1)	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (1) 15 07:33 (1)	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:06 (1) 23 07:29 (1)	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (1) 18 07:33 (1)	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:07 (1) 22 07:29 (1)	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	07:13 (1) 20 07:33 (1)	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:09 (1) 20 07:29 (1)	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:11 (1) 22 07:33 (1)	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:10 (1) 18 07:28 (1)	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:09 (1) 23 07:32 (1)	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:12 (1) 15 07:27 (1)	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	07:10 (1) 22 07:32 (1)	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:14 (1) 12 07:26 (1)	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:10 (1) 21 07:31 (1)	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:16 (1) 9 07:25 (1)	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:10 (1) 20 07:30 (1)	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:17 (1) 6 07:23 (1)	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	07:11 (1) 17 07:28 (1)	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:19 (1) 1 07:20 (1)	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	07:13 (1) 14 07:27 (1)	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49		07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	07:14 (1) 9 07:23 (1)	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47		07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26		05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44		07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28		05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42		07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30		05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39		07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32		05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37		07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34		05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34		07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35		05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32		08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37		05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29		08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39		05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27		08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41		05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24		08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43		05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22		08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45		05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20		07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46		05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17		07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48		05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15		07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50		05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12		07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52		05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 9 07:24 (1)		07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54		05:05 21:43	04:58 22:01	05:36 21:28	06:29 20:23	07:24 14 07:27 (1)		07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	07:27 (1) 07:28 (1)		05:04 21:44		05:37 21:27	06:31 20:21	07:11 (1) 17 07:28 (1)		07:22 16:56	08:11 16:14	08:44 16:14
Potential sun hours	250	273	367	420		494	510	512	460	382		328	259	233
Total, worst case			1	227					40	188				
Sun reduction			0.27	0.35					0.34	0.32				
Oper. time red.			1.00	1.00					1.00	1.00				
Wind dir. red.			0.68	0.68					0.68	0.68				
Total reduction			0.18	0.24					0.23	0.22				
Total, real			0	54					9	41				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HW - H231

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19	
	16:15	17:06	18:02	07:59 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10	
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21	
	16:16	17:08	18:04	08:00 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09	
3	08:44	08:10	07:12	07:37 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:22	
	16:17	17:10	18:06	08:00 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09	
4	08:43	08:09	07:09	07:37 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24	
	16:18	17:12	18:08	08:00 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08	
5	08:43	08:07	07:07	07:37 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25	
	16:20	17:14	18:10	07:59 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07	
6	08:43	08:05	07:05	07:37 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27	
	16:21	17:16	18:12	07:59 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:07	
7	08:42	08:03	07:02	07:38 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28	
	16:22	17:18	18:13	07:59 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06	
8	08:42	08:01	07:00	07:38 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29	
	16:24	17:20	18:15	07:58 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:06	
9	08:41	07:59	06:58	07:39 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30	
	16:25	17:22	18:17	07:57 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06	
10	08:41	07:57	06:55	07:40 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32	
	16:27	17:24	18:19	07:54 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05	
11	08:40	07:55	06:53	07:42 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33	
	16:28	17:26	18:21	07:52 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05	
12	08:39	07:53	06:50		06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:34	
	16:30	17:28	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05	
13	08:38	07:51	06:48		06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35	
	16:31	17:30	18:25		20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:05	
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36	
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05	
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37	
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05	
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	06:59	07:54	08:38	
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05	
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39	
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05	
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39	
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05	
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40	
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:05	
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41	
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:06	
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41	
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06	
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42	
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:07	
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42	
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:07	
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43	
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:08	
25	08:25	07:26	07:51 (1)	06:19	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:43	
	16:53	17:54	1	07:52 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20	16:08	
26	08:23	07:23	07:48 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:44	
	16:54	17:56	7	07:55 (1)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	16:09	
27	08:22	07:21	07:46 (1)	06:14	06:01	05:08	04:57	05:31	06:24	07:19	07:15	08:44	
	16:56	17:58	12	07:58 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	16:10	
28	08:20	07:19	07:43 (1)	06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17	08:44	
	16:58	18:00	15	07:58 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	16:11	
29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:44	
	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21	08:44	
	17:02			19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:13	
31	08:16			07:04		05:04		05:37	06:31	07:22		08:44	
	17:04			19:58		21:44		21:27	20:21	16:56		16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382	328	259	233
Total, worst case		35		212							256		
Sun reduction		0.23		0.27							0.29		
Oper. time red.		1.00		1.00							1.00		
Wind dir. red.		0.65		0.65							0.65		
Total reduction		0.15		0.18							0.19		
Total, real		5		37							49		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: HX - H232

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
2	16:15	17:06	18:02	08:01 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10
3	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
4	16:16	17:08	18:04	08:02 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
5	08:44	08:10	07:12	07:38 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:22
6	16:17	17:10	18:06	08:02 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
7	08:43	08:09	07:09	07:38 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
8	16:18	17:12	18:08	08:02 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
9	08:43	08:07	07:07	07:37 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
10	16:20	17:14	18:10	08:02 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
11	08:43	08:05	07:05	07:37 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
12	16:21	17:16	18:12	08:02 (1)	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:07
13	08:42	08:03	07:02	07:37 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
14	16:22	17:18	18:13	08:02 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
15	08:42	08:01	07:00	07:37 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
16	16:24	17:20	18:15	08:01 (1)	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
17	08:41	07:59	06:58	07:38 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
18	16:25	17:22	18:17	08:00 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06
19	08:41	07:57	06:55	07:38 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
20	16:27	17:24	18:19	07:59 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
21	08:40	07:55	06:53	07:39 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
22	16:28	17:26	18:21	07:57 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
23	08:39	07:53	06:50	07:40 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:34
24	16:30	17:28	18:23	07:55 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
25	08:38	07:51	06:48	07:44 (1)	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
26	16:31	17:30	18:25	07:52 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:05
27	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
28	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05
29	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
30	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
31	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	06:59	07:54	08:38
32	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
33	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
34	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
35	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39
36	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
37	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40
38	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:05
39	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41
40	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:06
41	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41
42	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06
43	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
44	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:07
45	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
46	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:07
47	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
48	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:08
49	08:25	07:26	06:19		06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:43
50	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:08
51	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:44
52	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:09
53	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19	07:15	08:44
54	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	17:05	16:10
55	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21	07:17	08:44
56	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:11
57	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:44
58	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12
59	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	07:21	08:44
60	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:13
61	08:15		07:04			05:04		05:37	06:31		07:22	08:44
62	17:04		19:58			21:44		21:27	20:21		16:56	16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		233
Total, worst case												
Sun reduction		0.23	0.27							0.32	0.29	
Oper. time red.		1.00	1.00							1.00	1.00	
Wind dir. red.		0.65	0.65							0.65	0.65	
Total reduction		0.15	0.18							0.21	0.19	
Total, real		6	48							1	59	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HY - H233

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	08:42 (3)	07:16	08:37 (1)	07:01	05:52	05:03			
	16:15	17:06	18	09:00 (1)	18:02	31	09:08 (1)	20:00	20:56	21:45	
2	08:44	08:12	08:40 (3)	07:14	08:39 (1)	06:59	05:50	05:02			
	16:16	17:08	23	09:03 (1)	18:04	27	09:06 (1)	20:02	20:57	21:47	
3	08:44	08:10	08:38 (3)	07:12	08:41 (1)	06:56	05:48	05:01			
	16:17	17:10	27	09:05 (1)	18:06	22	09:03 (1)	20:04	20:59	21:48	
4	08:43	08:09	08:36 (3)	07:09	08:45 (1)	06:54	05:46	05:00			
	16:18	17:12	31	09:07 (1)	18:08	14	08:59 (1)	20:06	21:01	21:49	
5	08:43	08:07	08:34 (3)	07:07		06:52	05:44	04:59			
	16:20	17:14	35	09:09 (1)	18:10		20:08	21:03	21:50		
6	08:43	08:05	08:33 (3)	07:05		06:49	05:42	04:59			
	16:21	17:16	37	09:10 (1)	18:11		20:09	21:05	21:51		
7	08:42	08:03	08:34 (3)	07:02		06:47	05:40	04:58			
	16:22	17:18	38	09:12 (1)	18:13		20:11	21:06	21:52		
8	08:42	08:01	08:35 (3)	07:00	07:24 (2)	06:44	05:38	04:57			
	16:24	17:20	38	09:13 (1)	18:15	3	07:27 (2)	20:13	21:08	21:53	
9	08:41	07:59	08:35 (1)	06:57	07:22 (2)	06:42	05:36	04:57			
	16:25	17:22	39	09:14 (1)	18:17	7	07:29 (2)	20:15	21:10	21:54	
10	08:41	07:57	08:34 (1)	06:55	07:19 (2)	06:40	05:35	04:56			
	16:27	17:24	41	09:15 (1)	18:19	10	07:29 (2)	20:17	21:12	21:55	
11	08:40	07:55	08:34 (1)	06:53	07:17 (2)	06:37	05:33	04:56			
	16:28	17:26	42	09:16 (1)	18:21	12	07:29 (2)	20:19	21:13	21:56	
12	08:39	07:53	08:33 (1)	06:50	07:14 (2)	06:35	05:31	04:55			
	16:30	17:28	43	09:16 (1)	18:23	14	07:28 (2)	20:21	21:15	21:56	
13	08:38	07:51	08:33 (1)	06:48	07:12 (2)	06:32	05:29	04:55			
	16:31	17:30	44	09:17 (1)	18:25	16	07:28 (2)	20:22	21:17	21:57	
14	08:37	07:49	08:32 (1)	06:45	07:09 (2)	06:30	05:27	04:55			
	16:33	17:32	44	09:16 (1)	18:27	18	07:27 (2)	20:24	21:19	21:58	
15	08:37	07:47	08:32 (1)	06:43	07:10 (2)	06:28	05:26	04:55			
	16:35	17:34	45	09:17 (1)	18:29	17	07:27 (2)	20:26	21:20	21:58	
16	08:36	07:45	08:32 (1)	06:41	07:10 (2)	06:25	05:24	04:54			
	16:36	17:36	45	09:17 (1)	18:30	15	07:25 (2)	20:28	21:22	21:59	
17	08:35	07:43	08:32 (1)	06:38	07:12 (2)	06:23	05:22	04:54			
	16:38	17:38	46	09:18 (1)	18:32	11	07:23 (2)	20:30	21:24	21:59	
18	08:33	07:41	08:32 (1)	06:36	07:15 (2)	06:21	05:21	04:54			
	16:40	17:40	46	09:18 (1)	18:34	4	07:19 (2)	20:32	21:25	22:00	
19	08:32	07:39	08:31 (1)	06:33		06:18	05:19	04:54			
	16:41	17:42	46	09:17 (1)	18:36		20:33	21:27	22:00		
20	08:31	07:37	08:31 (1)	06:31		06:16	05:18	04:54			
	16:43	17:44	46	09:17 (1)	18:38		20:35	21:28	22:00		
21	08:30	07:34	08:32 (1)	06:28		06:14	05:16	04:55			
	16:45	17:46	45	09:17 (1)	18:40		20:37	21:30	22:01		
22	08:29	07:32	08:32 (1)	06:26		06:12	05:15	04:55			
	16:47	17:48	44	09:16 (1)	18:42		20:39	21:31	22:01		
23	08:27	07:30	08:32 (1)	06:23		06:09	05:13	04:55			
	16:49	17:50	43	09:15 (1)	18:44		20:41	21:33	22:01		
24	08:26	07:28	08:33 (1)	06:21		06:07	05:12	04:55			
	16:51	17:52	42	09:15 (1)	18:45		20:43	21:35	22:01		
25	08:25	07:26	08:33 (1)	06:18		06:05	05:11	04:56			
	16:53	17:54	40	09:13 (1)	18:47		20:45	21:36	22:01		
26	08:23	07:23	08:34 (1)	06:16		06:03	05:09	04:56			
	16:54	17:56	38	09:12 (1)	18:49		20:46	21:37	22:01		
27	08:22	07:21	08:35 (1)	06:14		06:01	05:08	04:56			
	16:56	17:58	37	09:12 (1)	18:51		20:48	21:39	22:01		
28	08:20	08:49 (3)	07:19	08:36 (1)	06:11		05:59	05:07	04:57		
	16:58	2	08:51 (3)	18:00	33	09:09 (1)	18:53	20:50	21:40	22:01	
29	08:19	08:47 (3)				07:09	05:56	05:06	04:58		
	17:00	5	08:52 (3)			19:55	20:52	21:42	22:01		
30	08:17	08:45 (3)				07:06	05:54	05:05	04:58		
	17:02	7	08:52 (3)			19:57	20:54	21:43	22:01		
31	08:15	08:44 (3)				07:04		05:04			
	17:04	10	08:54 (3)			19:58		21:44			
Potential sun hours	250		273		367		420	494	510		
Total, worst case	24		1096		221						
Sun reduction	0.24		0.23		0.27						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.61		0.61		0.64						
Total reduction	0.15		0.14		0.17						
Total, real	4		156		38						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: HY - H233

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (2) 16:54	08:04 (1) 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (2) 16:52	08:05 (1) 16:09
3	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:56 (2) 16:50	08:04 (3) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:58 (2) 16:48	08:04 (3) 16:08
5	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	08:00 (2) 16:46	08:03 (3) 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:02 (2) 16:45	08:04 (3) 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:06 (3) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:09 (3) 16:06
9	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	09:22 (1) 16:39	08:11 (3) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	09:17 (1) 16:37	08:13 (3) 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	09:14 (1) 16:36	08:15 (3) 16:05
12	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	09:12 (1) 16:34	08:17 (3) 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	09:10 (1) 16:32	08:19 (3) 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	09:08 (1) 16:31	08:21 (3) 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	09:07 (1) 16:29	08:23 (3) 16:05
16	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	09:06 (1) 16:28	08:38 16:05
17	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	09:05 (1) 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	09:04 (1) 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	09:03 (1) 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	09:03 (1) 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	09:02 (1) 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	09:02 (1) 16:19	08:42 16:07
23	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	09:01 (1) 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	09:01 (1) 16:17	08:43 16:08
25	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	08:01 (1) 16:16	08:43 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 08:04 (2)	08:01 (1) 16:15	08:44 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 08:06 (2)	08:01 (1) 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 07:51 (2)	08:01 (1) 16:13	08:44 16:11
29	05:34 21:30	06:28 20:26	07:23 19:10	07:19 08:08 (2)	08:02 (1) 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 08:08 (2)	08:03 (1) 16:11	08:44 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56	08:03 (1) 08:45 (1)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case			75	939	347	
Sun reduction			0.32	0.29	0.27	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.66	0.61	0.61	
Total reduction			0.21	0.18	0.16	
Total, real			16	169	56	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Assumptions for shadow calculations

Shadow receptor: HZ - H234

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	12:17 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (2)	08:19	12:17 (1)	12:17 (1)	12:17 (1)	12:17 (1)	12:17 (1)	12:17 (1)	12:17 (1)	12:17 (1)	12:17 (1)
2	08:44	12:19 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	07:56 (2)	08:21	12:14 (1)	12:14 (1)	12:14 (1)	12:14 (1)	12:14 (1)	12:14 (1)	12:14 (1)	12:14 (1)	12:14 (1)
3	08:44	12:19 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	07:58 (2)	08:22	12:11 (1)	12:11 (1)	12:11 (1)	12:11 (1)	12:11 (1)	12:11 (1)	12:11 (1)	12:11 (1)	12:11 (1)
4	08:43	12:21 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:00 (2)	08:24	12:11 (1)	12:11 (1)	12:11 (1)	12:11 (1)	12:11 (1)	12:11 (1)	12:11 (1)	12:11 (1)	12:11 (1)
5	08:43	12:21 (1)	08:07	07:07	06:52	05:44	05:02	05:02	05:45	06:40	07:33	07:32	08:02 (2)	08:25	12:09 (1)	12:09 (1)	12:09 (1)	12:09 (1)	12:09 (1)	12:09 (1)	12:09 (1)	12:09 (1)	12:09 (1)
6	08:43	12:23 (1)	08:05	07:05	06:49	05:42	05:03	05:03	05:47	06:42	07:35	07:34	08:04 (2)	08:27	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)
7	08:42	12:24 (1)	08:03	07:02	06:47	05:40	05:04	05:04	05:49	06:44	07:37	07:36	08:06 (2)	08:28	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)
8	08:42	12:26 (1)	08:01	07:00	06:44	05:38	05:05	05:05	05:51	06:45	07:39	07:38	08:09 (2)	08:29	12:09 (1)	12:09 (1)	12:09 (1)	12:09 (1)	12:09 (1)	12:09 (1)	12:09 (1)	12:09 (1)	12:09 (1)
9	08:41	12:28 (1)	07:59	06:42	06:36	05:36	05:06	05:06	05:52	06:47	07:41	07:40	08:13 (2)	08:30	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)	12:08 (1)
10	08:40	12:31 (1)	07:57	06:40	06:34	05:34	05:07	05:07	05:54	06:49	07:43	07:42	08:15 (2)	08:31	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)
11	08:40	12:34 (1)	07:55	06:37	06:28	05:33	05:08	05:08	05:56	06:51	07:44	07:44	08:18 (2)	08:33	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)
12	08:39	12:36 (1)	07:53	06:35	06:26	05:31	05:09	05:09	05:58	06:52	07:46	07:46	08:20 (2)	08:34	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)	12:07 (1)
13	08:38	12:38 (1)	07:51	06:32	06:23	05:29	05:11	05:11	05:59	06:54	07:48	07:48	08:22 (2)	08:36	12:06 (1)	12:06 (1)	12:06 (1)	12:06 (1)	12:06 (1)	12:06 (1)	12:06 (1)	12:06 (1)	12:06 (1)
14	08:37	12:40 (1)	07:49	06:30	06:21	05:27	05:12	05:12	06:01	06:56	07:50	07:49	08:24 (2)	08:38	12:05 (1)	12:05 (1)	12:05 (1)	12:05 (1)	12:05 (1)	12:05 (1)	12:05 (1)	12:05 (1)	12:05 (1)
15	08:36	12:42 (1)	07:47	06:28	06:19	05:25	05:13	05:13	06:03	06:58	07:52	07:51	08:26 (2)	08:40	12:04 (1)	12:04 (1)	12:04 (1)	12:04 (1)	12:04 (1)	12:04 (1)	12:04 (1)	12:04 (1)	12:04 (1)
16	08:36	12:44 (1)	07:45	06:26	06:17	05:24	05:14	05:14	06:05	06:59	07:54	07:53	08:28 (2)	08:42	12:03 (1)	12:03 (1)	12:03 (1)	12:03 (1)	12:03 (1)	12:03 (1)	12:03 (1)	12:03 (1)	12:03 (1)
17	08:35	12:46 (1)	07:43	06:24	06:15	05:22	05:16	05:16	06:06	07:01	07:56	07:55	08:30 (2)	08:44	12:02 (1)	12:02 (1)	12:02 (1)	12:02 (1)	12:02 (1)	12:02 (1)	12:02 (1)	12:02 (1)	12:02 (1)
18	08:33	12:48 (1)	07:41	06:22	06:13	05:21	05:17	05:17	06:08	07:03	07:57	07:57	08:32 (2)	08:46	12:01 (1)	12:01 (1)	12:01 (1)	12:01 (1)	12:01 (1)	12:01 (1)	12:01 (1)	12:01 (1)	12:01 (1)
19	08:32	12:50 (1)	07:39	06:20	06:11	05:19	05:18	05:18	06:10	07:05	07:59	07:59	08:34 (2)	08:48	12:00 (1)	12:00 (1)	12:00 (1)	12:00 (1)	12:00 (1)	12:00 (1)	12:00 (1)	12:00 (1)	12:00 (1)
20	08:31	12:52 (1)	07:37	06:18	06:09	05:18	05:18	05:18	06:12	07:06	08:01	08:01	08:36 (2)	08:50	11:59 (1)	11:59 (1)	11:59 (1)	11:59 (1)	11:59 (1)	11:59 (1)	11:59 (1)	11:59 (1)	11:59 (1)
21	08:30	12:54 (1)	07:35	06:16	06:07	05:16	05:16	05:16	06:13	07:08	08:03	08:03	08:38 (2)	08:52	11:58 (1)	11:58 (1)	11:58 (1)	11:58 (1)	11:58 (1)	11:58 (1)	11:58 (1)	11:58 (1)	11:58 (1)
22	08:29	12:56 (1)	07:33	06:14	06:05	05:15	05:15	05:15	06:15	07:10	08:05	08:05	08:40 (2)	08:54	11:57 (1)	11:57 (1)	11:57 (1)	11:57 (1)	11:57 (1)	11:57 (1)	11:57 (1)	11:57 (1)	11:57 (1)
23	08:27	12:58 (1)	07:31	06:12	06:03	05:13	05:13	05:13	06:17	07:12	08:07	08:07	08:42 (2)	08:56	11:56 (1)	11:56 (1)	11:56 (1)	11:56 (1)	11:56 (1)	11:56 (1)	11:56 (1)	11:56 (1)	11:56 (1)
24	08:26	12:59 (1)	07:29	06:10	06:01	05:12	05:12	05:12	06:19	07:14	08:09	08:09	08:44 (2)	08:58	11:55 (1)	11:55 (1)	11:55 (1)	11:55 (1)	11:55 (1)	11:55 (1)	11:55 (1)	11:55 (1)	11:55 (1)
25	08:25	13:00 (1)	07:27	06:08	06:00	05:11	05:11	05:11	06:21	07:15	08:11	08:11	08:46 (2)	09:00	11:54 (1)	11:54 (1)	11:54 (1)	11:54 (1)	11:54 (1)	11:54 (1)	11:54 (1)	11:54 (1)	11:54 (1)
26	08:23	13:02 (1)	07:25	06:06	06:00	05:10	05:10	05:10	06:23	07:17	08:13	08:13	08:48 (2)	09:02	11:53 (1)	11:53 (1)	11:53 (1)	11:53 (1)	11:53 (1)	11:53 (1)	11:53 (1)	11:53 (1)	11:53 (1)
27	08:22	13:04 (1)	07:23	06:04	06:00	05:09	05:09	05:09	06:25	07:19	08:15	08:15	08:50 (2)	09:04	11:52 (1)	11:52 (1)	11:52 (1)	11:52 (1)	11:52 (1)	11:52 (1)	11:52 (1)	11:52 (1)	11:52 (1)
28	08:20	13:06 (1)	07:21	06:02	06:00	05:08	05:08	05:08	06:27	07:21	08:17	08:17	08:52 (2)	09:06	11:51 (1)	11:51 (1)	11:51 (1)	11:51 (1)	11:51 (1)	11:51 (1)	11:51 (1)	11:51 (1)	11:51 (1)
29	08:19	13:08 (1)	07:19	06:00	06:00	05:07	05:07	05:07	06:29	07:23	08:19	08:19	08:54 (2)	09:08	11:50 (1)	11:50 (1)	11:50 (1)	11:50 (1)	11:50 (1)	11:50 (1)	11:50 (1)	11:50 (1)	11:50 (1)
30	08:17	13:10 (1)	07:17	05:58	06:00	05:06	05:06	05:06	06:31	07:25	08:21	08:21	08:56 (2)	09:10	11:49 (1)	11:49 (1)	11:49 (1)	11:49 (1)	11:49 (1)	11:49 (1)	11:49 (1)	11:49 (1)	11:49 (1)
31	08:15	13:12 (1)	07:15	05:56	06:00	05:05	05:05	05:05	06:33	07:27	08:23	08:23	08:58 (2)	09:12	11:48 (1)	11:48 (1)	11:48 (1)	11:48 (1)	11:48 (1)	11:48 (1)	11:48 (1)	11:48 (1)	11:48 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	257	121	964	125	125	125	125	125	125	125	125	125	125
Total, worst case	260	378	420	494	510	512	460	382	328	257	121	964	125	125	125	125	125	125	125	125	125	125	125
Sun reduction	0.24	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
Total reduction	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Total, real	39	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IA - H235

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	13:11 (1)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	16:15	30	13:41 (1)	17:06	29	09:11 (2)	18:02	20:55	21:45	22:00	21:25	19:05
3	08:44	13:12 (1)	08:12	08:41 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28
4	16:16	29	13:41 (1)	17:08	31	09:12 (2)	18:04	20:02	20:57	21:47	22:00	19:02
5	08:44	13:12 (1)	08:10	08:41 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
6	16:17	29	13:41 (1)	17:10	31	09:12 (2)	18:06	20:04	20:59	21:48	21:59	19:00
7	08:43	13:14 (1)	08:09	08:41 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32
8	16:18	27	13:41 (1)	17:12	31	09:12 (2)	18:08	20:06	21:01	21:49	21:59	18:57
9	08:43	13:14 (1)	08:07	08:41 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33
10	16:20	26	13:40 (1)	17:14	31	09:12 (2)	18:09	20:08	21:03	21:50	21:58	18:55
11	08:43	13:16 (1)	08:05	08:41 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35
12	16:21	24	13:40 (1)	17:16	31	09:12 (2)	18:11	20:09	21:05	21:51	21:58	18:53
13	08:42	13:17 (1)	08:03	08:42 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37
14	16:22	22	13:39 (1)	17:18	30	09:12 (2)	18:13	20:11	21:06	21:52	21:57	18:50
15	08:42	13:19 (1)	08:01	08:42 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
16	16:24	19	13:38 (1)	17:20	29	09:11 (2)	18:15	20:13	21:08	21:53	21:56	18:48
17	08:41	13:22 (1)	07:59	08:43 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
18	16:25	16	13:38 (1)	17:22	28	09:11 (2)	18:17	20:15	21:10	21:54	21:56	18:45
19	08:40	13:24 (1)	07:57	08:44 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43
20	16:27	12	13:36 (1)	17:24	26	09:10 (2)	18:19	20:17	21:12	21:55	21:58	18:43
21	08:40	13:28 (1)	07:55	08:45 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
22	16:28	5	13:33 (1)	17:26	25	09:10 (2)	18:21	20:19	21:13	21:56	21:54	18:41
23	08:39		07:53	08:46 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46
24	16:30		17:28	23	09:09 (2)	18:23	20:21	21:15	21:56	21:53	21:04	18:38
25	08:38		07:51	08:47 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48
26	16:31		17:30	19	09:06 (2)	18:25	20:22	21:17	21:57	21:52	21:01	18:36
27	08:37		07:49	08:49 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
28	16:33		17:32	15	09:04 (2)	18:27	20:24	21:18	21:58	21:51	20:59	18:33
29	08:36		07:47	08:52 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52
30	16:34		17:34	9	09:01 (2)	18:29	20:26	21:20	21:58	21:50	20:57	18:31
31	08:36		07:45		06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54
32	16:36		17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29
33	08:34		07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56
34	16:38		17:38		18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27
35	08:33		07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57
36	16:40		17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24
37	08:32		07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
38	16:41		17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22
39	08:31		07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
40	16:43		17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20
41	08:30		07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03
42	16:45		17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17
43	08:29		08:58 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05
44	16:47	1	08:59 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15
45	08:27		08:57 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07
46	16:49	5	09:02 (2)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13
47	08:26		08:55 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09
48	16:51	8	09:03 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11
49	08:25		08:54 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11
50	16:52	11	09:05 (2)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09
51	08:23		08:52 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13
52	16:54	14	09:06 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07
53	08:22		08:51 (2)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15
54	16:56	17	09:08 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04
55	08:20		08:49 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17
56	16:58	20	09:09 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02
57	08:19		08:47 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19
58	17:00	22	09:09 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00
59	08:17		08:45 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20
60	17:02	25	09:10 (2)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:08
61	08:15		08:44 (2)		07:04		05:04		05:37	06:31		07:22
62	17:04	27	09:11 (2)		19:58		21:44		21:27	20:21		16:56
63	Potential sun hours	250			367	420	494	510	512	460	382	328
64	Total, worst case	389	273	388								259
65	Sun reduction	0.24		0.23								96
66	Oper. time red.	1.00		1.00								446
67	Wind dir. red.	0.62		0.61								1.00
68	Total reduction	0.15		0.14								0.61
69	Total, real	59		55								0.16
70												17
71												72
72												
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100												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Assumptions for shadow calculations

Shadow receptor: IB - H236

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March	April	May	June	July	August	September	October	November		December	
1	08:44	13:13 (1)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:15 (2)	08:19	13:12 (1)
2	08:44	13:14 (1)	08:12	08:42 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:14 (2)	08:21	13:09 (1)
3	08:44	13:14 (1)	08:10	08:42 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:13 (2)	08:22	13:07 (1)
4	08:43	13:16 (1)	08:09	08:42 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:13 (2)	08:24	13:06 (1)
5	08:43	13:17 (1)	08:07	08:42 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:12 (2)	08:25	13:05 (1)
6	08:43	13:18 (1)	08:05	08:43 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:12 (2)	08:27	13:05 (1)
7	08:42	13:20 (1)	08:03	08:43 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:12 (2)	08:28	13:04 (1)
8	08:42	13:21 (1)	08:01	08:44 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:13 (2)	08:29	13:04 (1)
9	08:41	13:24 (1)	07:59	08:44 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:14 (2)	08:30	13:04 (1)
10	08:40	13:26 (1)	07:57	08:45 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:13 (2)	08:32	13:03 (1)
11	08:40	13:29 (1)	07:55	08:46 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:15 (2)	08:33	13:03 (1)
12	08:39	13:36 (1)	07:53	08:48 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:17 (2)	08:34	13:03 (1)
13	08:38	13:38	07:51	08:48 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:19 (2)	08:35	13:04 (1)
14	08:37	13:39	07:49	08:51 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:21 (2)	08:36	13:04 (1)
15	08:36	13:40	07:47	08:52 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:23 (2)	08:37	13:04 (1)
16	08:36	13:41	07:45	08:53 (2)	06:41	06:26	05:24	04:54	05:14	06:05	06:59	07:54	08:25 (2)	08:38	13:04 (1)
17	08:34	13:43	07:43	08:54 (2)	06:39	06:24	05:22	04:54	05:16	06:06	07:01	07:56	08:27 (2)	08:39	13:04 (1)
18	08:33	13:44	07:41	08:55 (2)	06:37	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:29 (2)	08:39	13:05 (1)
19	08:32	13:45	07:39	08:56 (2)	06:35	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:31 (2)	08:40	13:05 (1)
20	08:31	13:46	07:37	08:57 (2)	06:33	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:33 (2)	08:41	13:05 (1)
21	08:30	13:47	07:34	08:58 (2)	06:31	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:34 (2)	08:42	13:06 (1)
22	08:29	13:48	07:32	08:59 (2)	06:29	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:35 (2)	08:43	13:06 (1)
23	08:27	13:49	07:30	09:00 (2)	06:27	06:10	05:13	04:55	05:24	06:17	07:12	08:07	08:36 (2)	08:44	13:07 (1)
24	08:26	13:50	07:28	09:01 (2)	06:25	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:37 (2)	08:45	13:07 (1)
25	08:25	13:51	07:25	09:02 (2)	06:23	06:05	05:11	04:56	05:27	06:20	07:15	08:11	08:38 (2)	08:46	13:08 (1)
26	08:23	13:52	07:23	09:03 (2)	06:21	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:39 (2)	08:47	13:09 (1)
27	08:22	13:53	07:21	09:04 (2)	06:19	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:40 (2)	08:48	13:10 (1)
28	08:20	13:54	07:19	09:05 (2)	06:17	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:41 (2)	08:49	13:11 (1)
29	08:19	13:55	07:17	09:06 (2)	06:15	05:57	05:06	04:58	05:34	06:28	07:23	08:19	08:42 (2)	08:50	13:12 (1)
30	08:17	13:56	07:15	09:07 (2)	06:13	05:55	05:05	04:59	05:36	06:30	07:25	08:21	08:43 (2)	08:51	13:13 (1)
31	08:15	13:57	07:13	09:08 (2)	06:11	05:53	05:04	04:59	05:38	06:32	07:27	08:23	08:44 (2)	08:52	13:14 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	191	119	911	119
Total, worst case	415	383	367	420	494	510	512	460	382	328	259	191	119	911	119
Sun reduction	0.24	0.23	0.22	0.21	0.20	0.19	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.10
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.62	0.61	0.60	0.59	0.58	0.57	0.56	0.55	0.54	0.53	0.52	0.51	0.50	0.49	0.48
Total reduction	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.06	0.05	0.04	0.03	0.02	0.01
Total, real	63	54	47	40	34	29	25	21	18	15	12	9	6	4	3

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IC - H237

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: ID - H238

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	20:12 (5)	04:59	20:18 (5)	06:33	07:26	07:24
2	08:44	08:12	07:14	06:59	05:50	05:02	20:13 (5)	05:00	20:19 (5)	06:35	07:28	07:26
3	08:43	08:10	07:12	06:56	05:48	05:01	20:13 (5)	05:00	20:18 (5)	06:36	07:30	07:28
4	08:43	08:08	07:09	06:54	05:46	05:00	20:13 (5)	05:01	20:19 (5)	06:38	07:31	07:30
5	08:43	08:07	07:07	06:51	05:44	04:59	20:13 (5)	05:02	20:19 (5)	06:40	07:33	07:32
6	08:42	08:05	07:04	06:49	05:42	04:59	20:13 (5)	05:03	20:19 (5)	06:42	07:35	07:34
7	08:42	08:03	07:02	06:47	05:40	04:58	20:13 (5)	05:04	20:20 (5)	06:43	07:37	07:36
8	08:41	08:01	07:00	06:44	05:38	04:57	20:13 (5)	05:05	20:20 (5)	06:45	07:39	07:38
9	08:41	07:59	06:57	06:42	05:36	20:34 (5)	04:57	20:14 (5)	20:20 (5)	06:47	07:41	07:40
10	08:40	07:57	06:55	06:39	05:34	20:28 (5)	04:56	20:14 (5)	20:20 (5)	06:49	07:42	07:42
11	08:40	07:55	06:53	06:37	05:33	20:26 (5)	04:56	20:14 (5)	20:21 (5)	06:51	07:44	07:44
12	08:39	07:53	06:50	06:35	05:31	20:23 (5)	04:55	20:15 (5)	20:21 (5)	06:52	07:46	07:45
13	08:38	07:51	06:48	06:32	05:29	20:22 (5)	04:55	20:14 (5)	20:21 (5)	06:54	07:48	07:47
14	08:37	07:49	06:45	06:30	05:27	20:20 (5)	04:55	20:14 (5)	20:21 (5)	06:56	07:50	07:49
15	08:36	07:47	06:43	06:28	05:26	20:19 (5)	04:55	20:15 (5)	20:21 (5)	06:58	07:52	07:51
16	08:35	07:45	06:40	06:25	05:24	20:18 (5)	04:54	20:15 (5)	20:22 (5)	06:59	07:54	07:53
17	08:34	07:43	06:38	06:23	05:22	20:17 (5)	04:54	20:15 (5)	20:22 (5)	07:01	07:55	07:55
18	08:33	07:41	06:36	06:21	05:21	20:16 (5)	04:54	20:15 (5)	20:23 (5)	07:03	07:57	07:57
19	08:32	07:39	06:33	06:18	05:19	20:16 (5)	04:54	20:16 (5)	20:23 (5)	07:05	07:59	07:59
20	08:31	07:36	06:31	06:16	05:18	20:15 (5)	04:54	20:16 (5)	20:24 (5)	07:06	08:01	08:00
21	08:30	07:34	06:28	06:14	05:16	20:15 (5)	04:55	20:16 (5)	20:24 (5)	07:08	08:03	08:02
22	08:28	07:32	06:26	06:12	05:15	20:14 (5)	04:55	20:17 (5)	20:24 (5)	07:10	08:05	08:04
23	08:27	07:30	06:23	06:09	05:13	20:13 (5)	04:55	20:17 (5)	20:25 (5)	07:12	08:07	08:06
24	08:26	07:28	06:21	06:07	05:12	20:13 (5)	04:55	20:17 (5)	20:26 (5)	07:13	08:09	08:08
25	08:24	07:25	06:18	06:05	05:11	20:13 (5)	04:56	20:17 (5)	20:27 (5)	07:15	08:11	08:09
26	08:23	07:23	06:16	06:03	05:09	20:13 (5)	04:56	20:17 (5)	20:27 (5)	07:17	08:13	08:11
27	08:22	07:21	06:13	06:01	05:08	20:13 (5)	04:56	20:18 (5)	20:28 (5)	07:19	08:15	08:13
28	08:20	07:18	06:11	05:58	05:07	20:13 (5)	04:57	20:18 (5)	20:29 (5)	07:21	08:16	08:14
29	08:18	07:16	06:09	05:56	05:06	20:13 (5)	04:58	20:18 (5)	20:30 (5)	07:22	08:18	08:16
30	08:17	07:15	06:06	05:54	05:05	20:13 (5)	04:58	20:18 (5)	20:31 (5)	07:24	08:20	08:18
31	08:15	07:14	06:04	05:54	05:04	20:12 (5)	04:57	20:18 (5)	20:33 (5)	07:26	08:22	08:20
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					820	1491	1350	44				
Sun reduction					0.38	0.32	0.32	0.34				
Oper. time red.					1.00	1.00	1.00	1.00				
Wind dir. red.					0.63	0.63	0.63	0.63				
Total reduction					0.24	0.20	0.20	0.22				
Total, real					197	301	276	9				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IE - H239

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	20:21 (5) 20:52 (5)	04:59 22:00	20:30 (5) 20:57 (5)	05:39 21:25	20:35 (5) 20:53 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	20:22 (5) 20:53 (5)	05:00 22:00	20:30 (5) 20:57 (5)	05:40 21:23	20:36 (5) 20:52 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	20:22 (5) 20:53 (5)	05:00 21:59	20:29 (5) 20:57 (5)	05:42 21:21	20:37 (5) 20:50 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	20:22 (5) 20:53 (5)	05:01 21:59	20:29 (5) 20:58 (5)	05:44 21:19	20:40 (5) 20:48 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	20:23 (5) 20:53 (5)	05:02 21:58	20:29 (5) 20:58 (5)	05:45 21:17		06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	20:23 (5) 20:53 (5)	05:03 21:57	20:30 (5) 20:59 (5)	05:47 21:15		06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	20:23 (5) 20:52 (5)	05:04 21:57	20:30 (5) 20:59 (5)	05:49 21:13		06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:32 (5) 20:37 (5)	04:57 21:53	05:05 21:56	20:30 (5) 21:00 (5)	05:51 21:11		06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:29 (5) 20:38 (5)	04:57 21:54	05:06 21:55	20:29 (5) 21:00 (5)	05:52 21:09		06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:26 (5) 20:40 (5)	04:56 21:55	05:07 21:54	20:29 (5) 21:01 (5)	05:54 21:07		06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	20:25 (5) 20:42 (5)	04:56 21:55	05:08 21:54	20:29 (5) 21:01 (5)	05:56 21:05		06:50 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:24 (5) 20:43 (5)	04:55 21:56	05:09 21:53	20:29 (5) 21:01 (5)	05:58 21:03		06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:23 (5) 20:44 (5)	04:55 21:57	05:11 21:52	20:29 (5) 21:01 (5)	05:59 21:01		06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:22 (5) 20:47 (5)	04:55 21:57	05:12 21:51	20:29 (5) 21:01 (5)	06:01 20:59		06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:21 (5) 20:48 (5)	04:55 21:58	05:13 21:50	20:29 (5) 21:01 (5)	06:03 20:57		06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:21 (5) 20:50 (5)	04:54 21:59	05:14 21:48	20:29 (5) 21:02 (5)	06:05 20:55		06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:20 (5) 20:50 (5)	04:54 21:59	05:16 21:47	20:29 (5) 21:02 (5)	06:06 20:53		07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:20 (5) 20:52 (5)	04:54 22:00	05:18 21:45	20:29 (5) 21:02 (5)	06:10 20:48		07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	20:20 (5) 20:53 (5)	04:58 22:00	05:35 21:28	20:33 (5) 20:56 (5)	06:29 20:23		07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44	20:21 (5) 20:53 (5)		05:37 21:26	20:34 (5) 20:55 (5)	06:31 20:21			07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259			233
Total, worst case					654		812			932					
Sun reduction					0.38		0.32			0.32				0.34	
Oper. time red.					1.00		1.00			1.00				1.00	
Wind dir. red.					0.63		0.63			0.63				0.63	
Total reduction					0.24		0.20			0.21				0.22	
Total, real					158		165			191				12	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IF - H240

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IG - H241

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IH - H242

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:28 (5)	07:16	17:24 (4)	07:01	05:52	20:06 (2)	05:03		
	16:15	17:06	16:34 (5)	18:02	17:34 (4)	20:00	20:55	20	20:26 (2)	21:45	
2	08:44	08:12	16:28 (5)	07:14	17:22 (4)	06:59	05:50	20:05 (2)	05:02		
	16:16	17:08	16:37 (5)	18:04	17:36 (4)	20:02	20:57	22	20:27 (2)	21:46	
3	08:43	08:10	16:28 (5)	07:11	17:20 (4)	06:56	05:48	20:05 (2)	05:01		
	16:17	17:10	16:39 (5)	18:06	17:38 (4)	20:04	20:59	24	20:29 (2)	21:48	
4	08:43	08:08	16:27 (5)	07:09	17:20 (4)	06:54	05:46	20:04 (2)	05:00		
	16:18	17:12	16:41 (5)	18:07	17:41 (4)	20:06	21:01	26	20:30 (2)	21:49	
5	08:43	08:07	16:27 (5)	07:07	17:18 (4)	06:51	05:44	20:04 (2)	04:59		
	16:19	17:14	16:43 (5)	18:09	17:42 (4)	20:07	21:03	28	20:32 (2)	21:50	
6	08:42	08:05	16:27 (5)	07:04	17:18 (4)	06:49	05:42	20:04 (2)	04:59		
	16:21	17:16	16:45 (5)	18:11	17:45 (4)	20:09	21:04	28	20:32 (2)	21:51	
7	08:42	08:03	16:27 (5)	07:02	17:16 (4)	06:47	05:40	20:04 (2)	04:58		
	16:22	17:18	16:47 (5)	18:13	17:46 (4)	20:11	21:06	29	20:33 (2)	21:52	
8	08:42	08:01	16:27 (5)	07:00	17:16 (4)	06:44	05:38	20:04 (2)	04:57		
	16:24	17:20	16:49 (5)	18:15	17:48 (4)	20:13	21:08	28	20:32 (2)	21:53	
9	08:41	07:59	16:27 (5)	06:57	17:15 (4)	06:42	05:36	20:04 (2)	04:57		
	16:25	17:22	16:48 (5)	18:17	17:50 (4)	20:15	21:10	28	20:32 (2)	21:54	
10	08:40	07:57	16:28 (5)	06:55	17:15 (4)	06:39	05:34	20:04 (2)	04:56		
	16:26	17:24	16:48 (5)	18:19	17:50 (4)	20:17	21:11	27	20:31 (2)	21:55	
11	08:40	07:55	16:29 (5)	06:52	17:16 (4)	06:37	05:33	20:05 (2)	04:56		
	16:28	17:26	16:48 (5)	18:21	17:50 (4)	20:19	21:13	26	20:31 (2)	21:55	
12	08:39	07:53	16:29 (5)	06:50	17:15 (4)	06:35	05:31	20:05 (2)	04:55		
	16:30	17:28	16:46 (5)	18:23	17:49 (4)	20:20	21:15	25	20:30 (2)	21:56	
13	08:38	07:51	16:30 (5)	06:48	17:16 (4)	06:32	05:29	20:05 (2)	04:55		
	16:31	17:30	16:45 (5)	18:25	17:49 (4)	20:22	21:17	24	20:29 (2)	21:57	
14	08:37	07:49	16:32 (5)	06:45	17:16 (4)	06:30	05:27	20:07 (2)	04:55		
	16:33	17:32	16:43 (5)	18:27	17:47 (4)	20:24	21:18	22	20:29 (2)	21:57	
15	08:36	07:47		06:43	17:17 (4)	06:28	05:26	20:07 (2)	04:54		
	16:34	17:34		18:28	17:47 (4)	20:26	21:20	21	20:28 (2)	21:58	
16	08:35	07:45		06:40	17:17 (4)	06:25	05:24	20:09 (2)	04:54		
	16:36	17:36		18:30	18:04 (3)	20:28	21:22	18	20:27 (2)	21:59	
17	08:34	07:43		06:38	17:18 (4)	06:23	05:22	20:10 (2)	04:54		
	16:38	17:38		18:32	18:06 (3)	20:30	21:23	16	20:26 (2)	21:59	
18	08:33	07:41		06:35	17:19 (4)	06:21	05:21	20:12 (2)	04:54		
	16:40	17:40		18:34	18:07 (3)	20:31	21:25	12	20:24 (2)	22:00	
19	08:32	07:39		06:33	17:21 (4)	06:18	05:19	20:14 (2)	04:54		
	16:41	17:42		18:36	18:10 (3)	20:33	21:27	9	20:23 (2)	22:00	
20	08:31	07:36		06:31	17:24 (4)	06:16	05:18		04:54		
	16:43	17:44		18:38	18:11 (3)	20:35	21:28		22:00		
21	08:30	07:34		06:28	17:57 (3)	06:14	05:16		04:54		
	16:45	17:46		18:40	18:13 (3)	20:37	21:30		22:01		
22	08:28	07:32		06:26	17:56 (3)	06:12	05:15		04:55		
	16:47	17:48		18:41	18:15 (3)	20:39	21:31		22:01		
23	08:27	07:30		06:23	17:56 (3)	06:09	05:13		04:55		
	16:49	17:50		18:43	18:17 (3)	20:41	21:33		22:01		
24	08:26	07:28		06:21	17:56 (3)	06:07	05:12		04:55		
	16:50	17:52		18:45	18:16 (3)	20:42	21:34		22:01		
25	08:24	07:25		06:18	17:57 (3)	06:05	05:11		04:55		
	16:52	17:54		18:47	18:15 (3)	20:44	21:36		22:01		
26	08:23	07:23		06:16	17:58 (3)	06:03	20:13 (2)	05:09	04:56		
	16:54	17:56		18:49	18:13 (3)	20:46	4	20:17 (2)	21:37		
27	08:22	07:21	17:30 (4)	06:13	18:00 (3)	06:01	20:11 (2)	05:08	04:56		
	16:56	17:58	1	17:31 (4)	18:11 (3)	20:48	8	20:19 (2)	21:39		
28	08:20	07:18	17:26 (4)	06:11		05:58		20:09 (2)	05:07		
	16:58	18:00	6	17:32 (4)	18:53	20:50	12	20:21 (2)	21:40		
29	08:18			07:08		05:56		20:08 (2)	05:06		
	17:00			19:54		20:52	14	20:22 (2)	21:41		
30	08:17			07:06		05:54		20:07 (2)	05:05		
	17:02			19:56		20:53	17	20:24 (2)	21:43		
31	08:15	16:29 (5)		07:04				05:04			
	17:04	3	16:32 (5)	19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case		3	226	680		55		433			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	0		35	125		13		106			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IH - H242

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	26	20:15 (2) 20:41 (2)	06:33 20:18		07:26 19:05	17:54 (4) 18:28 (4)	07:24 16:54	15:57 (5) 16:18 (5)	08:19 16:10
2	04:59 22:00	05:40 21:23	27	20:15 (2) 20:42 (2)	06:35 20:16		07:28 19:02	17:54 (4) 18:28 (4)	07:26 16:52	15:57 (5) 16:18 (5)	08:21 16:09
3	05:00 21:59	05:42 21:21	27	20:14 (2) 20:41 (2)	06:36 20:13		07:30 19:00	17:53 (4) 18:28 (4)	07:28 16:50	15:56 (5) 16:18 (5)	08:22 16:08
4	05:01 21:59	05:44 21:19	28	20:14 (2) 20:42 (2)	06:38 20:11		07:31 18:57	17:53 (4) 18:28 (4)	07:30 16:48	15:56 (5) 16:17 (5)	08:24 16:08
5	05:02 21:58	05:45 21:17	28	20:14 (2) 20:42 (2)	06:40 20:09		07:33 18:55	17:53 (4) 18:26 (4)	07:32 16:46	15:56 (5) 16:15 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	28	20:14 (2) 20:42 (2)	06:42 20:06		07:35 18:52	17:53 (4) 18:24 (4)	07:34 16:44	15:57 (5) 16:12 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	28	20:14 (2) 20:42 (2)	06:43 20:04		07:37 18:50	17:52 (4) 18:21 (4)	07:36 16:43	15:57 (5) 16:10 (5)	08:28 16:06
8	05:05 21:56	05:50 21:11	28	20:13 (2) 20:41 (2)	06:45 20:01		07:39 18:48	17:53 (4) 18:18 (4)	07:38 16:41	15:57 (5) 16:08 (5)	08:29 16:06
9	05:06 21:55	05:52 21:10	25	20:14 (2) 20:39 (2)	06:47 19:59		07:41 18:45	17:53 (4) 18:16 (4)	07:40 16:39	15:58 (5) 16:06 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	24	20:13 (2) 20:37 (2)	06:49 19:56		07:42 18:43	17:54 (4) 18:14 (4)	07:42 16:37	16:00 (5) 16:05 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	21	20:14 (2) 20:35 (2)	06:50 19:54		07:44 18:40	17:55 (4) 18:11 (4)	07:44 16:35	16:01 (5) 16:03 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	19	20:15 (2) 20:34 (2)	06:52 19:51		07:46 18:38	17:56 (4) 18:09 (4)	07:45 16:34		08:34 16:05
13	05:10 21:52	05:59 21:01	16	20:15 (2) 20:31 (2)	06:54 19:49		07:48 18:36	17:58 (4) 18:07 (4)	07:47 16:32		08:35 16:05
14	05:12 21:51	06:01 20:59	13	20:16 (2) 20:29 (2)	06:56 19:47		07:50 18:33	18:00 (4) 18:04 (4)	07:49 16:31		08:36 16:04
15	05:13 21:50	06:03 20:57	11	20:17 (2) 20:28 (2)	06:58 19:44		07:52 18:31		07:51 16:29		08:37 16:05
16	05:14 21:49	06:04 20:55	7	20:18 (2) 20:25 (2)	06:59 19:42	10	07:54 19:00 (3)		07:53 16:27		08:38 16:05
17	05:16 21:47	06:06 20:53	3	20:20 (2) 20:23 (2)	07:01 19:39		07:55 19:01 (3)		07:55 16:26		08:38 16:05
18	05:17 21:46	06:08 20:50			07:03 19:37	14	07:57 19:02 (3)		07:57 16:24		08:39 16:05
19	05:18 21:45	06:10 20:48			07:05 19:34	17	07:59 19:03 (3)		07:59 16:23		08:40 16:05
20	05:20 21:44	06:12 20:46			07:06 19:32	19	08:01 19:04 (3)		08:00 16:22		08:41 16:06
21	05:21 21:42	06:13 20:44			07:08 19:29	21	08:03 19:01 (3)		08:02 16:20		08:41 16:06
22	05:23 21:41	06:15 20:42			07:10 19:27	19	08:05 18:58 (3)		08:04 16:19		08:42 16:06
23	05:24 21:39	06:17 20:39			07:12 19:24	17	08:07 18:10 (4)		08:06 16:18		08:42 16:07
24	05:26 21:38	06:19 20:30 (2)			07:13 19:22	24	08:09 18:06 (4)		08:08 16:17		08:43 16:08
25	05:27 21:36	06:20 20:23 (2)			07:15 19:19	30	07:11 18:02 (4)		08:09 16:16		08:43 16:08
26	05:29 21:35	06:22 20:21 (2)	11	20:35 20:34 (2)	07:22 19:17	32	07:13 18:51 (3)		08:11 16:15		08:43 16:09
27	05:30 21:33	06:24 20:19 (2)	15	20:32 20:36 (2)	07:24 19:14	32	07:14 18:48 (3)		16:14 16:05 (5)		08:44 16:10
28	05:32 21:32	06:26 20:19 (2)	17	20:28 20:38 (2)	07:26 19:12	31	07:16 17:58 (4)	5	16:13 (5) 16:01 (5)		08:44 16:11
29	05:34 21:30	06:27 20:17 (2)	19	20:28 20:38 (2)	07:28 19:09	29	07:18 18:27 (4)	12	08:16 16:13 (5)		08:44 16:11
30	05:35 21:28	06:29 20:17 (2)	21	20:25 20:40 (2)	07:30 19:07	31	07:20 18:28 (4)	16	16:15 (5) 15:58 (5)		16:11 08:44
31	05:37 21:26	06:31 20:17 (2)	23	20:23 20:41 (2)		33	16:58 16:16 (5)	18	16:11 15:57 (5)		16:12 08:44
Potential sun hours	512		460		382		328		259		233
Total, worst case		134		359		359		411		158	
Sun reduction		0.32		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.65		0.65		0.68		0.67		0.66	
Total reduction		0.21		0.22		0.22		0.20		0.17	
Total, real		28		79		78		81		28	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: II - H243

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01			05:52			20:09 (3)	05:03	20:18 (4)
	16:15	17:06	18:02						20:00			20:55	17		20:26 (3)	21:45	39 20:57 (4)
2	08:44	08:12	07:14						06:59			05:50			20:09 (3)	05:02	20:19 (4)
	16:16	17:08	18:04						20:02			20:57	18		20:27 (3)	21:46	39 20:58 (4)
3	08:43	08:10	07:11						06:56			05:48			20:08 (3)	05:01	20:19 (4)
	16:17	17:10	18:06						20:04			20:59	21		20:29 (3)	21:48	39 20:58 (4)
4	08:43	08:08	07:09						06:54			05:46			20:08 (3)	05:00	20:19 (4)
	16:18	17:12	18:07						20:06			21:01	22		20:30 (3)	21:49	39 20:58 (4)
5	08:43	08:07	07:07						06:51			05:44			20:08 (3)	04:59	20:20 (4)
	16:20	17:14	18:09						20:07			21:03	23		20:31 (3)	21:50	39 20:59 (4)
6	08:42	08:05	07:04						06:49			05:42			20:08 (3)	04:59	20:20 (4)
	16:21	17:16	18:11						20:09			21:04	22		20:30 (3)	21:51	38 20:58 (4)
7	08:42	08:03	07:02						06:47			05:40			20:09 (3)	04:58	20:19 (4)
	16:22	17:18	18:13						20:11			21:06	25		20:36 (4)	21:52	39 20:58 (4)
8	08:41	08:01	07:00						06:44			05:38			20:10 (3)	04:57	20:20 (4)
	16:24	17:20	18:15						20:13			21:08	27		20:37 (4)	21:53	38 20:58 (4)
9	08:41	07:59	06:57					17:47 (5)	06:42			05:36			20:10 (3)	04:57	20:20 (4)
	16:25	17:22	18:17	3				17:50 (5)	20:15			21:10	29		20:39 (4)	21:54	38 20:58 (4)
10	08:40	07:57	06:55					17:43 (5)	06:39			05:34			20:11 (3)	04:56	20:21 (4)
	16:27	17:24	18:19	9				17:52 (5)	20:17			21:11	29		20:40 (4)	21:55	37 20:58 (4)
11	08:40	07:55	06:52					17:41 (5)	06:37			05:33			20:13 (3)	04:56	20:21 (4)
	16:28	17:26	18:21	14				17:55 (5)	20:19			21:13	29		20:42 (4)	21:55	38 20:59 (4)
12	08:39	07:53	06:50					17:39 (5)	06:35			05:31			20:14 (3)	04:55	20:22 (4)
	16:30	17:28	18:23	17				17:56 (5)	20:20			21:15	29		20:43 (4)	21:56	37 20:59 (4)
13	08:38	07:51	06:48					17:38 (5)	06:32			05:29			20:16 (3)	04:55	20:21 (4)
	16:31	17:30	18:25	20				17:58 (5)	20:22			21:17	28		20:44 (4)	21:57	37 20:58 (4)
14	08:37	07:49	06:45					17:36 (5)	06:30			05:27			20:21 (4)	04:55	20:22 (4)
	16:33	17:32	18:27	24				18:00 (5)	20:24			21:18	26		20:47 (4)	21:57	37 20:59 (4)
15	08:36	07:47	06:43					17:35 (5)	06:28			05:26			20:19 (4)	04:55	20:22 (4)
	16:34	17:34	18:28	27				18:02 (5)	20:26			21:20	29		20:48 (4)	21:58	37 20:59 (4)
16	08:35	07:45	06:40					17:34 (5)	06:25			05:24			20:19 (4)	04:54	20:23 (4)
	16:36	17:36	18:30	27				18:01 (5)	20:28			21:22	31		20:50 (4)	21:59	36 20:59 (4)
17	08:34	07:43	06:38					17:34 (5)	06:23			05:22			20:18 (4)	04:54	20:23 (4)
	16:38	17:38	18:32	28				18:02 (5)	20:30			21:23	33		20:51 (4)	21:59	36 20:59 (4)
18	08:33	07:41	06:35					17:33 (5)	06:21			05:21			20:18 (4)	04:54	20:23 (4)
	16:40	17:40	18:34	28				18:01 (5)	20:31			21:25	35		20:53 (4)	22:00	36 20:59 (4)
19	08:32	07:39	06:33					17:34 (5)	06:18			05:19			20:18 (4)	04:54	20:23 (4)
	16:41	17:42	18:36	27				18:01 (5)	20:33			21:27	36		20:54 (4)	22:00	36 20:59 (4)
20	08:31	07:36	06:31					17:33 (5)	06:16			05:18			20:17 (4)	04:54	20:24 (4)
	16:43	17:44	18:38	27				18:00 (5)	20:35			21:28	38		20:55 (4)	22:00	36 21:00 (4)
21	08:30	07:34	06:28					17:34 (5)	06:14			05:16			20:17 (4)	04:54	20:24 (4)
	16:45	17:46	18:40	25				17:59 (5)	20:37			21:30	39		20:56 (4)	22:00	36 21:00 (4)
22	08:28	07:32	06:26					17:34 (5)	06:12			05:15			20:18 (4)	04:55	20:25 (4)
	16:47	17:48	18:42	24				17:58 (5)	20:39			21:31	39		20:57 (4)	22:01	36 21:01 (4)
23	08:27	07:30	06:23					17:35 (5)	06:09			05:13			20:17 (4)	04:55	20:24 (4)
	16:49	17:50	18:43	22				17:57 (5)	20:41			21:33	39		20:56 (4)	22:01	36 21:00 (4)
24	08:26	07:28	06:21					17:36 (5)	06:07			05:12			20:17 (4)	04:55	20:24 (4)
	16:51	17:52	18:45	19				17:55 (5)	20:42			21:34	40		20:57 (4)	22:01	36 21:00 (4)
25	08:24	07:25	06:18					17:38 (5)	06:05			05:11			20:17 (4)	04:56	20:25 (4)
	16:52	17:54	18:47	15				17:53 (5)	20:44			21:36	40		20:57 (4)	22:01	36 21:01 (4)
26	08:23	07:23	06:16					17:42 (5)	06:03			05:09			20:17 (4)	04:56	20:25 (4)
	16:54	17:56	18:49	8				17:50 (5)	20:46	3	20:14 (3)	21:37	40		20:57 (4)	22:01	36 21:01 (4)
27	08:22	07:21	06:13						06:01			05:08			20:17 (4)	04:56	20:24 (4)
	16:56	17:58	18:51						20:48	7	20:19 (3)	21:39	40		20:57 (4)	22:01	37 21:01 (4)
28	08:20	07:18	06:11						05:58			05:07			20:17 (4)	04:57	20:25 (4)
	16:58	18:00	18:53						20:50	10	20:21 (3)	21:40	41		20:58 (4)	22:01	37 21:02 (4)
29	08:18		07:08						05:56			05:06			20:18 (4)	04:58	20:26 (4)
	17:00		19:54						20:52	12	20:22 (3)	21:41	40		20:58 (4)	22:01	36 21:02 (4)
30	08:17		07:06						05:54			05:05			20:18 (4)	04:58	20:25 (4)
	17:02		19:56						20:53	14	20:24 (3)	21:43	40		20:58 (4)	22:00	37 21:02 (4)
31	08:15		07:04									05:04			20:18 (4)		
	17:04		19:58									21:44	40		20:58 (4)		
Potential sun hours	250	273	367					420				494			510		
Total, worst case				364				46				985			1114		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.67				0.65				0.64			0.63		
Total reduction				0.18				0.23				0.24			0.20		
Total, real				66				10				239			225		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: II - H243

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:26 (4)	05:39	20:24 (3)	06:33	07:26	18:17 (5)	07:24	08:19		
	22:00	37	21:03 (4)	21:25	29	20:53 (4)	20:18	19:05	19	18:36 (5)	16:54
2	05:00	20:26 (4)	05:40	20:23 (3)	06:35	07:28	18:18 (5)	07:26	08:21		
	22:00	37	21:03 (4)	21:23	29	20:52 (4)	20:16	19:02	15	18:33 (5)	16:52
3	05:00	20:25 (4)	05:42	20:21 (3)	06:36	07:30	18:20 (5)	07:28	08:22		
	21:59	38	21:03 (4)	21:21	29	20:50 (4)	20:13	19:00	11	18:31 (5)	16:50
4	05:01	20:25 (4)	05:44	20:20 (3)	06:38	07:31	18:23 (5)	07:30	08:24		
	21:59	39	21:04 (4)	21:19	28	20:48 (4)	20:11	18:57	6	18:29 (5)	16:48
5	05:02	20:26 (4)	05:45	20:19 (3)	06:40	07:33		07:32		08:25	
	21:58	38	21:04 (4)	21:17	26	20:46 (4)	20:09	18:55		16:46	16:07
6	05:03	20:26 (4)	05:47	20:19 (3)	06:42	07:35		07:34		08:26	
	21:57	38	21:04 (4)	21:15	21	20:40 (3)	20:06	18:52		16:44	16:07
7	05:04	20:26 (4)	05:49	20:18 (3)	06:43	07:37		07:36		08:28	
	21:57	39	21:05 (4)	21:13	23	20:41 (3)	20:04	18:50		16:43	16:06
8	05:05	20:26 (4)	05:51	20:17 (3)	06:45	07:39		07:38		08:29	
	21:56	39	21:05 (4)	21:11	23	20:40 (3)	20:01	18:48		16:41	16:06
9	05:06	20:26 (4)	05:52	20:18 (3)	06:47	07:41		07:40		08:30	
	21:55	39	21:05 (4)	21:09	21	20:39 (3)	19:59	18:45		16:39	16:05
10	05:07	20:26 (4)	05:54	20:17 (3)	06:49	07:42		07:42		08:31	
	21:55	40	21:06 (4)	21:07	20	20:37 (3)	19:56	18:43		16:37	16:05
11	05:08	20:26 (4)	05:56	20:17 (3)	06:50	07:44		07:44		08:33	
	21:54	40	21:06 (4)	21:05	18	20:35 (3)	19:54	18:40		16:36	16:05
12	05:09	20:26 (4)	05:57	20:18 (3)	06:52	07:46		07:45		08:34	
	21:53	40	21:06 (4)	21:03	16	20:34 (3)	19:51	18:38		16:34	16:05
13	05:11	20:26 (4)	05:59	20:17 (3)	06:54	07:48		07:47		08:35	
	21:52	40	21:06 (4)	21:01	14	20:31 (3)	19:49	18:36		16:32	16:05
14	05:12	20:26 (4)	06:01	20:18 (3)	06:56	07:50		07:49		08:36	
	21:51	40	21:06 (4)	20:59	11	20:29 (3)	19:47	18:33		16:31	16:05
15	05:13	20:26 (4)	06:03	20:19 (3)	06:58	07:52		07:51		08:37	
	21:50	40	21:06 (4)	20:57	9	20:28 (3)	19:44	18:31		16:29	16:05
16	05:14	20:27 (4)	06:05	20:19 (3)	06:59	07:54		07:53		08:38	
	21:49	40	21:07 (4)	20:55	6	20:25 (3)	19:42	18:29		16:27	16:05
17	05:16	20:27 (4)	06:06	20:21 (3)	07:01	18:30 (5)	07:55		07:55	08:38	
	21:47	40	21:07 (4)	20:53	2	20:23 (3)	19:39	6	18:36 (5)	18:26	16:26
18	05:17	20:27 (4)	06:08		07:03	18:26 (5)	07:57		07:57	08:39	
	21:46	40	21:07 (4)	20:50		19:37	14	18:40 (5)	18:24	16:25	16:05
19	05:18	20:26 (4)	06:10		07:05	18:24 (5)	07:59		07:59	08:40	
	21:45	40	21:06 (4)	20:48		19:34	18	18:42 (5)	18:22	16:23	16:05
20	05:20	20:27 (4)	06:12		07:06	18:22 (5)	08:01		08:00	08:41	
	21:44	40	21:07 (4)	20:46		19:32	21	18:43 (5)	18:20	16:22	16:06
21	05:21	20:27 (4)	06:13		07:08	18:20 (5)	08:03		08:02	08:41	
	21:42	39	21:06 (4)	20:44		19:29	23	18:43 (5)	18:17	16:20	16:06
22	05:23	20:27 (4)	06:15		07:10	18:19 (5)	08:05		08:04	08:42	
	21:41	39	21:06 (4)	20:42		19:27	25	18:44 (5)	18:15	16:19	16:06
23	05:24	20:28 (4)	06:17		07:12	18:18 (5)	08:07		08:06	08:42	
	21:39	38	21:06 (4)	20:39		19:24	26	18:44 (5)	18:13	16:18	16:07
24	05:26	20:28 (4)	06:19		07:13	18:17 (5)	08:09		08:08	08:43	
	21:38	37	21:05 (4)	20:37		19:22	28	18:45 (5)	18:11	16:17	16:08
25	05:27	20:29 (4)	06:20		07:15	18:16 (5)	07:11		08:09	08:43	
	21:36	35	21:04 (4)	20:35		19:19	28	18:44 (5)	17:09	16:16	16:08
26	05:29	20:29 (4)	06:22		07:17	18:16 (5)	07:13		08:11	08:43	
	21:35	33	21:02 (4)	20:32		19:17	28	18:44 (5)	17:06	16:15	16:09
27	05:30	20:30 (4)	06:24		07:19	18:16 (5)	07:14		08:13	08:44	
	21:33	31	21:01 (4)	20:30		19:14	27	18:43 (5)	17:04	16:13	16:10
28	05:32	20:30 (4)	06:26		07:21	18:16 (5)	07:16		08:14	08:44	
	21:32	29	20:59 (4)	20:28		19:12	27	18:43 (5)	17:02	16:12	16:11
29	05:34	20:31 (4)	06:28		07:22	18:16 (5)	07:18		08:16	08:44	
	21:30	27	20:58 (4)	20:25		19:09	25	18:41 (5)	17:00	16:12	16:11
30	05:35	20:31 (4)	06:29		07:24	18:16 (5)	07:20		08:17	08:44	
	21:28	25	20:56 (4)	20:23		19:07	22	18:38 (5)	16:58	16:11	16:12
31	05:37	20:26 (3)	06:31								08:44
	21:26	29	20:55 (4)	20:21							16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	1146		325		318		51				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.63		0.64		0.67		0.67				
Total reduction	0.20		0.22		0.22		0.20				
Total, real	235		71		69		10				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar**Calculation:** Kellystown N149 Worst Case
Assumptions for shadow calculations**Shadow receptor:** IJ - H244

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	18:02	07:01	20:00	30	19:00 (5)	05:52	20:55	05:03	20:42 (3)	
2	08:44	16:16	08:12	17:08	18:04	07:14	18:04	18:04	06:59	20:02	30	19:30 (5)	05:50	20:57	05:02	20:43 (3)	
3	08:43	16:17	08:10	17:10	18:06	07:12	18:06	18:06	06:56	20:04	30	19:29 (5)	05:48	20:59	05:01	20:44 (3)	
4	08:43	16:18	08:08	17:12	18:07	07:09	18:07	18:07	06:54	20:06	29	19:29 (5)	05:46	21:01	05:00	20:45 (3)	
5	08:43	16:20	08:07	17:14	18:09	07:07	18:09	18:09	06:51	20:07	28	19:27 (5)	05:44	21:03	04:59	20:47 (3)	
6	08:42	16:21	08:05	17:16	18:11	07:04	18:11	18:11	06:49	20:09	27	19:27 (5)	05:42	21:04	04:59	20:48 (3)	
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	18:13	06:47	20:11	25	19:25 (5)	05:40	21:06	04:58	20:54 (3)	
8	08:41	16:24	08:01	17:20	18:15	07:00	18:15	18:15	06:44	20:13	23	19:24 (5)	05:38	21:08	04:57	20:52 (3)	
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	18:17	06:42	20:15	20	19:23 (5)	05:36	21:10	04:57	20:51 (3)	
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	18:19	06:39	20:17	16	19:20 (5)	05:34	21:11	04:56	20:50 (3)	
11	08:40	16:28	07:55	17:26	18:21	06:52	18:21	18:21	06:37	20:19	10	19:17 (5)	05:33	21:13	04:56	20:49 (3)	
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	18:23	06:35	20:20			05:31	21:15	04:55	20:48 (3)	
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	18:25	06:32	20:22			05:29	21:17	04:55	20:47 (3)	
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	18:27	06:30	20:24			05:27	21:18	04:55	20:46 (3)	
15	08:36	16:34	07:47	17:34	18:28	06:43	18:28	18:28	06:28	20:26			05:26	21:20	04:55	20:45 (3)	
16	08:35	16:36	07:45	17:36	18:30	06:40	18:30	18:30	06:25	20:28			05:24	21:22	04:54	20:44 (3)	
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	18:32	06:23	20:30			05:22	21:23	04:54	20:43 (3)	
18	08:33	16:40	07:41	17:40	18:34	06:35	18:34	18:34	06:21	20:31			05:21	21:25	04:54	20:42 (3)	
19	08:32	16:41	07:39	17:42	18:36	06:33	18:36	18:36	06:18	20:33			05:19	21:27	04:54	20:41 (3)	
20	08:31	16:43	07:36	17:44	18:38	06:31	18:38	18:38	06:16	20:35			05:18	21:28	04:54	20:40 (3)	
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	18:40	06:14	20:37			05:16	21:30	04:54	20:39 (3)	
22	08:28	16:47	07:32	17:48	18:42	06:26	18:42	18:42	06:12	20:39			05:15	21:31	04:54	20:38 (3)	
23	08:27	16:49	07:30	17:50	18:43	06:23	18:43	18:43	06:09	20:41			05:13	21:33	04:55	20:37 (3)	
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45	18:45	06:07	20:42			05:12	21:34	04:55	20:36 (3)	
25	08:24	16:52	07:25	17:54	18:47	06:18	18:47	18:47	06:05	20:44			05:11	21:36	04:56	20:35 (3)	
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	18:49	06:03	20:46			05:09	21:37	04:56	20:34 (3)	
27	08:22	16:56	07:21	17:58	18:51	06:13	18:51	18:51	06:01	20:48			05:08	21:39	04:56	20:33 (3)	
28	08:20	16:58	07:18	18:00	18:53	06:11	18:53	18:53	05:58	20:50			05:07	21:40	04:57	20:32 (3)	
29	08:18	17:00	07:16	18:02	18:55	06:09	18:55	18:55	05:56	20:52			05:06	21:41	04:58	20:31 (3)	
30	08:17	17:02	07:14	18:04	18:57	06:07	18:57	18:57	05:54	20:54			05:05	21:42	04:58	20:30 (3)	
31	08:15	17:04	07:12	18:06	18:59	06:05	18:59	18:59	05:52	20:56			05:04	21:43	04:59	20:29 (3)	
Potential sun hours	250	273	367	420	494	510	67	0.32	1.00	0.63	0.20	13					
Total, worst case																	
Sun reduction																	
Oper. time red.																	
Wind dir. red.																	
Total reduction																	
Total, real																	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IJ - H244

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59		05:39	20:51 (3)	06:33		19:06 (5)	07:26	07:24	08:19	
	22:00		21:25	20:53 (3)	20:18	10	19:16 (5)	19:05	16:54	16:10	
2	05:00		05:40		06:35		19:03 (5)	07:28	07:26	08:21	
	22:00		21:23		20:16	16	19:19 (5)	19:02	16:52	16:09	
3	05:00		05:42		06:36		19:01 (5)	07:30	07:28	08:22	
	21:59		21:21		20:13	20	19:21 (5)	19:00	16:50	16:08	
4	05:01		05:44		06:38		18:58 (5)	07:31	07:30	08:24	
	21:59		21:19		20:11	23	19:21 (5)	18:57	16:48	16:08	
5	05:02		05:45		06:40		18:57 (5)	07:33	07:32	08:25	
	21:58		21:17		20:09	25	19:22 (5)	18:55	16:46	16:07	
6	05:03	20:55 (3)	05:47		06:42		18:56 (5)	07:35	07:34	08:26	
	21:57	4	20:59 (3)	21:15	20:06	27	19:23 (5)	18:52	16:44	16:07	
7	05:04		20:54 (3)	05:49	06:43		18:55 (5)	07:37	07:36	08:28	
	21:57	7	21:01 (3)	21:13	20:04	28	19:23 (5)	18:50	16:43	16:06	
8	05:05		20:53 (3)	05:51	06:45		18:54 (5)	07:39	07:38	08:29	
	21:56	9	21:02 (3)	21:11	20:01	29	19:23 (5)	18:48	16:41	16:06	
9	05:06		20:52 (3)	05:52	06:47		18:54 (5)	07:41	07:40	08:30	
	21:55	12	21:04 (3)	21:09	19:59	29	19:23 (5)	18:45	16:39	16:05	
10	05:07		20:51 (3)	05:54	06:49		18:52 (5)	07:42	07:42	08:31	
	21:55	14	21:05 (3)	21:07	19:56	30	19:22 (5)	18:43	16:37	16:05	
11	05:08		20:51 (3)	05:56	06:50		18:52 (5)	07:44	07:44	08:33	
	21:54	14	21:05 (3)	21:05	19:54	30	19:22 (5)	18:40	16:36	16:05	
12	05:09		20:50 (3)	05:58	06:52		18:52 (5)	07:46	07:45	08:34	
	21:53	16	21:06 (3)	21:03	19:51	30	19:22 (5)	18:38	16:34	16:05	
13	05:11		20:49 (3)	05:59	06:54		18:53 (5)	07:48	07:47	08:35	
	21:52	18	21:07 (3)	21:01	19:49	28	19:21 (5)	18:36	16:32	16:05	
14	05:12		20:49 (3)	06:01	06:56		18:52 (5)	07:50	07:49	08:36	
	21:51	18	21:07 (3)	20:59	19:47	26	19:18 (5)	18:33	16:31	16:05	
15	05:13		20:48 (3)	06:03	06:58		18:53 (5)	07:52	07:51	08:37	
	21:50	20	21:08 (3)	20:57	19:44	23	19:16 (5)	18:31	16:29	16:05	
16	05:14		20:49 (3)	06:05	06:59		18:54 (5)	07:54	07:53	08:38	
	21:48	20	21:09 (3)	20:55	19:42	20	19:14 (5)	18:29	16:27	16:05	
17	05:16		20:48 (3)	06:06	07:01		18:54 (5)	07:55	07:55	08:38	
	21:47	21	21:09 (3)	20:53	19:39	17	19:11 (5)	18:26	16:26	16:05	
18	05:17		20:48 (3)	06:08	07:03		18:56 (5)	07:57	07:57	08:39	
	21:46	21	21:09 (3)	20:50	19:37	12	19:08 (5)	18:24	16:25	16:05	
19	05:18		20:47 (3)	06:10	07:05		18:58 (5)	07:59	07:59	08:40	
	21:45	22	21:09 (3)	20:48	19:34	8	19:06 (5)	18:22	16:23	16:05	
20	05:20		20:48 (3)	06:12	07:06			08:01	08:00	08:41	
	21:44	22	21:10 (3)	20:46	19:32			18:20	16:22	16:06	
21	05:21		20:47 (3)	06:13	07:08			08:03	08:02	08:41	
	21:42	22	21:09 (3)	20:44	19:29			18:17	16:20	16:06	
22	05:23		20:47 (3)	06:15	07:10			08:05	08:04	08:42	
	21:41	20	21:07 (3)	20:42	19:27			18:15	16:19	16:07	
23	05:24		20:47 (3)	06:17	07:12			08:07	08:06	08:42	
	21:39	20	21:07 (3)	20:39	19:24			18:13	16:18	16:07	
24	05:26		20:47 (3)	06:19	07:13			08:09	08:08	08:43	
	21:38	18	21:05 (3)	20:37	19:22			18:11	16:17	16:08	
25	05:27		20:48 (3)	06:20	07:15			07:11	08:09	08:43	
	21:36	16	21:04 (3)	20:35	19:19			17:09	16:16	16:08	
26	05:29		20:47 (3)	06:22	07:17			07:13	08:11	08:43	
	21:35	15	21:02 (3)	20:32	19:17			17:06	16:15	16:09	
27	05:30		20:48 (3)	06:24	07:19			07:14	08:13	08:44	
	21:33	13	21:01 (3)	20:30	19:14			17:04	16:13	16:10	
28	05:32		20:48 (3)	06:26	07:21			07:16	08:14	08:44	
	21:32	11	20:59 (3)	20:28	19:12			17:02	16:13	16:11	
29	05:34		20:49 (3)	06:28	07:22			07:18	08:16	08:44	
	21:30	9	20:58 (3)	20:25	19:09			17:00	16:12	16:11	
30	05:35		20:49 (3)	06:29	07:24			07:20	08:17	08:44	
	21:28	7	20:56 (3)	20:23	19:07			16:58	16:11	16:12	
31	05:37		20:50 (3)	06:31				07:22		08:44	
	21:26	5	20:55 (3)	20:21				16:56		16:13	
Potential sun hours	512		460		382		328	259	233		
Total, worst case	394		2		431						
Sun reduction	0.32		0.34		0.32						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.63		0.63		0.67						
Total reduction	0.20		0.21		0.22						
Total, real	80		0		93						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: IK - H245
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		19:06 (5)	05:52			05:03		20:44 (3)
	16:15	17:06	18:02						20:00	27	19:33 (5)	20:55			21:45	19	21:03 (3)
2	08:44	08:12	07:14						06:59		19:04 (5)	05:50			05:02		20:45 (3)
	16:16	17:08	18:04						20:02	29	19:33 (5)	20:57			21:46	19	21:04 (3)
3	08:43	08:10	07:12						06:56		19:04 (5)	05:48			05:01		20:45 (3)
	16:17	17:10	18:06						20:04	30	19:34 (5)	20:59			21:48	19	21:04 (3)
4	08:43	08:08	07:09						06:54		19:04 (5)	05:46			05:00		20:46 (3)
	16:18	17:12	18:07						20:06	30	19:34 (5)	21:01			21:49	17	21:03 (3)
5	08:43	08:07	07:07						06:51		19:03 (5)	05:44			04:59		20:47 (3)
	16:20	17:14	18:09						20:07	30	19:33 (5)	21:03			21:50	16	21:03 (3)
6	08:42	08:05	07:04						06:49		19:03 (5)	05:42			04:59		20:47 (3)
	16:21	17:16	18:11						20:09	30	19:33 (5)	21:04			21:51	16	21:03 (3)
7	08:42	08:03	07:02						06:47		19:03 (5)	05:40			04:58		20:47 (3)
	16:22	17:18	18:13						20:11	29	19:32 (5)	21:06			21:52	15	21:02 (3)
8	08:41	08:01	07:00						06:44		19:04 (5)	05:38			04:57		20:49 (3)
	16:24	17:20	18:15						20:13	27	19:31 (5)	21:08			21:53	13	21:02 (3)
9	08:41	07:59	06:57						06:42		19:04 (5)	05:36			04:57		20:50 (3)
	16:25	17:22	18:17						20:15	27	19:31 (5)	21:10			21:54	12	21:02 (3)
10	08:40	07:57	06:55						06:39		19:04 (5)	05:34			04:56		20:50 (3)
	16:27	17:24	18:19						20:17	25	19:29 (5)	21:11			21:55	11	21:01 (3)
11	08:40	07:55	06:52						06:37		19:06 (5)	05:33			04:56		20:51 (3)
	16:28	17:26	18:21						20:19	22	19:28 (5)	21:13			21:55	10	21:01 (3)
12	08:39	07:53	06:50						06:35		19:07 (5)	05:31			04:55		20:52 (3)
	16:30	17:28	18:23						20:20	19	19:26 (5)	21:15			21:56	9	21:01 (3)
13	08:38	07:51	06:48						06:32		19:09 (5)	05:29			04:55		20:52 (3)
	16:31	17:30	18:25						20:22	14	19:23 (5)	21:17			21:57	7	20:59 (3)
14	08:37	07:49	06:45						06:30		19:13 (5)	05:27		20:45 (3)	04:55		20:54 (3)
	16:33	17:32	18:27						20:24	6	19:19 (5)	21:18	2	20:47 (3)	21:57	5	20:59 (3)
15	08:36	07:47	06:43						06:28			05:26		20:43 (3)	04:55		20:55 (3)
	16:34	17:34	18:28						20:26			21:20	5	20:48 (3)	21:58	3	20:58 (3)
16	08:35	07:45	06:40						06:25			05:24		20:43 (3)	04:54		
	16:36	17:36	18:30						20:28			21:22	7	20:50 (3)	21:59		
17	08:34	07:43	06:38						06:23			05:22		20:42 (3)	04:54		
	16:38	17:38	18:32						20:30			21:23	9	20:51 (3)	21:59		
18	08:33	07:41	06:35						06:21			05:21		20:42 (3)	04:54		
	16:40	17:40	18:34						20:31			21:25	11	20:53 (3)	22:00		
19	08:32	07:39	06:33						06:18			05:19		20:42 (3)	04:54		
	16:41	17:42	18:36						20:33			21:27	12	20:54 (3)	22:00		
20	08:31	07:36	06:31						06:16			05:18		20:41 (3)	04:54		
	16:43	17:44	18:38						20:35			21:28	14	20:55 (3)	22:00		
21	08:30	07:34	06:28						06:14			05:16		20:41 (3)	04:54		
	16:45	17:46	18:40						20:37			21:30	16	20:57 (3)	22:00		
22	08:28	07:32	06:26						06:12			05:15		20:42 (3)	04:55		
	16:47	17:48	18:42						20:39			21:31	17	20:59 (3)	22:01		
23	08:27	07:30	06:23						06:09			05:13		20:41 (3)	04:55		
	16:49	17:50	18:43						20:41			21:33	18	20:59 (3)	22:01		
24	08:26	07:28	06:21						06:07			05:12		20:41 (3)	04:55		
	16:51	17:52	18:45						20:42			21:34	20	21:01 (3)	22:01		
25	08:24	07:25	06:18						06:05			05:11		20:41 (3)	04:56		
	16:52	17:54	18:47						20:44			21:36	21	21:02 (3)	22:01		
26	08:23	07:23	06:16					18:18 (5)	06:03			05:09		20:42 (3)	04:56		
	16:54	17:56	18:49	5				18:23 (5)	20:46			21:37	22	21:04 (3)	22:01		
27	08:22	07:21	06:13					18:13 (5)	06:01			05:08		20:42 (3)	04:56		20:58 (3)
	16:56	17:58	18:51	11				18:24 (5)	20:48			21:39	23	21:05 (3)	22:01	2	21:00 (3)
28	08:20	07:18	06:11					18:11 (5)	05:58			05:07		20:42 (3)	04:57		20:57 (3)
	16:58	18:00						18:26 (5)	20:50	15		21:40	23	21:05 (3)	22:01	5	21:02 (3)
29	08:18		07:09					19:09 (5)	05:56			05:06		20:43 (3)	04:58		20:57 (3)
	17:00		19:54	19				19:28 (5)	20:52			21:41	21	21:04 (3)	22:01	6	21:03 (3)
30	08:17		07:06					19:08 (5)	05:54			05:05		20:43 (3)	04:58		20:56 (3)
	17:02		19:56	22				19:30 (5)	20:53			21:43	21	21:04 (3)	22:00	8	21:04 (3)
31	08:15		07:04					19:06 (5)				05:04		20:43 (3)			
	17:04		19:58	25				19:31 (5)				21:44	21	21:04 (3)			
Potential sun hours	250	273	367					420				494		510			
Total, worst case				97				345				283		212			
Sun reduction				0.27				0.35				0.38		0.32			
Oper. time red.				1.00				1.00				1.00		1.00			
Wind dir. red.				0.67				0.67				0.63		0.63			
Total reduction				0.18				0.24				0.24		0.20			
Total, real				18				82				68		42			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IK - H245

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:56 (3)	05:39	06:33		19:05 (5)	07:26	07:24		08:19	
	22:00	9	21:05 (3)	21:25	20:18	21	19:26 (5)	19:05		16:10	
2	05:00		20:55 (3)	05:40	06:35		19:03 (5)	07:28		08:21	
	22:00	11	21:06 (3)	21:23	20:16	25	19:28 (5)	19:02		16:09	
3	05:00		20:54 (3)	05:42	06:36		19:02 (5)	07:30		08:22	
	21:59	12	21:06 (3)	21:21	20:13	27	19:29 (5)	19:00		16:08	
4	05:01		20:54 (3)	05:44	06:38		19:01 (5)	07:31		08:24	
	21:59	13	21:07 (3)	21:19	20:11	27	19:28 (5)	18:57		16:08	
5	05:02		20:54 (3)	05:45	06:40		19:00 (5)	07:33		08:25	
	21:58	14	21:08 (3)	21:17	20:09	29	19:29 (5)	18:55		16:07	
6	05:03		20:54 (3)	05:47	06:42		19:00 (5)	07:35		08:26	
	21:57	15	21:09 (3)	21:15	20:06	29	19:29 (5)	18:52		16:07	
7	05:04		20:53 (3)	05:49	06:43		18:58 (5)	07:37		08:28	
	21:57	16	21:09 (3)	21:13	20:04	30	19:28 (5)	18:50		16:06	
8	05:05		20:53 (3)	05:51	06:45		18:58 (5)	07:39		08:29	
	21:56	17	21:10 (3)	21:11	20:01	30	19:28 (5)	18:48		16:06	
9	05:06		20:53 (3)	05:52	06:47		18:58 (5)	07:41		08:30	
	21:55	18	21:11 (3)	21:09	19:59	30	19:28 (5)	18:45		16:05	
10	05:07		20:53 (3)	05:54	06:49		18:57 (5)	07:42		08:31	
	21:55	18	21:11 (3)	21:07	19:56	30	19:27 (5)	18:43		16:05	
11	05:08		20:52 (3)	05:56	06:50		18:58 (5)	07:44		08:33	
	21:54	20	21:12 (3)	21:05	19:54	28	19:26 (5)	18:40		16:05	
12	05:09		20:52 (3)	05:58	06:52		18:58 (5)	07:46		08:34	
	21:53	20	21:12 (3)	21:03	19:51	26	19:24 (5)	18:38		16:05	
13	05:11		20:52 (3)	05:59	06:54		18:59 (5)	07:48		08:35	
	21:52	21	21:13 (3)	21:01	19:49	23	19:22 (5)	18:36		16:05	
14	05:12		20:51 (3)	06:01	06:56		18:59 (5)	07:50		08:36	
	21:51	22	21:13 (3)	20:59	19:47	19	19:18 (5)	18:33		16:05	
15	05:13		20:51 (3)	06:03	06:58		19:00 (5)	07:52		08:37	
	21:50	22	21:13 (3)	20:57	19:44	16	19:16 (5)	18:31		16:05	
16	05:14		20:52 (3)	06:05	06:59		19:02 (5)	07:54		08:38	
	21:48	22	21:14 (3)	20:55	19:42	12	19:14 (5)	18:29		16:05	
17	05:16		20:51 (3)	06:06	07:01		19:04 (5)	07:55		08:38	
	21:47	23	21:14 (3)	20:53	19:39	7	19:11 (5)	18:26		16:05	
18	05:17		20:51 (3)	06:08	07:03			07:57		08:39	
	21:46	21	21:12 (3)	20:50	19:37			18:24		16:05	
19	05:18		20:51 (3)	06:10	07:05			07:59		08:40	
	21:45	20	21:11 (3)	20:48	19:34			18:22		16:05	
20	05:20		20:51 (3)	06:12	07:06			08:01		08:41	
	21:44	19	21:10 (3)	20:46	19:32			18:20		16:06	
21	05:21		20:51 (3)	06:13	07:08			08:03		08:41	
	21:42	18	21:09 (3)	20:44	19:29			18:17		16:06	
22	05:23		20:51 (3)	06:15	07:10			08:05		08:42	
	21:41	16	21:07 (3)	20:42	19:27			18:15		16:07	
23	05:24		20:52 (3)	06:17	07:12			08:07		08:42	
	21:39	15	21:07 (3)	20:39	19:24			18:13		16:07	
24	05:26		20:52 (3)	06:19	07:13			08:09		08:43	
	21:38	13	21:05 (3)	20:37	19:22			18:11		16:08	
25	05:27		20:53 (3)	06:20	07:15			07:11		08:43	
	21:36	11	21:04 (3)	20:35	19:19			17:09		16:08	
26	05:29		20:53 (3)	06:22	07:17			07:13		08:43	
	21:35	9	21:02 (3)	20:32	19:17			17:06		16:09	
27	05:30		20:54 (3)	06:24	07:19			07:14		08:44	
	21:33	7	21:01 (3)	20:30	19:14			17:04		16:10	
28	05:32		20:54 (3)	06:26	07:21			07:16		08:44	
	21:32	5	20:59 (3)	20:28	19:12			17:02		16:11	
29	05:34		20:55 (3)	06:28	19:13 (5)	07:22		07:18		08:44	
	21:30	3	20:58 (3)	20:25	7	19:20 (5)		17:00		16:11	
30	05:35			06:29	19:09 (5)	07:24		07:20		08:44	
	21:28			20:23	15	19:24 (5)		16:58		16:12	
31	05:37			06:31		19:06 (5)		07:22		08:44	
	21:26			20:21	19	19:25 (5)		16:56		16:13	
Potential sun hours	512			460		382		328		259	
Total, worst case		450		41		409					
Sun reduction		0.32		0.34		0.32					
Oper. time red.		1.00		1.00		1.00					
Wind dir. red.		0.63		0.67		0.67					
Total reduction		0.20		0.23		0.22					
Total, real		91		9		88					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IL - H246

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IM - H247

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** IN - H248

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26	07:53 (1)	07:24	08:19
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	20	08:13 (1)	16:54
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	18	08:12 (1)	16:52
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	15	08:11 (1)	16:50
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	13	08:11 (1)	16:48
5	08:43	08:07	07:07		06:52	05:44	04:59	05:02	05:46	06:40		07:33		08:00 (1)	07:32
	16:20	17:14	18:10		20:08	21:03	21:50	21:58	21:18	20:09		18:55	10	08:10 (1)	16:46
6	08:43	08:05	07:05		06:49	05:42	04:59	05:03	05:47	06:42		07:35		08:02 (1)	07:34
	16:21	17:16	18:12	1	07:30 (1)	20:10	21:05	21:51	21:58	20:06		18:53	7	08:09 (1)	16:45
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	06:44		07:37		08:04 (1)	07:36
	16:22	17:18	18:13	5	07:32 (1)	20:11	21:06	21:52	21:57	20:04		18:50	3	08:07 (1)	16:43
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	06:45		07:39			07:38
	16:24	17:20	18:15	9	07:33 (1)	20:13	21:08	21:53	21:56	20:02		18:48			16:41
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	06:47		07:41			07:40
	16:25	17:22	18:17	12	07:34 (1)	20:15	21:10	21:54	21:56	19:59		18:45			16:39
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	06:49		07:43			07:42
	16:27	17:24	18:19	14	07:33 (1)	20:17	21:12	21:55	21:58	19:57		18:43			16:37
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	06:51		07:45			07:44
	16:28	17:26	18:21	17	07:34 (1)	20:19	21:13	21:56	21:54	19:54		18:41			16:36
12	08:39	07:53	06:50		07:14 (1)	06:35	05:31	04:56	05:09	06:52		07:46			07:46
	16:30	17:28	18:23	19	07:33 (1)	20:21	21:15	21:56	21:53	19:52		18:38			16:34
13	08:38	07:51	06:48		07:13 (1)	06:33	05:29	04:55	05:11	06:54		07:48			07:48
	16:31	17:30	18:25	20	07:33 (1)	20:22	21:17	21:57	21:52	19:49		18:36			16:32
14	08:37	07:49	06:45		07:13 (1)	06:30	05:27	04:55	05:12	06:56		07:50			07:50
	16:33	17:32	18:27	18	07:31 (1)	20:24	21:19	21:58	21:51	19:47		18:34			16:31
15	08:37	07:47	06:43		07:14 (1)	06:28	05:26	04:55	05:13	06:03		07:52			07:51
	16:35	17:34	18:29	17	07:31 (1)	20:26	21:20	21:58	21:50	19:44		18:31			16:29
16	08:36	07:45	06:41		07:15 (1)	06:25	05:24	04:55	05:15	06:05		07:54			07:53
	16:36	17:36	18:31	13	07:28 (1)	20:28	21:22	21:59	21:49	19:42		18:29			16:28
17	08:35	07:43	06:38		07:17 (1)	06:23	05:22	04:54	05:16	06:06		07:56			07:55
	16:38	17:38	18:32	9	07:26 (1)	20:30	21:24	21:59	21:48	19:39		18:27			16:26
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03		07:58			07:57
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37		18:24			16:25
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05		07:59			07:59
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34		18:22			16:23
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01			08:01
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20			16:22
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03			08:02
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18			16:21
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05			08:04
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15			16:19
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07			08:06
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13			16:18
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09			08:08
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22		18:11			16:17
25	08:25	07:26	06:19		06:05	05:11	04:56	05:28	06:21	07:15		07:11			08:10
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20		17:09			16:16
26	08:23	07:23	06:16		06:03	05:10	04:56	05:29	06:22	07:17		07:13			08:11
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	7	08:07 (1)			16:15
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:57 (1)			08:13
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	12	08:09 (1)			16:14
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:56 (1)			08:15
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	15	08:11 (1)			16:13
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:54 (1)			08:16
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	18	08:12 (1)			16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		07:53 (1)			08:18
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	19	08:12 (1)			16:11
31	08:16		07:04			05:04		05:37	06:31			07:23			
	17:04		19:58			21:44		21:27	20:21			16:56			
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233
Total, worst case				154						71		86			
Sun reduction				0.27						0.32		0.29			
Oper. time red.				1.00						1.00		1.00			
Wind dir. red.				0.65						0.65		0.65			
Total reduction				0.18						0.21		0.19			
Total, real				27						15		16			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** IO - H249

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26	07:56 (1)	07:24	08:19	
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	19	08:15 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:55 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	20	08:15 (1)	16:52	16:09
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	19	08:15 (1)	16:50	16:09
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	16	08:14 (1)	16:48	16:08
5	08:43	08:07	07:07	07:31 (1)	06:52	05:44	04:59	05:02	05:46	06:40		07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10	2	07:33 (1)	20:08	21:03	21:50	21:58	21:18		18:55	14	08:14 (1)	16:46	16:07
6	08:43	08:05	07:05	07:29 (1)	06:49	05:42	04:59	05:03	05:47	06:42		07:35		08:02 (1)	07:34	08:27
	16:21	17:16	18:12	6	07:35 (1)	20:10	21:05	21:51	21:58	21:16		18:53	11	08:13 (1)	16:45	16:07
7	08:42	08:03	07:02	07:27 (1)	06:47	05:40	04:58	05:04	05:49	06:44		07:37		08:04 (1)	07:36	08:28
	16:22	17:18	18:13	10	07:37 (1)	20:11	21:06	21:52	21:57	21:14		18:50	8	08:12 (1)	16:43	16:06
8	08:42	08:01	07:00	07:24 (1)	06:44	05:38	04:57	05:05	05:51	06:45		07:39		08:06 (1)	07:38	08:29
	16:24	17:20	18:15	13	07:37 (1)	20:13	21:08	21:53	21:56	21:12		18:48	4	08:10 (1)	16:41	16:06
9	08:41	07:59	06:58	07:22 (1)	06:42	05:36	04:57	05:06	05:52	06:47		07:41			07:40	08:31
	16:25	17:22	18:17	15	07:37 (1)	20:15	21:10	21:54	21:56	21:10		18:45			16:39	16:06
10	08:41	07:57	06:55	07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49		07:43			07:42	08:32
	16:27	17:24	18:19	18	07:37 (1)	20:17	21:12	21:55	21:55	21:08		18:43			16:37	16:05
11	08:40	07:55	06:53	07:17 (1)	06:37	05:33	04:56	05:08	05:56	06:51		07:45			07:44	08:33
	16:28	17:26	18:21	20	07:37 (1)	20:19	21:13	21:56	21:54	21:06		18:41			16:36	16:05
12	08:39	07:53	06:50	07:16 (1)	06:35	05:31	04:56	05:09	05:58	06:52		07:46			07:46	08:34
	16:30	17:28	18:23	20	07:36 (1)	20:21	21:15	21:56	21:53	21:04		18:38			16:34	16:05
13	08:38	07:51	06:48	07:17 (1)	06:33	05:29	04:55	05:11	05:59	06:54		07:48			07:48	08:35
	16:31	17:30	18:25	18	07:35 (1)	20:22	21:17	21:57	21:52	21:02		18:36			16:32	16:05
14	08:37	07:49	06:45	07:17 (1)	06:30	05:27	04:55	05:12	06:01	06:56		07:50			07:50	08:36
	16:33	17:32	18:27	16	07:33 (1)	20:24	21:19	21:58	21:51	20:59		18:34			16:31	16:05
15	08:37	07:47	06:43	07:19 (1)	06:28	05:26	04:55	05:13	06:03	06:58		07:52			07:51	08:37
	16:35	17:34	18:29	13	07:32 (1)	20:26	21:20	21:58	21:50	20:57		18:31			16:29	16:05
16	08:36	07:45	06:41	07:20 (1)	06:25	05:24	04:55	05:14	06:05	07:00		07:54			07:53	08:38
	16:36	17:36	18:31	9	07:29 (1)	20:28	21:22	21:59	21:49	20:55		18:29			16:28	16:05
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:56			07:55	08:39
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27		18:27			16:26	16:05
18	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58		07:58			07:57	08:39
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24		18:24			16:25	16:05
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59		07:59			07:59	08:40
	16:42	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22		18:22			16:23	16:05
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01		08:01			08:01	08:41
	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20		18:20			16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03		08:03			08:02	08:41
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18		18:18			16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:05			08:04	08:42
	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15		18:15			16:19	16:07
23	08:27	07:30	06:23	06:10	05:13	04:55	05:24	06:17	07:12	08:07		08:07			08:06	08:43
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13		18:13			16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:09			08:08	08:43
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11		18:11			16:17	16:08
25	08:25	07:26	06:19	06:05	05:11	04:56	05:28	06:21	07:15	08:11		07:11			08:10	08:43
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09		17:09			16:16	16:08
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		07:13			08:11	08:44
	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:06		17:07			16:15	16:09
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:03 (1)	07:15			08:13	08:44
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	6	08:09 (1)	17:05		16:14	16:10
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:00 (1)	07:17			08:15	08:44
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:01	12	08:12 (1)	17:02		16:13	16:11
29	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	07:58 (1)	07:19			08:16	08:44
	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	16	08:14 (1)	17:00		16:12	16:12
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	07:57 (1)	07:21			08:18	08:44
	17:02		19:57	20:54	21:43	22:01	21:28	20:23	19:07	18:00	18	08:15 (1)	16:58		16:11	16:13
31	08:16		07:04		05:04		05:37	06:31				07:23				08:44
	17:04		19:58		21:44		21:27	20:21				16:56				16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case			160							52		111				
Sun reduction			0.27							0.32		0.29				
Oper. time red.			1.00							1.00		1.00				
Wind dir. red.			0.65							0.65		0.65				
Total reduction			0.18							0.21		0.19				
Total, real			28							11		21				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IP - H250

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IQ - H251

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	07:34 (1) 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:31 (1) 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:29 (1) 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:30 (1) 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:29 (1) 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:31 (1) 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:31 (1) 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:34 (1) 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:41 (1) 18:23	06:35 20:21	05:31 21:15	04:56 21:53	05:09 21:04	05:58 21:52	06:52 19:52	07:46 18:38	07:46 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 18:25	05:29 20:22	04:55 21:17	05:11 21:52	05:59 21:02	06:54 21:02	07:48 19:49	07:48 18:36	07:48 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 18:27	05:27 20:24	04:55 21:19	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 17:51	07:50 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 18:29	05:26 20:26	04:55 21:20	05:13 21:58	06:03 21:50	06:58 20:57	07:52 19:44	07:52 18:31	07:52 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 18:31	05:24 20:28	04:55 21:22	05:14 21:59	06:05 21:49	07:00 20:55	07:54 19:42	07:54 18:29	07:54 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 18:32	05:22 20:30	04:54 21:24	05:16 21:59	06:06 21:48	07:01 20:53	07:56 19:39	07:56 18:27	07:56 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 18:34	05:21 20:32	04:54 21:25	05:17 22:00	06:08 21:46	07:03 20:51	07:58 19:37	07:58 18:24	07:58 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 18:36	05:19 20:34	04:54 21:27	05:19 22:00	06:10 21:45	07:05 20:49	07:59 19:34	07:59 18:22	07:59 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 18:38	05:18 20:35	04:54 21:28	05:20 22:01	06:12 21:44	07:07 20:46	08:01 19:32	08:01 18:20	08:01 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 18:40	05:16 20:37	04:55 21:30	05:21 22:01	06:14 21:42	07:08 20:44	08:03 19:29	08:03 18:18	08:03 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 18:42	05:15 20:39	04:55 21:32	05:23 22:01	06:15 21:41	07:10 20:42	08:05 19:27	08:05 18:15	08:05 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 18:44	05:13 20:41	04:55 21:33	05:24 22:01	06:17 21:40	07:12 20:40	08:07 19:24	08:07 18:13	08:07 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 18:45	05:12 20:43	04:55 21:35	05:26 22:01	06:19 21:38	07:14 20:37	08:09 19:22	08:09 18:11	08:09 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 18:47	05:11 20:45	04:56 21:36	05:27 22:01	06:21 21:37	07:15 20:35	07:11 19:20	07:11 18:09	07:11 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 18:49	05:09 20:46	04:56 21:38	05:29 22:01	06:22 21:35	07:17 20:33	07:13 19:17	07:13 18:07	07:13 16:08
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 18:51	05:08 20:48	04:57 21:39	05:31 22:01	06:24 21:33	07:19 20:30	07:15 19:15	07:15 18:05	07:15 16:10
28	08:20 16:58	07:19 18:00	07:43 (1) 18:53	06:11 18:53	05:07 20:50	04:57 21:40	05:32 22:01	06:26 21:32	07:21 20:28	07:17 19:12	07:17 18:02	07:17 16:11
29	08:19 17:00		07:45 (1) 18:53	07:09 18:53	05:06 20:52	04:58 21:42	05:34 22:01	06:28 21:30	07:23 20:26	07:19 19:10	07:19 18:00	07:19 16:12
30	08:17 17:02			07:06 19:57	05:04 20:54	05:05 21:43	04:58 22:01	06:29 21:28	07:24 20:23	07:21 19:07	07:21 18:00	07:21 16:13
31	08:16 17:04			07:04 19:58	05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	07:23 19:07	07:23 18:00	07:23 17:00	07:23 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		2	149							151		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		0	26							29		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IR - H252

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:36 (1) 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:34 (1) 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	08:33 (1) 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	08:32 (1) 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:31 (1) 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	08:30 (1) 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:30 (1) 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:31 (1) 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:33 (1) 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:35 (1) 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:37 (1) 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:39 (1) 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:41 (1) 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:44 (1) 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:45 (1) 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:46 (1) 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:48 (1) 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	06:31 20:21	07:23 16:56	07:23 16:56	08:49 (1) 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		185								185		
Sun reduction		0.23								0.29		
Oper. time red.		1.00								1.00		
Wind dir. red.		0.64								0.64		
Total reduction		0.15								0.19		
Total, real		28								35		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IS - H253

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IT - H254

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
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12	08:39 16:30	07:53 17:28	08:20 (1) 08:27 (1)	06:50 18:23	05:31 20:21	04:55 21:15	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	08:18 (1) 08:28 (1)	06:48 18:25	05:29 20:22	04:55 21:17	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	08:15 (1) 08:28 (1)	06:45 18:27	05:27 20:24	04:55 21:19	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	08:13 (1) 08:29 (1)	06:43 18:29	05:26 20:26	04:55 21:20	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:41	07:45 17:42	08:11 (1) 08:29 (1)	06:41 18:31	05:24 20:28	04:55 21:22	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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18	08:34 16:40	07:41 17:40	08:09 (1) 08:30 (1)	06:36 18:34	05:21 20:32	04:54 21:25	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	08:09 (1) 08:29 (1)	06:33 18:36	05:19 20:34	04:54 21:27	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		198								200		
Sun reduction		0.23								0.29		
Oper. time red.		1.00								1.00		
Wind dir. red.		0.63								0.63		
Total reduction		0.15								0.19		
Total, real		29								37		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IU - H255

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IV - H256

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:16 17:04		07:04 19:58	05:04 21:44			05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IW - H257

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IX - H258

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IY - H259

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: IZ - H260

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JA - H261

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JB - H262

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JC - H263

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JD - H264

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JE - H265

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
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Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JF - H266

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JG - H267

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JH - H268

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JI - H269

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JJ - H270

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JK - H271

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JL - H272

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JM - H273

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JN - H274

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
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Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JO - H275

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JP - H276

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JQ - H277

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JR - H278

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JS - H279

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JT - H280

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JU - H281

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JV - H282

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JW - H283

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JX - H284

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JY - H285

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: JZ - H286

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KA - H287

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KB - H288

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KC - H289

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
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30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KD - H290

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KE - H291

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KF - H292

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	06:18 (5) 06:50 (5)	05:03 21:45	05:33 (4) 05:40 (4)	04:59 22:00	05:32 (4) 05:45 (4)	05:39 21:25	06:31 (5) 06:53 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	06:16 (5) 06:50 (5)	05:02 21:47	05:33 (4) 05:41 (4)	05:00 22:00	05:33 (4) 05:45 (4)	05:40 21:23	06:31 (5) 06:55 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:54 20:59	06:16 (5) 06:50 (5)	05:01 21:48	05:32 (4) 05:41 (4)	05:00 21:59	05:33 (4) 05:45 (4)	05:42 21:21	06:29 (5) 06:55 (5)	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	06:16 (5) 06:49 (5)	05:00 21:49	05:31 (4) 05:40 (4)	05:01 21:59	05:34 (4) 05:46 (4)	05:44 21:19	06:28 (5) 06:56 (5)	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	06:16 (5) 06:48 (5)	04:59 21:50	05:31 (4) 05:41 (4)	05:02 21:58	05:35 (4) 05:46 (4)	05:46 21:17	06:28 (5) 06:57 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	06:17 (5) 06:49 (5)	04:59 21:51	05:30 (4) 05:41 (4)	05:03 21:58	05:36 (4) 05:47 (4)	05:47 21:16	06:27 (5) 06:57 (5)	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	06:17 (5) 06:48 (5)	04:58 21:52	05:30 (4) 05:41 (4)	05:04 21:57	05:37 (4) 05:47 (4)	05:49 21:14	06:26 (5) 06:58 (5)	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	06:18 (5) 06:47 (5)	04:57 21:53	05:29 (4) 05:41 (4)	05:05 21:56	05:38 (4) 05:48 (4)	05:51 21:12	06:25 (5) 06:58 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	06:18 (5) 06:46 (5)	04:57 21:54	05:29 (4) 05:41 (4)	05:06 21:55	05:39 (4) 05:48 (4)	05:52 21:10	06:25 (5) 06:59 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:26	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	06:20 (5) 06:45 (5)	04:56 21:55	05:28 (4) 05:40 (4)	05:07 21:55	05:40 (4) 05:48 (4)	05:54 21:08	06:25 (5) 06:59 (5)	06:49 19:56	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:27	07:55 17:24	06:53 18:19	06:37 20:17	05:33 21:12	06:21 (5) 06:45 (5)	04:56 21:55	05:28 (4) 05:40 (4)	05:08 21:55	05:41 (4) 05:48 (4)	05:56 21:08	06:25 (5) 06:59 (5)	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	06:21 (5) 06:42 (5)	04:56 21:56	05:28 (4) 05:41 (4)	05:09 21:53	05:42 (4) 05:49 (4)	05:06 21:03	06:27 (5) 06:59 (5)	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	06:24 (5) 06:41 (5)	04:55 21:57	05:27 (4) 05:40 (4)	05:13 21:52	05:43 (4) 05:49 (4)	05:33 21:01	06:29 (5) 06:59 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	06:25 (5) 06:38 (5)	04:55 21:58	05:27 (4) 05:40 (4)	05:12 21:51	05:44 (4) 05:49 (4)	06:01 20:59	06:30 (5) 06:58 (5)	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	06:28 (5) 06:35 (5)	04:55 21:58	05:27 (4) 05:41 (4)	05:13 21:50	05:45 (4) 05:49 (4)	06:03 20:57	06:32 (5) 06:58 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	06:28 (5)	04:55 21:59	05:27 (4) 05:41 (4)	05:14 21:49	05:47 (4) 05:49 (4)	06:05 20:55	06:33 (5) 06:57 (5)	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	06:38 (5)	04:54 21:59	05:27 (4) 05:41 (4)	05:16 21:47	05:48 (4) 05:49 (4)	06:06 20:53	06:35 (5) 06:57 (5)	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	06:39 (5)	04:54 22:00	05:27 (4) 05:41 (4)	05:17 21:46	05:49 (4) 05:52 (4)	06:08 20:51	06:37 (5) 06:56 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	06:40 (5)	04:54 22:00	05:27 (4) 05:41 (4)	05:19 21:45	05:50 (4) 05:52 (4)	06:10 20:48	06:38 (5) 06:55 (5)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	06:41 (5) 06:46 (5)	04:55 22:00	05:27 (4) 05:41 (4)	05:20 21:44	05:51 (4) 05:52 (4)	06:12 20:46	06:40 (5) 06:54 (5)	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	06:39 (5) 06:48 (5)	04:55 22:01	05:27 (4) 05:41 (4)	05:21 21:42	05:52 (4) 05:58 (4)	06:13 20:44	06:42 (5) 06:53 (5)	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	06:36 (5) 06:48 (5)	04:55 22:01	05:28 (4) 05:42 (4)	05:23 21:41	05:50 (4) 05:52 (4)	06:15 20:42	06:43 (5) 06:51 (5)	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	06:34 (5) 06:49 (5)	04:55 22:01	05:28 (4) 05:42 (4)	05:24 21:39	05:54 (4) 05:58 (4)	06:17 20:39	06:45 (5) 06:50 (5)	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 20:43	06:32 (5) 06:49 (5)	04:55 22:01	05:28 (4) 05:42 (4)	05:26 21:38	05:56 (4) 05:59 (4)	06:19 20:37	06:47 (5) 06:48 (5)	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	06:30 (5) 06:50 (5)	04:56 22:01	05:29 (4) 05:43 (4)	05:27 21:36	05:57 (4) 05:59 (4)	06:21 20:35	06:46 (5) 06:51 (5)	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	06:28 (5) 06:50 (5)	04:56 22:01	05:29 (4) 05:43 (4)	05:29 21:35	05:59 (4) 06:01 (4)	06:22 20:32	06:47 (5) 06:52 (5)	07:17 19:17	08:13 18:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	06:26 (5) 06:51 (5)	04:58 22:01	05:30 (4) 05:44 (4)	05:31 21:33	06:03 (4) 06:05 (4)	06:24 20:30	06:49 (5) 06:53 (5)	07:19 19:15	08:15 18:05	08:14 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	06:24 (5) 06:51 (5)	04:57 22:01	05:37 (4) 05:40 (4)	05:32 21:32	06:06 (4) 06:08 (4)	06:26 20:28	06:50 (5) 06:54 (5)	07:21 19:12	08:14 17:07	08:14 16:13	08:44 16:11
29	08:19 17:00	07:09 17:55	05:56 18:50	05:52 20:56	05:06 21:41	06:22 (5) 06:51 (5)	04:58 22:01	05:36 (4) 05:44 (4)	05:34 21:30	06:10 (4) 06:12 (4)	06:28 20:25	06:56 (5) 06:59 (5)	07:23 19:10	08:16 18:00	08:16 16:12	08:44 16:12
30	08:17 17:02	07:06 17:56	05:54 18:56	05:54 20:54	05:05 21:43	06:20 (5) 06:51 (5)	04:58 22:00	05:35 (4) 05:44 (4)	05:35 21:28	06:13 (4) 06:15 (4)	06:29 20:23	06:59 (5) 06:59 (5)	07:24 19:07	08:18 18:00	08:18 16:11	08:44 16:13
31	08:15 17:04	07:04 17:58	05:52 18:58	05:52 20:58	05:04 21:44	06:19 (5) 06:52 (5)	04:58 22:01	05:34 (4) 05:40 (4)	05:37 21:27	06:14 (4) 06:16 (4)	06:31 20:21	06:59 (5) 06:59 (5)	07:22 19:02	08:19 18:00	08:19 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	512	512	460	382	328	259	233		
Total, worst case				213	411	374	184	563								
Sun reduction				0.35	0.38	0.32	0.32	0.34								
Oper. time red.				1.00	1.00	1.00	1.00	1.00								
Wind dir. red.				0.68	0.68	0.66	0.66	0.68								
Total reduction				0.24	0.26	0.21	0.21	0.23								
Total, real				51	106	79	39	130								

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KG - H293

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	18:02	07:01	20:00	8	07:25 (5)	05:52	20:55	05:03		
2	08:44	16:16	08:12	17:08	18:04	07:14	18:04	18:04	06:59	20:02	11	07:34 (5)	05:50	20:57	05:02		
3	08:44	16:17	08:10	17:10	18:06	07:12	18:06	18:06	06:56	20:04	14	07:20 (5)	05:48	20:59	05:01		
4	08:43	16:18	08:09	17:12	18:08	07:09	18:08	18:08	06:54	20:06	16	07:34 (5)	05:46	21:01	05:00		
5	08:43	16:20	08:07	17:14	18:10	07:07	18:10	18:10	06:52	20:08	18	07:15 (5)	05:44	21:03	04:59		
6	08:43	16:21	08:05	17:16	18:11	07:05	18:11	18:11	06:49	20:09	20	07:33 (5)	05:42	21:04	04:59		
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	18:13	06:47	20:11	22	07:11 (5)	05:40	21:06	04:58		
8	08:42	16:24	08:01	17:20	18:15	07:00	18:15	18:15	06:44	20:13	24	07:33 (5)	05:38	21:08	04:57		
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	18:17	06:42	20:15	24	07:07 (5)	05:36	21:10	04:57		
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	18:19	06:40	20:17	22	07:31 (5)	05:35	21:12	04:56		
11	08:40	16:28	07:55	17:26	18:21	06:53	18:21	18:21	06:37	20:19	19	07:09 (5)	05:33	21:13	04:56	1	05:28 (3)
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	18:23	06:35	20:21	16	07:28 (5)	05:31	21:15	04:56	2	05:28 (3)
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	18:25	06:32	20:22	11	07:10 (5)	05:29	21:17	04:55	3	05:27 (3)
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	18:27	06:30	20:24		07:24 (5)	05:27	21:18	04:55	4	05:30 (3)
15	08:36	16:35	07:47	17:34	18:29	06:43	18:29	18:29	06:28	20:26			05:25	21:20	04:55	5	05:27 (3)
16	08:35	16:36	07:45	17:36	18:30	06:41	18:30	18:30	06:25	20:28			05:24	21:22	04:55	6	05:31 (3)
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	18:32	06:23	20:30			05:22	21:23	04:54	7	05:27 (3)
18	08:33	16:40	07:41	17:40	18:34	06:36	18:34	18:34	06:21	20:32			05:21	21:25	04:54	8	05:31 (3)
19	08:32	16:42	07:39	17:42	18:36	06:33	18:36	18:36	06:19	20:33			05:19	21:27	04:54	9	05:27 (3)
20	08:31	16:43	07:37	17:44	18:38	06:31	18:38	18:38	06:16	20:35			05:18	21:28	04:54	10	05:32 (3)
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	18:40	06:14	20:37			05:16	21:30	04:55	11	05:27 (3)
22	08:29	16:47	07:32	17:48	18:42	06:26	18:42	18:42	06:12	20:39			05:15	21:31	04:55	12	05:32 (3)
23	08:27	16:49	07:30	17:50	18:44	06:23	18:44	18:44	06:09	20:41			05:13	21:33	04:55	13	05:28 (3)
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45	18:45	06:07	20:43			05:12	21:34	04:55	14	05:33 (3)
25	08:25	16:53	07:25	17:54	18:47	06:18	18:47	18:47	06:05	20:44			05:11	21:36	04:56	15	05:29 (3)
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	18:49	06:03	20:46			05:10	21:37	04:56	16	05:33 (3)
27	08:22	16:56	07:21	17:58	18:51	06:14	18:51	18:51	06:01	20:48			05:08	21:39	04:57	17	05:29 (3)
28	08:20	16:58	07:19	18:00	18:53	06:11	18:53	18:53	05:59	20:50			05:07	21:40	04:57	18	05:34 (3)
29	08:19	17:00			19:55	07:09			05:56	20:52			05:06	21:41	04:58	19	05:30 (3)
30	08:17	17:02			19:56	07:06			05:54	20:54			05:05	21:43	04:58	20	05:31 (3)
31	08:15	17:04			19:58	07:04			05:52	20:56			05:04	21:44	04:59	21	05:34 (3)
Potential sun hours	250		273		367				420				494		510		
Total, worst case						7			225						79		
Sun reduction						0.27			0.35						0.32		
Oper. time red.						1.00			1.00						1.00		
Wind dir. red.						0.68			0.68						0.66		
Total reduction						0.18			0.24						0.21		
Total, real						1			54						17		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KG - H293

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:32 (3) 21:25	06:33 20:18	07:08 (5) 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00	05:33 (3) 21:23	06:35 20:16	07:06 (5) 19:02	07:26 16:52	08:21 16:09
3	05:00 21:59	05:33 (3) 21:21	06:37 20:14	07:05 (5) 19:00	07:30 16:50	08:22 16:09
4	05:01 21:59	05:34 (3) 21:19	06:38 20:11	07:05 (5) 18:57	07:32 16:48	08:24 16:08
5	05:02 21:58	05:46 21:17	06:40 20:09	07:07 (5) 18:55	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:09 (5) 18:53	07:35 16:45	08:26 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:10 (5) 18:50	07:37 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:12 (5) 18:48	07:39 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	07:14 (5) 18:45	07:41 16:39	08:30 16:06
10	05:07 21:55	05:54 21:08	06:49 19:57	07:16 (5) 18:43	07:43 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:17 (5) 18:41	07:44 16:36	08:33 16:05
12	05:09 21:53	05:58 21:03	06:52 19:52	07:19 (5) 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:21 (5) 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:23 (5) 18:34	07:50 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 (5) 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21	07:10 (5) 07:26 (5)	07:22 16:56	08:19 16:14	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	4	28	207			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.68	0.68			
Total reduction	0.21	0.23	0.22			
Total, real	1	6	45			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KH - H294

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		07:25 (5)	05:52			05:03		05:34 (3)
	16:15	17:06	18:02						20:00	14	07:39 (5)	20:55			21:45	11	05:45 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50			05:02		05:33 (3)
	16:16	17:08	18:04						20:02	16	07:39 (5)	20:57			21:47	12	05:45 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48			05:01		05:32 (3)
	16:17	17:10	18:06						20:04	18	07:38 (5)	20:59			21:48	13	05:45 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46			05:00		05:31 (3)
	16:18	17:12	18:08						20:06	20	07:38 (5)	21:01			21:49	14	05:45 (3)
5	08:43	08:07	07:07						06:52		07:15 (5)	05:44			04:59		05:31 (3)
	16:20	17:14	18:10						20:08	22	07:37 (5)	21:03			21:50	14	05:45 (3)
6	08:43	08:05	07:05						06:49		07:16 (5)	05:42			04:59		05:30 (3)
	16:21	17:16	18:11						20:09	20	07:36 (5)	21:04			21:51	15	05:45 (3)
7	08:42	08:03	07:02						06:47		07:17 (5)	05:40			04:58		05:30 (3)
	16:22	17:18	18:13						20:11	18	07:35 (5)	21:06			21:52	16	05:46 (3)
8	08:42	08:01	07:00						06:44		07:18 (5)	05:38			04:57		05:29 (3)
	16:24	17:20	18:15						20:13	14	07:32 (5)	21:08			21:53	16	05:45 (3)
9	08:41	07:59	06:57						06:42		07:20 (5)	05:36			04:57		05:29 (3)
	16:25	17:22	18:17						20:15	9	07:29 (5)	21:10			21:54	17	05:46 (3)
10	08:40	07:57	06:55						06:40			05:35			04:56		05:28 (3)
	16:27	17:24	18:19						20:17			21:12			21:55	17	05:45 (3)
11	08:40	07:55	06:53						06:37			05:33			04:56		05:28 (3)
	16:28	17:26	18:21						20:19			21:13			21:55	18	05:46 (3)
12	08:39	07:53	06:50						06:35			05:31			04:56		05:28 (3)
	16:30	17:28	18:23						20:21			21:15			21:56	18	05:46 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:27 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	19	05:46 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:27 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	19	05:46 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:27 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	19	05:46 (3)
16	08:35	07:45	06:41						06:25			05:24			04:55		05:27 (3)
	16:36	17:36	18:30						20:28			21:22			21:59	19	05:46 (3)
17	08:34	07:43	06:38						06:23			05:22			04:54		05:27 (3)
	16:38	17:38	18:32						20:30			21:23			21:59	19	05:46 (3)
18	08:33	07:41	06:36						06:21			05:21			04:54		05:27 (3)
	16:40	17:40	18:34						20:32			21:25			22:00	20	05:47 (3)
19	08:32	07:39	06:33						06:19			05:19			04:54		05:27 (3)
	16:42	17:42	18:36						20:33			21:27			22:00	20	05:47 (3)
20	08:31	07:37	06:31						06:16			05:18			04:55		05:27 (3)
	16:43	17:44	18:38						20:35			21:28			22:00	20	05:47 (3)
21	08:30	07:34	06:28						06:14			05:16			04:55		05:27 (3)
	16:45	17:46	18:40						20:37			21:30			22:01	20	05:47 (3)
22	08:29	07:32	06:26						06:12			05:15			04:55		05:28 (3)
	16:47	17:48	18:42						20:39			21:31			22:01	20	05:48 (3)
23	08:27	07:30	06:23						06:09			05:13			04:55		05:28 (3)
	16:49	17:50	18:44						20:41			21:33			22:01	20	05:48 (3)
24	08:26	07:28	06:21						06:07			05:12		05:41 (3)	04:55		05:28 (3)
	16:51	17:52	18:45						20:43		1	21:34		05:42 (3)	22:01	20	05:48 (3)
25	08:25	07:25	06:18						06:05			05:11		05:40 (3)	04:56		05:29 (3)
	16:53	17:54	18:47						20:44			21:36		05:42 (3)	22:01	19	05:48 (3)
26	08:23	07:23	06:16						06:03			05:10		05:39 (3)	04:56		05:29 (3)
	16:54	17:56	18:49						20:46			21:37		05:43 (3)	22:01	19	05:48 (3)
27	08:22	07:21	06:14						06:01			05:08		05:38 (3)	04:57		05:30 (3)
	16:56	17:58	18:51						20:48			21:39		05:43 (3)	22:01	19	05:49 (3)
28	08:20	07:19	06:11					06:35 (5)	05:59			05:07		05:37 (3)	04:57		05:30 (3)
	16:58	18:00	18:53	3				06:38 (5)	20:50			21:40		05:44 (3)	22:01	19	05:49 (3)
29	08:19		07:09					07:32 (5)	05:56			05:06		05:36 (3)	04:58		05:31 (3)
	17:00		19:55	7				07:39 (5)	20:52			21:41		05:44 (3)	22:01	19	05:50 (3)
30	08:17		07:06					07:30 (5)	05:54			05:05		05:35 (3)	04:58		05:31 (3)
	17:02		19:56	9				07:39 (5)	20:54			21:43		05:44 (3)	22:00	18	05:49 (3)
31	08:15		07:04					07:27 (5)				05:04		05:34 (3)			
	17:04		19:58	12				07:39 (5)				21:44		05:44 (3)			
Potential sun hours	250	273	367					420				494			510		
Total, worst case				31				151				46			529		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.68				0.68				0.66			0.66		
Total reduction				0.18				0.24				0.25			0.21		
Total, real				6				36				12			111		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KH - H294

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 18	05:32 (3) 05:50 (3) 21:25	05:39 21:25 20:18	06:33 20:18	07:26 19:05 16:54	08:19 16:10
2	05:00 22:00 18	05:33 (3) 05:51 (3) 21:23	05:40 21:23 20:16	06:35 20:16	07:28 19:02 16:52	08:21 16:09
3	05:00 21:59 17	05:33 (3) 05:50 (3) 21:21	05:42 21:21 20:14	06:37 20:14	07:30 19:00 16:50	08:22 16:09
4	05:01 21:59 17	05:34 (3) 05:51 (3) 21:19	05:44 21:19 20:11	06:38 20:11	07:32 18:57 16:48	08:24 16:08
5	05:02 21:58 16	05:35 (3) 05:51 (3) 21:17	05:46 21:17 20:09	06:40 20:09	07:33 18:55 16:46	08:25 16:07
6	05:03 21:58 15	05:36 (3) 05:51 (3) 21:16	05:47 21:16 20:06	06:42 20:06	07:35 18:53 16:45	08:26 16:07
7	05:04 21:57 15	05:37 (3) 05:52 (3) 21:14	05:49 21:14 20:04	06:44 20:04	07:37 18:50 16:43	08:28 16:06
8	05:05 21:56 14	05:38 (3) 05:52 (3) 21:12	05:51 21:12 20:01	06:45 20:01	07:39 18:48 16:41	08:29 16:06
9	05:06 21:55 13	05:39 (3) 05:52 (3) 21:10	05:52 21:10 19:59	06:47 19:59	07:41 18:45 16:39	08:30 16:06
10	05:07 21:55 12	05:40 (3) 05:52 (3) 21:08	05:54 21:08 19:57	06:49 19:57	07:43 18:43 16:37	08:32 16:05
11	05:08 21:54 12	05:41 (3) 05:53 (3) 21:06	05:56 21:06 19:54	06:51 19:54	07:44 18:41 16:36	08:33 16:05
12	05:10 21:53 11	05:42 (3) 05:53 (3) 21:03	05:58 21:03 19:52	06:52 19:52	07:46 18:38 16:34	08:34 16:05
13	05:11 21:52 10	05:43 (3) 05:53 (3) 21:01	05:59 21:01 19:49	06:54 19:49	07:48 18:36 16:32	08:35 16:05
14	05:12 21:51 8	05:44 (3) 05:52 (3) 20:59	06:01 20:59 19:47	06:56 19:47	07:50 18:34 16:31	08:36 16:05
15	05:13 21:50 7	05:45 (3) 05:52 (3) 20:57	06:03 20:57 19:44	06:58 19:44	07:52 18:31 16:29	08:37 16:05
16	05:15 21:49 6	05:47 (3) 05:53 (3) 20:55	06:05 20:55 19:42	06:59 19:42	07:54 18:29 16:28	08:38 16:05
17	05:16 21:47 5	05:48 (3) 05:53 (3) 20:53	06:06 20:53 19:39	07:01 19:39	07:56 18:27 16:26	08:39 16:05
18	05:17 21:46 3	05:49 (3) 05:52 (3) 20:51	06:08 20:51 19:37	07:03 19:37	07:57 18:24 16:25	08:39 16:05
19	05:19 21:45 2	05:50 (3) 05:52 (3) 20:48	06:10 20:48 19:34	07:05 19:34	07:59 18:22 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46 19:32	07:07 19:32	08:01 18:20 16:22	08:01 16:22	08:41 16:06
21	05:21 21:42	06:14 20:44 19:29	07:08 19:29	08:03 18:18 16:21	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42 19:27	07:10 19:27	08:05 18:15 16:19	08:04 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39 19:24	07:12 19:24	08:07 18:13 16:18	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37 19:22	07:14 19:22	08:09 18:11 16:17	08:08 16:17	08:43 16:08
25	05:28 21:36	06:21 20:35 19:19	07:15 19:19	07:11 17:09 16:16	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:33 19:17	07:17 19:17	07:13 17:07 16:15	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30 19:15	07:19 19:15	07:15 17:05 16:14	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28 19:12	07:21 19:12	07:17 17:02 16:13	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25 19:10	07:23 19:10	07:19 17:00 16:12	08:16 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23 19:07	07:24 19:07	07:20 16:58 16:11	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21	07:25 19:07	07:22 16:56 16:14	08:19 16:14	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	219		188			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	47		41			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KI - H295

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		07:25 (5)	05:52			05:03		05:34 (3)
	16:15	17:06	18:02						20:00	13	07:38 (5)	20:55			21:45	16	05:50 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50			05:02		05:33 (3)
	16:16	17:08	18:04						20:02	15	07:38 (5)	20:57			21:47	16	05:49 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48			05:01		05:32 (3)
	16:17	17:10	18:06						20:04	17	07:37 (5)	20:59			21:48	17	05:49 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46			05:00		05:31 (3)
	16:18	17:12	18:08						20:06	19	07:37 (5)	21:01			21:49	18	05:49 (3)
5	08:43	08:07	07:07						06:52		07:16 (5)	05:44			04:59		05:31 (3)
	16:20	17:14	18:10						20:08	19	07:35 (5)	21:03			21:50	18	05:49 (3)
6	08:43	08:05	07:05						06:49		07:17 (5)	05:42			04:59		05:30 (3)
	16:21	17:16	18:11						20:09	16	07:33 (5)	21:04			21:51	18	05:48 (3)
7	08:42	08:03	07:02						06:47		07:19 (5)	05:40			04:58		05:31 (3)
	16:22	17:18	18:13						20:11	13	07:32 (5)	21:06			21:52	18	05:49 (3)
8	08:42	08:01	07:00						06:44		07:22 (5)	05:38			04:57		05:31 (3)
	16:24	17:20	18:15						20:13	5	07:27 (5)	21:08			21:53	17	05:48 (3)
9	08:41	07:59	06:57						06:42			05:36			04:57		05:32 (3)
	16:25	17:22	18:17						20:15			21:10			21:54	16	05:48 (3)
10	08:40	07:57	06:55						06:40			05:35			04:56		05:32 (3)
	16:27	17:24	18:19						20:17			21:12			21:55	16	05:48 (3)
11	08:40	07:55	06:53						06:37			05:33			04:56		05:33 (3)
	16:28	17:26	18:21						20:19			21:13			21:55	15	05:48 (3)
12	08:39	07:53	06:50						06:35			05:31			04:56		05:34 (3)
	16:30	17:28	18:23						20:21			21:15			21:56	14	05:48 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:33 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	14	05:47 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:34 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	13	05:47 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:35 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	12	05:47 (3)
16	08:35	07:45	06:41						06:25			05:24			04:55		05:35 (3)
	16:36	17:36	18:30						20:28			21:22			21:59	12	05:47 (3)
17	08:34	07:43	06:38						06:23			05:22			04:54		05:36 (3)
	16:38	17:38	18:32						20:30			21:23			21:59	11	05:47 (3)
18	08:33	07:41	06:36						06:21			05:21			04:54		05:36 (3)
	16:40	17:40	18:34						20:32			21:25			22:00	11	05:47 (3)
19	08:32	07:39	06:33						06:19			05:19			04:54		05:37 (3)
	16:42	17:42	18:36						20:33			21:27			22:00	10	05:47 (3)
20	08:31	07:37	06:31						06:16			05:18			04:55		05:37 (3)
	16:43	17:44	18:38						20:35			21:28	2	05:48 (3)	22:00	10	05:47 (3)
21	08:30	07:34	06:28						06:14			05:16		05:45 (3)	04:55		05:38 (3)
	16:45	17:46	18:40						20:37			21:30	4	05:49 (3)	22:01	10	05:48 (3)
22	08:29	07:32	06:26						06:12			05:15		05:44 (3)	04:55		05:38 (3)
	16:47	17:48	18:42						20:39			21:31	5	05:49 (3)	22:01	10	05:48 (3)
23	08:27	07:30	06:23						06:09			05:13		05:43 (3)	04:55		05:38 (3)
	16:49	17:50	18:44						20:41			21:33	7	05:50 (3)	22:01	10	05:48 (3)
24	08:26	07:28	06:21						06:07			05:12		05:41 (3)	04:55		05:37 (3)
	16:51	17:52	18:45						20:43			21:34	8	05:49 (3)	22:01	11	05:48 (3)
25	08:25	07:25	06:18						06:05			05:11		05:40 (3)	04:56		05:38 (3)
	16:53	17:54	18:47						20:44			21:36	9	05:49 (3)	22:01	11	05:49 (3)
26	08:23	07:23	06:16						06:03			05:10		05:39 (3)	04:56		05:38 (3)
	16:54	17:56	18:49						20:46			21:37	10	05:49 (3)	22:01	11	05:49 (3)
27	08:22	07:21	06:14						06:01			05:08		05:38 (3)	04:57		05:38 (3)
	16:56	17:58	18:51						20:48			21:39	11	05:49 (3)	22:01	12	05:50 (3)
28	08:20	07:19	06:11						06:35 (5)			05:07		05:37 (3)	04:57		05:37 (3)
	16:58	18:00						3	06:38 (5)			21:40	12	05:49 (3)	22:01	13	05:50 (3)
29	08:19		07:09						07:32 (5)			05:06		05:36 (3)	04:58		05:38 (3)
	17:00		19:55					6	07:38 (5)			21:41	13	05:49 (3)	22:01	13	05:51 (3)
30	08:17		07:06						07:30 (5)			05:05		05:35 (3)	04:58		05:37 (3)
	17:02		19:56					9	07:39 (5)			21:43	14	05:49 (3)	22:00	14	05:51 (3)
31	08:15		07:04						07:27 (5)			05:04		05:34 (3)			
	17:04		19:58					11	07:38 (5)			21:44	15	05:49 (3)			
Potential sun hours	250	273	367						420			494			510		
Total, worst case						29			117			110			407		
Sun reduction						0.27			0.35			0.38			0.32		
Oper. time red.						1.00			1.00			1.00			1.00		
Wind dir. red.						0.68			0.68			0.66			0.66		
Total reduction						0.18			0.24			0.25			0.21		
Total, real						5			28			27			85		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KI - H295

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 15	05:37 (3) 05:52 (3) 21:25	05:39 21:25 20:18	06:33 20:18	07:26 19:05 16:54	08:19 16:10
2	05:00 22:00 16	05:37 (3) 05:53 (3) 21:23	05:40 21:23 20:16	06:35 20:16	07:28 19:02 16:52	08:21 16:09
3	05:00 21:59 16	05:36 (3) 05:52 (3) 21:21	05:42 21:21 20:14	06:37 20:14	07:30 19:00 16:50	08:22 16:09
4	05:01 21:59 17	05:36 (3) 05:53 (3) 21:19	05:44 21:19 20:11	06:38 20:11	07:32 18:57 16:48	08:24 16:08
5	05:02 21:58 18	05:36 (3) 05:54 (3) 21:17	05:46 21:17 20:09	06:40 20:09	07:33 18:55 16:46	08:25 16:07
6	05:03 21:58 19	05:36 (3) 05:55 (3) 21:16	05:47 21:16 20:06	06:42 20:06	07:35 18:53 16:45	08:26 16:07
7	05:04 21:57 18	05:37 (3) 05:55 (3) 21:14	05:49 21:14 20:04	06:44 20:04	07:37 18:50 16:43	08:28 16:06
8	05:05 21:56 18	05:38 (3) 05:56 (3) 21:12	05:51 21:12 20:01	06:45 20:01	07:39 18:48 16:41	08:29 16:06
9	05:06 21:55 17	05:39 (3) 05:56 (3) 21:10	05:52 21:10 19:59	06:47 19:59	07:41 18:45 16:39	08:30 16:06
10	05:07 21:55 17	05:40 (3) 05:57 (3) 21:08	05:54 21:08 19:57	06:49 19:57	07:43 18:43 16:37	08:32 16:05
11	05:08 21:54 16	05:41 (3) 05:57 (3) 21:06	05:56 21:06 19:54	06:51 19:54	07:44 18:41 16:36	08:33 16:05
12	05:10 21:53 15	05:42 (3) 05:57 (3) 21:04	05:58 21:04 19:52	06:52 19:52	07:46 18:38 16:34	08:34 16:05
13	05:11 21:52 15	05:43 (3) 05:58 (3) 21:01	05:59 21:01 19:49	06:54 19:49	07:48 18:36 16:32	08:35 16:05
14	05:12 21:51 14	05:44 (3) 05:58 (3) 20:59	06:01 20:59 19:47	06:56 19:47	07:50 18:34 16:31	08:36 16:05
15	05:13 21:50 13	05:45 (3) 05:58 (3) 20:57	06:03 20:57 19:44	06:58 19:44	07:52 18:31 16:29	08:37 16:05
16	05:15 21:49 12	05:47 (3) 05:59 (3) 20:55	06:05 20:55 19:42	06:59 19:42	07:54 18:29 16:28	08:38 16:05
17	05:16 21:47 11	05:48 (3) 05:59 (3) 20:53	06:06 20:53 19:39	07:01 19:39	07:56 18:27 16:26	08:39 16:05
18	05:17 21:46 10	05:49 (3) 05:59 (3) 20:51	06:08 20:51 19:37	07:03 19:37	07:57 18:24 16:25	08:39 16:05
19	05:19 21:45 9	05:51 (3) 06:00 (3) 20:48	07:05 20:48 19:34	07:05 19:34	07:59 18:22 16:23	08:40 16:05
20	05:20 21:44 7	05:52 (3) 05:59 (3) 20:46	07:07 20:46 19:32	07:07 19:32	08:01 18:20 16:22	08:41 16:06
21	05:21 21:42 6	05:53 (3) 05:59 (3) 20:44	07:08 20:44 19:29	07:08 19:29	08:03 18:18 16:21	08:41 16:06
22	05:23 21:41 4	05:55 (3) 05:59 (3) 20:42	07:10 20:42 19:27	07:10 19:27	08:05 18:15 16:19	08:42 16:07
23	05:24 21:39 3	05:56 (3) 05:59 (3) 20:39	07:12 20:39 19:24	07:12 19:24	08:07 18:13 16:18	08:42 16:07
24	05:26 21:38 1	05:57 (3) 05:58 (3) 20:37	07:14 20:37 19:22	07:14 19:22	08:09 18:11 16:17	08:43 16:08
25	05:28 21:36 0	06:21 20:35 19:19	07:15 19:19	07:15 19:19	08:09 17:09 16:16	08:43 16:08
26	05:29 21:35 0	06:22 20:33 19:17	07:17 19:17	07:17 19:17	08:11 17:07 16:15	08:43 16:09
27	05:31 21:33 0	06:24 20:30 19:15	07:19 19:15	07:19 19:15	08:13 17:05 16:14	08:44 16:10
28	05:32 21:32 0	06:26 20:28 19:12	07:21 19:12	07:21 19:12	08:14 17:02 16:13	08:44 16:11
29	05:34 21:30 0	06:28 20:25 19:10	07:23 19:10	07:23 19:10	08:16 17:00 16:12	08:44 16:12
30	05:35 21:28 0	06:29 20:23 19:07	07:24 19:07	07:24 19:07	08:18 16:58 16:11	08:44 16:13
31	05:37 21:27 0	06:31 20:21	07:25 19:05	07:25 19:05	08:19 16:56 16:14	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	307		150			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	65		32			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KJ - H296

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:07 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KK - H297

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:09 (1)	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	14	06:23 (1)	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:41	06:11 (1)	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	12	06:23 (1)	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	06:57	05:48	05:01	05:01	05:42	06:12 (1)	06:37	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	10	06:22 (1)	20:14	19:00	16:50	16:09		
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:14 (1)	06:38	07:32	07:30	08:24			
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	8	06:22 (1)	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:46	06:16 (1)	06:40	07:33	07:32	08:25			
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	6	06:22 (1)	20:09	18:55	16:47	16:07		
6	08:43	08:05	07:05	06:49	05:42	06:09 (1)	04:59	05:03	05:47	06:17 (1)	06:42	07:35	07:34	08:27		
	16:21	17:16	18:12	20:09	21:05	2	06:11 (1)	21:51	21:58	21:16	4	06:21 (1)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	06:07 (1)	04:58	05:04	05:49	06:19 (1)	06:44	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	5	06:12 (1)	21:52	21:57	21:14	1	06:20 (1)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	06:05 (1)	04:57	05:05	05:51	06:45	07:39	07:38	08:29			
	16:24	17:20	18:15	20:13	21:08	7	06:12 (1)	21:53	21:56	21:12	20:01	18:48	16:41	16:06		
9	08:41	07:59	06:58	06:42	05:36	06:03 (1)	04:57	05:06	05:52	06:47	07:41	07:40	08:30			
	16:25	17:22	18:17	20:15	21:10	9	06:12 (1)	21:54	21:56	21:10	19:59	18:45	16:39	16:06		
10	08:41	07:57	06:55	06:40	05:35	06:02 (1)	04:56	05:07	05:54	06:49	07:43	07:42	08:32			
	16:27	17:24	18:19	20:17	21:12	11	06:13 (1)	21:55	21:55	21:08	19:57	18:43	16:37	16:05		
11	08:40	07:55	06:53	06:37	05:33	06:00 (1)	04:56	05:08	05:56	06:51	07:44	07:44	08:33			
	16:28	17:26	18:21	20:19	21:13	13	06:13 (1)	21:56	21:54	21:06	19:54	18:41	16:36	16:05		
12	08:39	07:53	06:50	06:35	05:31	05:58 (1)	04:56	05:10	05:58	06:52	07:46	07:46	08:34			
	16:30	17:28	18:23	20:21	21:15	14	06:12 (1)	21:56	21:53	21:04	19:52	18:38	16:34	16:05		
13	08:38	07:51	06:48	06:33	05:29	05:57 (1)	04:55	05:11	05:59	06:54	07:48	07:48	08:35			
	16:31	17:30	18:25	20:22	21:17	16	06:13 (1)	21:57	21:52	21:01	19:49	18:36	16:32	16:05		
14	08:37	07:49	06:45	06:30	05:27	05:55 (1)	04:55	05:12	06:01	06:56	07:50	07:49	08:36			
	16:33	17:32	18:27	20:24	21:19	17	06:12 (1)	21:58	21:51	20:59	19:47	18:34	16:31	16:05		
15	08:37	07:47	06:43	06:28	05:26	05:54 (1)	04:55	05:13	06:03	06:58	07:52	07:51	08:37			
	16:35	17:34	18:29	20:26	21:20	19	06:13 (1)	21:58	21:50	20:57	19:44	18:31	16:29	16:05		
16	08:36	07:45	06:41	06:25	05:24	05:53 (1)	04:55	05:15	06:05	07:00	07:54	07:53	08:38			
	16:36	17:36	18:31	20:28	21:22	19	06:12 (1)	21:59	21:49	20:55	19:42	18:29	16:28	16:05		
17	08:35	07:43	06:38	06:23	05:22	05:54 (1)	04:54	05:16	06:06	07:01	07:56	07:55	08:39			
	16:38	17:38	18:32	20:30	21:24	18	06:12 (1)	21:59	21:48	20:53	19:39	18:27	16:26	16:05		
18	08:33	07:41	06:36	06:21	05:21	05:54 (1)	04:54	05:17	06:08	07:03	07:58	07:57	08:39			
	16:40	17:40	18:34	20:32	21:25	16	06:10 (1)	22:00	21:46	20:51	19:37	18:24	16:25	16:05		
19	08:32	07:39	06:33	06:19	05:19	05:55 (1)	04:54	05:19	06:10	07:05	07:59	07:59	08:40			
	16:42	17:42	18:36	20:34	21:27	15	06:10 (1)	22:00	21:45	20:49	19:34	18:22	16:23	16:05		
20	08:31	07:37	06:31	06:16	05:18	05:56 (1)	04:55	05:20	06:12	07:07	08:01	08:01	08:41			
	16:43	17:44	18:38	20:35	21:28	12	06:08 (1)	22:00	21:44	20:46	19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16	05:57 (1)	04:55	05:22	06:11 (1)	06:14	07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	21:30	10	06:07 (1)	22:01	21:42	3	06:14 (1)	20:44	16:21	16:06		
22	08:29	07:32	06:26	06:12	05:15	05:59 (1)	04:55	05:23	06:10 (1)	06:15	07:10	08:05	08:04	08:42		
	16:47	17:48	18:42	20:39	21:31	7	06:06 (1)	22:01	21:41	8	06:17 (1)	20:42	16:19	16:07		
23	08:27	07:30	06:23	06:10	05:13	04:55	05:24	05:24	06:07 (1)	06:17	07:12	08:07	08:06	08:42		
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	21:40	11	06:18 (1)	20:39	18:13	16:18	16:07		
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	05:26	06:06 (1)	06:19	07:14	08:09	08:08	08:43		
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	21:38	13	06:19 (1)	20:37	18:11	16:17	16:08		
25	08:25	07:26	06:19	06:05	05:11	04:56	05:28	05:28	06:05 (1)	06:21	07:15	08:11	08:09	08:43		
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	21:37	16	06:21 (1)	20:35	18:10	16:16	16:08		
26	08:23	07:23	06:16	06:03	05:10	04:56	05:29	05:29	06:04 (1)	06:22	07:17	08:13	08:11	08:44		
	16:55	17:56	18:49	20:46	21:37	22:01	21:35	21:35	17	06:21 (1)	20:33	18:12	16:15	16:09		
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	05:31	06:04 (1)	06:24	07:19	08:15	08:13	08:44		
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	21:33	18	06:22 (1)	20:30	18:14	16:14	16:10		
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	05:32	06:03 (1)	06:26	07:21	08:17	08:15	08:44		
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	21:32	19	06:22 (1)	20:28	18:16	16:13	16:11		
29	08:19		07:09	05:56	05:06	04:58	05:34	05:34	06:05 (1)	06:28	07:23	08:19	08:16	08:44		
	17:00		19:55	20:52	21:42	22:01	21:30	21:30	18	06:23 (1)	20:26	18:10	16:12	16:12		
30	08:17		07:06	05:54	05:05	04:58	05:36	05:36	06:06 (1)	06:30	07:24	08:21	08:18	08:44		
	17:02		19:57	20:54	21:43	22:00	21:28	21:28	17	06:23 (1)	20:23	18:09	16:11	16:13		
31	08:15		07:04	05:04	05:04		05:37	05:37	06:08 (1)	06:31	07:22	08:22	08:19	08:44		
	17:04		19:58	21:44	21:44		21:27	21:27	15	06:23 (1)	20:21	18:06	16:11	16:14		
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233			
Total, worst case					210			55								
Sun reduction					0.38			0.32		0.34						
Oper. time red.					1.00			1.00		1.00						
Wind dir. red.					0.67			0.67		0.67						
Total reduction					0.25			0.22		0.23						
Total, real					53			33		13						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KL - H298

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:09 (1)	06:33	07:26	07:24	08:19		
2	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20	06:29 (1)	20:18	19:05	16:54	16:10	
	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:41	06:11 (1)	06:35	07:28	07:26	08:21		
3	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	18	06:29 (1)	20:16	19:02	16:52	16:09	
	08:44	08:10	07:12	06:57	05:48	05:01	05:01	05:42	06:12 (1)	06:37	07:30	07:28	08:22		
4	16:17	17:10	18:06	20:04	20:59	3	06:17 (1)	21:48	21:21	17	06:29 (1)	20:14	19:00	16:50	16:09
	08:43	08:09	07:09	06:54	05:46	06:12 (1)	05:00	05:01	05:44	06:14 (1)	06:38	07:32	07:30	08:24	
5	16:18	17:12	18:08	20:06	21:01	5	06:17 (1)	21:49	21:19	15	06:29 (1)	20:11	18:57	16:48	16:08
	08:43	08:07	07:07	06:52	05:44	06:10 (1)	04:59	05:02	05:46	06:16 (1)	06:40	07:33	07:32	08:25	
6	16:20	17:14	18:10	20:08	21:03	8	06:18 (1)	21:50	21:18	13	06:29 (1)	20:09	18:55	16:47	16:07
	08:43	08:05	07:05	06:49	05:42	06:09 (1)	04:59	05:03	05:47	06:17 (1)	06:42	07:35	07:34	08:27	
7	16:21	17:16	18:12	20:09	21:05	10	06:19 (1)	21:51	21:16	11	06:28 (1)	20:06	18:53	16:45	16:07
	08:42	08:03	07:02	06:47	05:40	06:07 (1)	04:58	05:04	05:49	06:19 (1)	06:44	07:37	07:36	08:28	
8	16:22	17:18	18:13	20:11	21:06	12	06:19 (1)	21:52	21:14	9	06:28 (1)	20:04	18:50	16:43	16:06
	08:42	08:01	07:00	06:44	05:38	06:05 (1)	04:57	05:05	05:51	06:20 (1)	06:45	07:39	07:38	08:29	
9	16:24	17:20	18:15	20:13	21:08	14	06:19 (1)	21:53	21:12	7	06:27 (1)	20:01	18:48	16:41	16:06
	08:41	07:59	06:58	06:42	05:36	06:03 (1)	04:57	05:06	05:52	06:22 (1)	06:47	07:41	07:40	08:30	
10	16:25	17:22	18:17	20:15	21:10	16	06:19 (1)	21:54	21:10	5	06:27 (1)	19:59	18:45	16:39	16:06
	08:41	07:57	06:55	06:40	05:35	06:02 (1)	04:56	05:07	05:54	06:24 (1)	06:49	07:43	07:42	08:32	
11	16:27	17:24	18:19	20:17	21:12	17	06:19 (1)	21:55	21:08	2	06:26 (1)	19:57	18:43	16:37	16:05
	08:40	07:55	06:53	06:37	05:33	06:00 (1)	04:56	05:08	05:56		06:51	07:44	07:44	08:33	
12	16:28	17:26	18:21	20:19	21:13	19	06:19 (1)	21:56	21:06		19:54	18:41	16:36	16:05	
	08:39	07:53	06:50	06:35	05:31	05:58 (1)	04:56	05:10	05:58		06:52	07:46	07:46	08:34	
13	16:30	17:28	18:23	20:21	21:15	20	06:18 (1)	21:56	21:04		19:52	18:38	16:34	16:05	
	08:38	07:51	06:48	06:33	05:29	05:59 (1)	04:55	05:11	05:59		06:54	07:48	07:48	08:35	
14	16:31	17:30	18:25	20:22	21:17	19	06:18 (1)	21:57	21:01		19:49	18:36	16:32	16:05	
	08:37	07:49	06:45	06:30	05:27	05:59 (1)	04:55	05:12	06:01		06:56	07:50	07:49	08:36	
15	16:33	17:32	18:27	20:24	21:19	18	06:17 (1)	21:58	21:01		19:47	18:34	16:31	16:05	
	08:37	07:47	06:43	06:28	05:26	06:00 (1)	04:55	05:13	06:03		06:58	07:52	07:51	08:37	
16	16:35	17:34	18:29	20:26	21:20	17	06:17 (1)	21:58	21:03		19:44	18:31	16:29	16:05	
	08:36	07:45	06:41	06:25	05:24	06:01 (1)	04:55	05:15	06:05		07:00	07:54	07:53	08:38	
17	16:36	17:36	18:31	20:28	21:22	15	06:16 (1)	21:59	21:05		19:42	18:29	16:28	16:05	
	08:35	07:43	06:38	06:23	05:22	06:02 (1)	04:54	05:16	06:06		07:01	07:56	07:55	08:39	
18	16:38	17:38	18:32	20:30	21:24	13	06:15 (1)	21:59	21:03		19:39	18:27	16:26	16:05	
	08:33	07:41	06:36	06:21	05:21	06:03 (1)	04:54	05:17	06:08		07:03	07:58	07:57	08:39	
19	16:40	17:40	18:34	20:32	21:25	10	06:13 (1)	22:00	21:06		19:37	18:24	16:25	16:05	
	08:32	07:39	06:33	06:19	05:19	06:06 (1)	04:54	05:19	06:10		07:05	07:59	07:59	08:40	
20	16:42	17:42	18:36	20:34	21:27	5	06:11 (1)	22:00	21:09		19:34	18:22	16:23	16:05	
	08:31	07:37	06:31	06:16	05:18	04:55	05:20	06:12	06:12		07:07	08:01	08:01	08:41	
21	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46		19:32	18:20	16:22	16:06		
	08:30	07:34	06:28	06:14	05:16	04:55	05:22	06:14	06:14		07:08	08:03	08:02	08:41	
22	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44		19:29	18:18	16:21	16:06		
	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	06:15		07:10	08:05	08:04	08:42	
23	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42		19:27	18:15	16:19	16:07		
	08:27	07:30	06:23	06:10	05:13	04:55	05:24	06:17	06:17		07:12	08:07	08:06	08:42	
24	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:39		19:24	18:13	16:18	16:07		
	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	06:19		07:14	08:09	08:08	08:43	
25	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37		19:22	18:11	16:17	16:08		
	08:25	07:26	06:19	06:05	05:11	04:56	05:28	06:21	06:21		07:15	07:11	08:09	08:43	
26	16:53	17:54	18:47	20:45	21:36	22:01	21:37	8	06:23 (1)	20:35	19:20	17:09	16:16	16:08	
	08:23	07:23	06:16	06:03	05:10	04:56	05:29	06:22	06:22		07:17	07:13	08:11	08:44	
27	16:55	17:56	18:49	20:46	21:37	22:01	21:35	11	06:24 (1)	20:33	19:17	17:07	16:15	16:09	
	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	06:24		07:19	07:15	08:13	08:44	
28	16:56	17:58	18:51	20:48	21:39	22:01	21:33	14	06:26 (1)	20:30	19:15	17:05	16:14	16:10	
	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	06:26		07:21	07:17	08:15	08:44	
29	16:58	18:00	18:53	20:50	21:40	22:01	21:32	16	06:27 (1)	20:28	19:12	17:02	16:13	16:11	
	08:19		07:09	05:56	05:06	04:58	05:34	06:10	06:10		07:23	07:19	08:16	08:44	
30	17:00		19:55	20:52	21:42	22:01	21:30	18	06:28 (1)	20:26	19:10	17:00	16:12	16:12	
	08:17		07:06	05:54	05:05	04:58	05:36	06:09	06:09		07:24	07:21	08:18	08:44	
31	17:02		19:57	20:54	21:43	22:00	21:28	19	06:28 (1)	20:23	19:07	16:58	16:11	16:13	
	08:15		07:04		05:04		05:37	06:09	06:09			07:22		08:44	
	17:04		19:58		21:44		21:27	20	06:29 (1)	20:21		16:56		16:14	
Potential sun hours	250	273	367	420	494	510	512	460		382		328		259	233
Total, worst case					221			106		117					
Sun reduction					0.38			0.32		0.34					
Oper. time red.					1.00			1.00		1.00					
Wind dir. red.					0.67			0.67		0.67					
Total reduction					0.26			0.22		0.23					
Total, real					56			23		27					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KM - H299

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	06:27 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:56	18 06:45 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	06:28 (1)	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	16 06:44 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48	06:29 (1)	05:01	05:00	05:42	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	13 06:42 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09	
4	08:43	08:09	07:09	06:54	05:46	06:31 (1)	05:00	05:01	05:44	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01	9 06:40 (1)	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44		04:59	05:02	05:46	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03		21:50	21:58	21:18	20:09	18:55	16:47	16:07	
6	08:43	08:05	07:05	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:09	21:05		21:51	21:58	21:16	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:14	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38		04:57	05:05	05:51	06:43 (1)	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:12	3 06:46 (1)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36		04:57	05:06	05:52	06:40 (1)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10		21:54	21:56	21:10	10 06:50 (1)	19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35		04:56	05:07	05:54	06:38 (1)	06:49	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12		21:55	21:55	21:08	14 06:52 (1)	19:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33		04:56	05:08	05:56	06:36 (1)	06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13		21:56	21:54	21:06	17 06:53 (1)	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	06:35 (1)	06:52	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	19 06:54 (1)	19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	06:35 (1)	06:54	07:48	07:48	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	20 06:55 (1)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:33 (1)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	22 06:55 (1)	19:47	18:34	16:31	16:05
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:33 (1)	06:58	07:52	07:51	08:37
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	22 06:55 (1)	19:44	18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	06:34 (1)	07:00	07:54	07:53	08:38
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	21 06:55 (1)	19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22		04:54	05:16	06:06	06:35 (1)	07:01	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	20 06:55 (1)	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08	06:37 (1)	07:03	07:58	07:57	08:39
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51	18 06:55 (1)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19	06:43 (1)	04:54	05:19	06:10	06:39 (1)	07:05	07:59	07:59	08:40
	16:42	17:42	18:36	20:34	1 06:44 (1)	21:27	22:00	21:45	20:49	15 06:54 (1)	19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	06:16	05:18	06:41 (1)	04:55	05:20	06:12	06:40 (1)	07:07	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	5 06:46 (1)	21:28	22:00	21:44	20:46	13 06:53 (1)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	06:39 (1)	04:55	05:21	06:14	06:42 (1)	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	8 06:47 (1)	21:30	22:01	21:42	20:44	11 06:53 (1)	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	06:36 (1)	04:55	05:23	06:15	06:44 (1)	07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	11 06:47 (1)	21:32	22:01	21:41	20:42	8 06:52 (1)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13	06:34 (1)	04:55	05:24	06:17	06:45 (1)	07:12	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	14 06:48 (1)	21:33	22:01	21:40	20:39	4 06:49 (1)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	06:32 (1)	04:55	05:26	06:19	06:47 (1)	07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	16 06:48 (1)	21:35	22:01	21:38	20:37	1 06:48 (1)	19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11	06:30 (1)	04:56	05:28	06:21		07:15	07:11	08:09	08:43
	16:53	17:54	18:47	20:45	18 06:48 (1)	21:36	22:01	21:37	20:35		19:20	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:10	06:28 (1)	04:56	05:29	06:22		07:17	07:13	08:11	08:44
	16:55	17:56	18:49	20:46	20 06:48 (1)	21:37	22:01	21:35	20:33		19:17	17:07	16:15	16:09
27	08:22	07:21	06:14	06:01	05:08	06:26 (1)	04:57	05:31	06:24		07:19	07:15	08:13	08:44
	16:56	17:58	18:51	20:48	22 06:48 (1)	21:39	22:01	21:33	20:30		19:15	17:05	16:14	16:10
28	08:20	07:19	06:11	05:59	05:07	06:26 (1)	04:57	05:32	06:26		07:21	07:17	08:15	08:44
	16:58	18:00	18:53	20:50	21 06:47 (1)	21:40	22:01	21:32	20:28		19:12	17:02	16:13	16:11
29	08:19		07:09	05:56	05:06	06:26 (1)	04:58	05:34	06:28		07:23	07:19	08:16	08:44
	17:00		19:55	20:52	21 06:47 (1)	21:42	22:01	21:30	20:26		19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05	06:27 (1)	04:58	05:36	06:29		07:24	07:21	08:18	08:44
	17:02		19:57	20:54	19 06:46 (1)	21:43	22:01	21:28	20:23		19:07	16:58	16:11	16:13
31	08:15		07:04		05:04			05:37	06:31			07:22		08:44
	17:04		19:58		21:44			21:27	20:21			16:56		16:14
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case				176	56				238					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.68	0.68				0.68					
Total reduction				0.24	0.26				0.23					
Total, real				42	14				55					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KN - H300

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:57	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:09
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32	08:25
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27
	16:21	17:16	18:12	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	04:56	05:10	05:58	06:52	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29	04:55	05:11	05:59	06:47 (1)	07:48	07:48	08:35
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:01	9 06:56 (1)	19:49	18:36	16:32
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:44 (1)	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	13 06:57 (1)	19:47	18:34	16:31
15	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:43 (1)	07:52	07:51	08:37
	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	16 06:59 (1)	19:44	18:31	16:29
16	08:36	07:45	06:41	06:25	06:50 (1)	05:24	04:55	05:15	06:05	06:42 (1)	07:00	07:54
	16:36	17:36	18:31	20:28	4 06:54 (1)	21:22	21:59	21:49	18 07:00 (1)	19:42	18:29	16:28
17	08:35	07:43	06:38	06:23	06:47 (1)	05:22	04:54	05:16	06:06	06:40 (1)	07:01	07:56
	16:38	17:38	18:32	20:30	7 06:54 (1)	21:24	21:59	21:48	20 07:00 (1)	19:39	18:27	16:26
18	08:33	07:41	06:36	06:21	06:45 (1)	05:21	04:54	05:17	06:08	06:40 (1)	07:03	07:58
	16:40	17:40	18:34	20:32	10 06:55 (1)	21:25	22:00	21:46	21 07:01 (1)	19:37	18:24	16:25
19	08:32	07:39	06:33	06:19	06:43 (1)	05:19	04:54	05:19	06:10	06:40 (1)	07:05	07:59
	16:42	17:42	18:36	20:34	13 06:56 (1)	21:27	22:00	21:45	22 07:02 (1)	19:34	18:22	16:23
20	08:31	07:37	06:31	06:16	06:41 (1)	05:18	04:55	05:20	06:12	06:40 (1)	07:07	08:01
	16:43	17:44	18:38	20:35	15 06:56 (1)	21:28	22:00	21:44	21 07:01 (1)	19:32	18:20	16:22
21	08:30	07:34	06:28	06:14	06:39 (1)	05:16	04:55	05:21	06:14	06:42 (1)	07:08	08:03
	16:45	17:46	18:40	20:37	18 06:57 (1)	21:30	22:01	21:42	19 07:01 (1)	19:29	18:18	16:21
22	08:29	07:32	06:26	06:12	06:36 (1)	05:15	04:55	05:23	06:15	06:44 (1)	07:10	08:05
	16:47	17:48	18:42	20:39	20 06:56 (1)	21:32	22:01	21:41	17 07:01 (1)	19:27	18:15	16:19
23	08:27	07:30	06:23	06:10	06:34 (1)	05:13	04:55	05:24	06:17	06:45 (1)	07:12	08:07
	16:49	17:50	18:44	20:41	21 06:55 (1)	21:33	22:01	21:40	15 07:00 (1)	19:24	18:13	16:18
24	08:26	07:28	06:21	06:07	06:33 (1)	05:12	04:55	05:26	06:19	06:47 (1)	07:14	08:09
	16:51	17:52	18:45	20:43	22 06:55 (1)	21:35	22:01	21:38	13 07:00 (1)	19:22	18:11	16:17
25	08:25	07:26	06:19	06:05	06:33 (1)	05:11	04:56	05:28	06:21	06:49 (1)	07:15	07:11
	16:53	17:54	18:47	20:45	21 06:54 (1)	21:36	22:01	21:37	10 06:59 (1)	19:20	17:09	16:16
26	08:23	07:23	06:16	06:03	06:34 (1)	05:10	04:56	05:29	06:22	06:50 (1)	07:17	07:13
	16:55	17:56	18:49	20:46	20 06:54 (1)	21:37	22:01	21:35	7 06:57 (1)	19:17	17:07	16:15
27	08:22	07:21	06:14	06:01	06:35 (1)	05:08	04:57	05:31	06:24	06:52 (1)	07:19	07:15
	16:56	17:58	18:51	20:48	18 06:53 (1)	21:39	22:01	21:33	4 06:56 (1)	19:15	17:05	16:14
28	08:20	07:19	06:11	05:59	06:36 (1)	05:07	04:57	05:32	06:26	07:21	07:17	08:15
	16:58	18:00	18:53	20:50	15 06:51 (1)	21:40	22:01	21:32	19:12	17:02	16:13	16:11
29	08:19		07:09	05:56	06:37 (1)	05:06	04:58	05:34	06:28	07:23	07:19	08:16
	17:00		19:55	20:52	12 06:49 (1)	21:42	22:01	21:30	19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	06:40 (1)	05:05	04:58	05:36	06:29	07:24	07:21	08:18
	17:02		19:57	20:54	6 06:46 (1)	21:43	22:01	21:23	19:07	16:58	16:11	16:13
31	08:15		07:04			05:04		06:31		07:22		08:44
	17:04		19:58			21:44		21:27		16:56		16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				222				225				
Sun reduction				0.35				0.34				
Oper. time red.				1.00				1.00				
Wind dir. red.				0.68				0.68				
Total reduction				0.24				0.23				
Total, real				53				52				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KO - H301

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:00 (1)	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	3 07:03 (1)	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35		07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16		19:02	16:52	16:09
3	08:44	08:10	07:12	06:57	05:48	05:01	05:00	05:42	06:37		07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14		19:00	16:50	16:09
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38		07:32	07:30	08:24
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11		18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:46	06:40		07:33	07:32	08:25
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09		18:55	16:46	16:07
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42		07:35	07:34	08:27
	16:21	17:16	18:12	20:09	21:05	21:51	21:58	21:16	20:06		18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44		07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04		18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45		07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01		18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47		07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59		18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49		07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57		18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	07:01 (1)	05:33	04:56	05:08	06:51		07:44	07:44	08:33
	16:28	17:26	18:21	20:19	3 07:04 (1)	21:13	21:56	21:54	19:54		18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	06:59 (1)	05:31	04:56	05:10	06:52		07:46	07:46	08:34
	16:30	17:28	18:23	20:21	7 07:06 (1)	21:15	21:56	21:53	19:52		18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	06:57 (1)	05:29	04:55	05:11	06:54		07:48	07:48	08:35
	16:31	17:30	18:25	20:22	10 07:07 (1)	21:17	21:57	21:52	19:49		18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	06:54 (1)	05:27	04:55	05:12	06:56		07:50	07:49	08:36
	16:33	17:32	18:27	20:24	13 07:07 (1)	21:19	21:58	21:51	19:47		18:34	16:31	16:05
15	08:37	07:47	06:43	06:28	06:52 (1)	05:26	04:55	05:13	06:58		07:52	07:51	08:37
	16:35	17:34	18:29	20:26	16 07:08 (1)	21:20	21:58	21:50	19:44		18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	06:50 (1)	05:24	04:55	05:15	06:59		07:54	07:53	08:38
	16:36	17:36	18:31	20:28	18 07:08 (1)	21:22	21:59	21:49	19:42		18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	06:47 (1)	05:22	04:54	05:16	07:01	06:56 (1)	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21 07:08 (1)	21:24	21:59	21:48	9 07:05 (1)	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	06:45 (1)	05:21	04:54	05:17	06:54 (1)	07:03	07:58	07:57	08:39
	16:40	17:40	18:34	20:32	23 07:08 (1)	21:25	22:00	21:46	14 07:08 (1)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	06:44 (1)	05:19	04:54	05:19	06:52 (1)	07:05	07:59	07:59	08:40
	16:42	17:42	18:36	20:34	23 07:07 (1)	21:27	22:00	21:45	17 07:09 (1)	19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	06:16	06:44 (1)	05:18	04:54	05:20	06:12	06:50 (1)	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	23 07:07 (1)	21:28	22:00	21:44	20 07:10 (1)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	06:44 (1)	05:16	04:55	05:21	06:14	06:50 (1)	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	23 07:07 (1)	21:30	22:01	21:42	21 07:11 (1)	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	06:44 (1)	05:15	04:55	05:23	06:15	06:49 (1)	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	21 07:05 (1)	21:32	22:01	21:41	20:42	22 07:11 (1)	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	06:45 (1)	05:13	04:55	05:24	06:17	06:48 (1)	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	19 07:04 (1)	21:33	22:01	21:40	20:39	23 07:11 (1)	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	06:46 (1)	05:12	04:55	05:26	06:19	06:48 (1)	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	17 07:03 (1)	21:35	22:01	21:38	20:37	23 07:11 (1)	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	06:48 (1)	05:11	04:56	05:28	06:21	06:49 (1)	07:11	08:09	08:43
	16:53	17:54	18:47	20:45	13 07:01 (1)	21:36	22:01	21:37	20:35	22 07:11 (1)	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	06:50 (1)	05:10	04:56	05:29	06:22	06:50 (1)	07:17	08:11	08:44
	16:54	17:56	18:49	20:46	8 06:58 (1)	21:37	22:01	21:35	20:33	20 07:10 (1)	17:07	16:15	16:09
27	08:22	07:21	06:14	06:01		05:08	04:57	05:31	06:24	06:52 (1)	07:19	08:13	08:44
	16:56	17:58	18:51	20:48		21:39	22:01	21:33	20:30	18 07:10 (1)	17:05	16:14	16:10
28	08:20	07:19	06:11	05:59		05:07	04:57	05:32	06:26	06:54 (1)	07:21	08:15	08:44
	16:58	18:00	18:53	20:50		21:40	22:01	21:32	20:28	16 07:10 (1)	17:02	16:13	16:11
29	08:19		07:09	05:56		05:06	04:58	05:34	06:28	06:55 (1)	07:23	08:16	08:44
	17:00		19:55	20:52		21:42	22:01	21:30	20:26	13 07:08 (1)	17:00	16:12	16:12
30	08:17		07:06	05:54		05:05	04:58	05:36	06:29	06:57 (1)	07:24	08:18	08:44
	17:02		19:57	20:54		21:43	22:01	21:28	20:23	10 07:07 (1)	16:58	16:11	16:13
31	08:15		07:04			05:04		05:37	06:31	06:59 (1)	07:22		08:44
	17:04		19:58			21:44		21:27	20:21	7 07:06 (1)	16:56		16:14
Potential sun hours	250	273	367	420		494	510	512	460	382		259	233
Total, worst case				258					255	3			
Sun reduction				0.35					0.34	0.32			
Oper. time red.				1.00					1.00	1.00			
Wind dir. red.				0.68					0.68	0.68			
Total reduction				0.24					0.23	0.22			
Total, real				61					59	1			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** KP - H302

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:02 (1)	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	24	07:26 (1)	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35		07:02 (1)	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	24	07:26 (1)	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	07:20 (1)	05:48	05:01	05:00	06:37		07:04 (1)	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	4	07:24 (1)	20:59	21:48	20:14	22	07:26 (1)	19:00	16:50	16:09	
4	08:43	08:09	07:09	06:54	07:18 (1)	05:46	05:00	05:01	06:38		07:05 (1)	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	8	07:26 (1)	21:01	21:49	20:11	20	07:25 (1)	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	07:15 (1)	05:44	04:59	05:02	06:40		07:07 (1)	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	11	07:26 (1)	21:03	21:50	20:09	17	07:24 (1)	18:55	16:46	16:07	
6	08:43	08:05	07:05	06:49	07:13 (1)	05:42	04:59	05:03	06:42		07:09 (1)	07:35	07:34	08:27	
	16:21	17:16	18:12	20:09	15	07:28 (1)	21:05	21:51	20:06	15	07:24 (1)	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	07:11 (1)	05:40	04:58	05:04	06:44		07:10 (1)	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	17	07:28 (1)	21:06	21:52	20:04	12	07:22 (1)	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	07:08 (1)	05:38	04:57	05:05	06:45		07:12 (1)	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	20	07:28 (1)	21:08	21:53	20:01	8	07:20 (1)	18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	07:06 (1)	05:36	04:57	05:06	06:47		07:14 (1)	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	22	07:28 (1)	21:10	21:54	19:59	4	07:18 (1)	18:45	16:39	16:06	
10	08:41	07:57	06:55	06:40	07:04 (1)	05:35	04:56	05:07	06:49			07:43	07:42	08:32	
	16:27	17:24	18:19	20:17	24	07:28 (1)	21:12	21:55	19:57			18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	07:03 (1)	05:33	04:56	05:08	06:51			07:44	07:44	08:33	
	16:28	17:26	18:21	20:19	24	07:27 (1)	21:13	21:56	19:54			18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	07:04 (1)	05:31	04:56	05:09	06:52			07:46	07:46	08:34	
	16:30	17:28	18:23	20:21	23	07:27 (1)	21:15	21:56	19:52			18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	07:04 (1)	05:29	04:55	05:11	06:54			07:48	07:48	08:35	
	16:31	17:30	18:25	20:22	22	07:26 (1)	21:17	21:57	19:49			18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	07:04 (1)	05:27	04:55	05:12	06:56			07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21	07:25 (1)	21:19	21:58	19:47			18:34	16:31	16:05	
15	08:37	07:47	06:43	06:28	07:05 (1)	05:26	04:55	05:13	06:58			07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	19	07:24 (1)	21:20	21:58	19:44			18:31	16:29	16:05	
16	08:36	07:45	06:41	06:25	07:07 (1)	05:24	04:55	05:15	06:59			07:54	07:53	08:38	
	16:36	17:36	18:31	20:28	15	07:22 (1)	21:22	21:59	19:42			18:29	16:28	16:05	
17	08:35	07:43	06:38	06:23	07:08 (1)	05:22	04:54	05:16	07:01			07:56	07:55	08:39	
	16:38	17:38	18:32	20:30	11	07:19 (1)	21:24	21:59	19:39			18:27	16:26	16:05	
18	08:33	07:41	06:36	06:21		05:21	04:54	05:17	07:03			07:58	07:57	08:39	
	16:40	17:40	18:34	20:32		21:25	22:00	21:46	19:37			18:24	16:25	16:05	
19	08:32	07:39	06:33	06:19		05:19	04:54	05:19	07:05			07:59	07:59	08:40	
	16:42	17:42	18:36	20:34		21:27	22:00	21:45	19:34			18:22	16:23	16:05	
20	08:31	07:37	06:31	06:16		05:18	04:54	05:20	07:07			08:01	08:01	08:41	
	16:43	17:44	18:38	20:35		21:28	22:00	21:44	19:32			18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14		05:16	04:55	05:21	07:08			08:03	08:02	08:41	
	16:45	17:46	18:40	20:37		21:30	22:01	21:42	19:29			18:18	16:21	16:06	
22	08:29	07:32	06:26	06:12		05:15	04:55	05:23	07:10			08:05	08:04	08:42	
	16:47	17:48	18:42	20:39		21:32	22:01	21:41	19:27			18:15	16:19	16:07	
23	08:27	07:30	06:23	06:10		05:13	04:55	05:24	07:12			08:07	08:06	08:42	
	16:49	17:50	18:44	20:41		21:33	22:01	21:40	19:24			18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07		05:12	04:55	05:26	07:14			08:09	08:08	08:43	
	16:51	17:52	18:45	20:43		21:35	22:01	21:38	19:22			18:11	16:17	16:08	
25	08:25	07:26	06:19	06:05		05:11	04:56	05:28	06:21			07:11	08:09	08:43	
	16:53	17:54	18:47	20:45		21:36	22:01	21:37	19:20	4	07:19 (1)	19:20	16:16	16:08	
26	08:23	07:23	06:16	06:03		05:10	04:56	05:29	06:22			07:10 (1)	07:17	08:44	
	16:54	17:56	18:49	20:46		21:37	22:01	21:35	19:17	12	07:22 (1)	19:17	17:07	16:15	16:09
27	08:22	07:21	06:14	06:01		05:08	04:57	05:31	06:24			07:08 (1)	07:19	08:44	
	16:56	17:58	18:51	20:48		21:39	22:01	21:33	19:15	16	07:24 (1)	19:15	17:05	16:14	16:10
28	08:20	07:19	06:11	05:59		05:07	04:57	05:32	06:26			07:07 (1)	07:21	08:44	
	16:58	18:00	18:53	20:50		21:40	22:01	21:32	19:12	18	07:25 (1)	19:12	17:02	16:13	16:11
29	08:19		07:09	05:56		05:06	04:58	05:34	06:28			07:05 (1)	07:23	08:44	
	17:00		19:55	20:52		21:42	22:01	21:30	19:10	21	07:26 (1)	19:10	17:00	16:12	16:12
30	08:17		07:06	05:54		05:05	04:58	05:36	06:29			07:04 (1)	07:24	08:44	
	17:02		19:57	20:54		21:43	22:01	21:28	19:07	22	07:26 (1)	19:07	16:58	16:11	16:13
31	08:15		07:04			05:04		05:37	06:31			07:04 (1)		08:44	
	17:04		19:58			21:44		21:27	20:21	23	07:27 (1)		16:56		16:14
Potential sun hours	250	273	367	420	494	510	512	460	382			328	259	233	
Total, worst case				256					116			146			
Sun reduction				0.35					0.34			0.32			
Oper. time red.				1.00					1.00			1.00			
Wind dir. red.				0.67					0.67			0.67			
Total reduction				0.24					0.23			0.22			
Total, real				61					27			32			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KQ - H303

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26		07:57 (1)	07:24	08:19
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	22	08:19 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:56 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	22	08:18 (1)	16:52	16:09
3	08:44	08:10	07:12		06:56	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	22	08:18 (1)	16:50	16:09
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	20	08:18 (1)	16:48	16:08
5	08:43	08:07	07:07		07:31 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10	4	07:35 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	17	08:17 (1)	16:46	16:07
6	08:43	08:05	07:05		07:29 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35		08:02 (1)	07:34	08:27
	16:21	17:16	18:12	9	07:38 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	14	08:16 (1)	16:45	16:07
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37		08:04 (1)	07:36	08:28
	16:22	17:18	18:13	12	07:39 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	11	08:15 (1)	16:43	16:06
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39		08:06 (1)	07:38	08:29
	16:24	17:20	18:15	16	07:40 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	7	08:13 (1)	16:41	16:06
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41		08:07 (1)	07:40	08:30
	16:25	17:22	18:17	18	07:40 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	2	08:09 (1)	16:39	16:06
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43			07:42	08:32
	16:27	17:24	18:19	21	07:40 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43			16:37	16:05
11	08:40	07:55	06:53		07:18 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:44			07:44	08:33
	16:28	17:26	18:21	23	07:41 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41			16:36	16:05
12	08:39	07:53	06:50		07:17 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46			07:46	08:34
	16:30	17:28	18:23	23	07:40 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38			16:34	16:05
13	08:38	07:51	06:48		07:17 (1)	06:32	05:29	04:55	05:11	05:59	06:54	07:48			07:48	08:35
	16:31	17:30	18:25	23	07:40 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36			16:32	16:05
14	08:37	07:49	06:45		07:17 (1)	06:30	05:27	04:55	05:12	06:01	06:56	07:50			07:50	08:36
	16:33	17:32	18:27	21	07:38 (1)	20:24	21:19	21:58	21:51	20:59	19:47	18:34			16:31	16:05
15	08:37	07:47	06:43		07:18 (1)	06:28	05:26	04:55	05:13	06:03	06:58	07:52			07:51	08:37
	16:35	17:34	18:29	20	07:38 (1)	20:26	21:20	21:58	21:50	20:57	19:44	18:31			16:29	16:05
16	08:36	07:45	06:41		07:18 (1)	06:25	05:24	04:55	05:14	06:05	06:59	07:54			07:53	08:38
	16:36	17:36	18:31	18	07:36 (1)	20:28	21:22	21:59	21:49	20:55	19:42	18:29			16:28	16:05
17	08:35	07:43	06:38		07:20 (1)	06:23	05:22	04:54	05:16	06:06	07:01	07:56			07:55	08:39
	16:38	17:38	18:32	14	07:34 (1)	20:30	21:24	21:59	21:48	20:53	19:39	18:27			16:26	16:05
18	08:34	07:41	06:36		07:22 (1)	06:21	05:21	04:54	05:17	06:08	07:03	07:58			07:57	08:39
	16:40	17:40	18:34	9	07:31 (1)	20:32	21:25	22:00	21:46	20:51	19:37	18:24			16:25	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05		07:59			07:59	08:40
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34		18:22			16:23	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01			08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20			16:22	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03			08:02	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18			16:21	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05			08:04	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15			16:19	16:07
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12		08:07			08:06	08:42
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13			16:18	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09			08:08	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22		18:11			16:17	16:08
25	08:25	07:26	06:19		06:05	05:11	04:56	05:27	06:21	07:15		08:07 (1)			07:11	08:10
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	6	08:13 (1)			17:09	16:16
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17		08:03 (1)			07:13	08:11
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	12	08:15 (1)			17:07	16:15
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		08:01 (1)			07:15	08:13
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	16	08:17 (1)			17:05	16:14
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:59 (1)			07:17	08:15
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	19	08:18 (1)			17:02	16:13
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:58 (1)			07:19	08:16
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	21	08:19 (1)			17:00	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		07:58 (1)			07:21	08:18
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	21	08:19 (1)			16:58	16:11
31	08:16		07:04			05:04		05:37	06:31			07:22			07:22	08:44
	17:04		19:58			21:44		21:27	20:21			16:56			16:14	16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case			231							95		137				
Sun reduction			0.27							0.32		0.29				
Oper. time red.			1.00							1.00		1.00				
Wind dir. red.			0.65							0.65		0.65				
Total reduction			0.18							0.21		0.19				
Total, real			41							20		26				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: KR - H304

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 07:54 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	08:14 (1) 08:31 (1)	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 07:55 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:12 (1) 08:31 (1)	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 07:56 (1)	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	08:11 (1) 08:32 (1)	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	07:34 (1) 07:57 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:10 (1) 08:33 (1)	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:33 (1) 07:56 (1)	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	08:09 (1) 08:33 (1)	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:33 (1) 07:57 (1)	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:09 (1) 08:33 (1)	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:33 (1) 07:57 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:09 (1) 08:33 (1)	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:32 (1) 07:56 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	08:09 (1) 08:33 (1)	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:33 (1) 07:56 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:08 (1) 08:31 (1)	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:32 (1) 07:55 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:09 (1) 08:30 (1)	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:33 (1) 07:54 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:11 (1) 08:29 (1)	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:34 (1) 07:52 (1)	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:13 (1) 08:28 (1)	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:36 (1) 07:50 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:15 (1) 08:26 (1)	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	07:38 (1) 07:47 (1)	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:17 (1) 08:23 (1)	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29		20:28	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31		07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31		20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29		07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32		20:28	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27		07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34		20:28	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24		07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36		20:28	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22		07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38		20:28	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20		08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40		20:28	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18		08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42		20:28	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44		20:28	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13		08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45		20:28	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11		08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47		20:28	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09		08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49		20:28	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07		08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51		20:28	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05		08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 8 07:51 (1)		20:28	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02		08:15 16:13	08:44 16:11
29	08:19 17:00				20:28	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 6 08:26 (1)		08:16 16:12	08:44 16:12
30	08:17 17:02				20:28	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 13 08:29 (1)		08:18 16:11	08:44 16:13
31	08:15 17:04				20:28	05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	07:22 16:56	07:22 16:56		08:44 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case		8	275						19	270				
Sun reduction		0.23	0.27						0.32	0.29				
Oper. time red.		1.00	1.00						1.00	1.00				
Wind dir. red.		0.65	0.65						0.65	0.65				
Total reduction		0.15	0.18						0.21	0.19				
Total, real		1	48						4	51				

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KS - H305

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:22 (1)	06:37 18:21	05:33 20:19	04:56 21:13	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:20 (1)	06:35 18:23	05:31 20:21	04:55 21:15	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:18 (1)	06:32 18:25	05:29 20:22	04:55 21:17	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:15 (1)	06:30 18:27	05:27 20:24	04:55 21:19	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:13 (1)	06:28 18:29	05:26 20:26	04:55 21:20	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:11 (1)	06:25 18:30	05:24 20:28	04:54 21:22	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:09 (1)	06:23 18:32	05:22 20:30	04:54 21:24	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:09 (1)	06:21 18:34	05:21 20:32	04:54 21:25	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:08 (1)	06:19 18:36	05:19 20:34	04:54 21:27	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:08 (1)	06:16 18:38	05:18 20:35	04:54 21:28	05:20 22:01	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:09 (1)	06:14 18:40	05:16 20:37	04:55 21:30	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:08 (1)	06:12 18:42	05:15 20:39	04:55 21:32	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:09 (1)	06:09 18:44	05:13 20:41	04:55 21:33	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:07 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:10 (1)	06:07 18:45	05:12 20:43	04:55 21:35	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:09 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:11 (1)	06:05 18:47	05:11 20:45	04:56 21:36	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	07:39 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:13 (1)	06:03 18:49	05:09 20:46	04:56 21:37	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	07:41 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:15 (1)	06:01 18:51	05:08 20:48	04:57 21:39	05:31 22:01	06:24 20:30	07:19 19:15	07:15 17:05	07:43 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	07:45 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	07:47 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	07:50 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44	05:37 21:27	05:37 21:27	06:31 20:21	07:22 16:56	07:22 16:56	07:52 (1) 07:56 (1)	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		324								332		
Sun reduction		0.23								0.29		
Oper. time red.		1.00								1.00		
Wind dir. red.		0.63								0.63		
Total reduction		0.15								0.19		
Total, real		48								62		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** KT - H306

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (1)
2	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	26 08:20 (1)
3	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	07:56 (1)
4	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	23 08:19 (1)
5	08:44	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28	07:58 (1)
6	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	19 08:17 (1)
7	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:00 (1)
8	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	15 08:15 (1)
9	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32	08:02 (1)
10	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	11 08:13 (1)
11	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:04 (1)
12	16:21	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	5 08:09 (1)
13	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:08
14	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	08:28
15	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29
16	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06
17	08:41	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
18	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05
19	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42	08:32
20	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05
21	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33
22	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05
23	08:39	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34
24	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05
25	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:35
26	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05
27	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36
28	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	8 09:04 (1)	
29	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	09:00 (1)	
30	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16 09:12 (1)	
31	08:36	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:58 (1)	
32	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	20 09:16 (1)	
33	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:56 (1)	
34	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	24 09:18 (1)	
35	08:33	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:55 (1)	
36	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	26 09:20 (1)	
37	08:32	07:39	06:33	06:18	05:19	04:54	05:19	06:10	07:05	07:59	08:54 (1)	
38	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	28 09:21 (1)	
39	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:53 (1)	
40	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	29 09:22 (1)	
41	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:52 (1)	
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	31 09:23 (1)	
43	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:51 (1)	
44	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	32 09:23 (1)	
45	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:51 (1)	
46	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	32 09:23 (1)	
47	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:50 (1)	
48	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	33 09:23 (1)	
49	08:25	07:26	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	07:50 (1)	
50	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	33 08:23 (1)	
51	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	07:50 (1)	
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	33 08:23 (1)	
53	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	07:50 (1)	
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	33 08:23 (1)	
55	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	07:50 (1)	
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	32 08:22 (1)	
57	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	07:51 (1)	
58	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	30 08:21 (1)	
59	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	07:52 (1)	
60	17:02		19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	30 08:22 (1)	
61	08:15		07:04	06:04	05:04	04:57	05:37	06:31	07:22	08:17	07:53 (1)	
62	17:04		19:58	21:44	21:33	22:01	21:27	20:21	16:56	28 08:21 (1)		
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction		586								498	99	
Oper. time red.		0.23								0.29	0.27	
Wind dir. red.		1.00								1.00	1.00	
Total reduction		0.62								0.62	0.62	
Total, real		0.15								0.18	0.17	
		85								91	16	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KU - H307

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	08:42 (3)	07:16	08:33 (1)	07:01
	16:15	17:06	18:02	29	09:02 (1)	20:00
2	08:44	08:12	08:40 (3)	07:14	08:36 (1)	06:59
	16:16	17:08	18:04	25	09:01 (1)	20:02
3	08:44	08:10	08:38 (3)	07:12	08:37 (1)	06:56
	16:17	17:10	18:06	20	08:57 (1)	20:04
4	08:43	08:09	08:36 (3)	07:09	08:41 (1)	06:54
	16:18	17:12	18:08	12	08:53 (1)	20:06
5	08:43	08:07	08:34 (3)	07:07		06:52
	16:20	17:14	18:10		20:08	21:03
6	08:43	08:05	08:32 (3)	07:05		06:49
	16:21	17:16	18:11		20:09	21:05
7	08:42	08:03	08:32 (3)	07:02		06:47
	16:22	17:18	18:13		20:11	21:06
8	08:42	08:01	08:33 (1)	07:00		06:44
	16:24	17:20	18:15	3	07:27 (2)	20:13
9	08:41	07:59	08:32 (1)	06:57		07:22 (2)
	16:25	17:22	18:17	7	07:29 (2)	20:15
10	08:41	07:57	08:31 (1)	06:55		07:19 (2)
	16:27	17:24	18:19	9	07:28 (2)	20:17
11	08:40	07:55	08:30 (1)	06:53		07:17 (2)
	16:28	17:26	18:21	12	07:29 (2)	20:19
12	08:39	07:53	08:30 (1)	06:50		07:14 (2)
	16:30	17:28	18:23	14	07:28 (2)	20:21
13	08:38	07:51	08:29 (1)	06:48		07:12 (2)
	16:31	17:30	18:25	16	07:28 (2)	20:22
14	08:37	07:49	08:28 (1)	06:45		07:09 (2)
	16:33	17:32	18:27	18	07:27 (2)	20:24
15	08:37	07:47	08:28 (1)	06:43		07:10 (2)
	16:35	17:34	18:29	16	07:26 (2)	20:26
16	08:36	07:45	08:28 (1)	06:41		07:11 (2)
	16:36	17:36	18:30	13	07:24 (2)	20:28
17	08:35	07:43	08:28 (1)	06:38		07:13 (2)
	16:38	17:38	18:32	9	07:22 (2)	20:30
18	08:33	07:41	08:28 (1)	06:36		06:21
	16:40	17:40	18:34			20:32
19	08:32	07:39	08:27 (1)	06:33		06:18
	16:41	17:42	18:36			20:33
20	08:31	07:37	08:28 (1)	06:31		06:16
	16:43	17:44	18:38			20:35
21	08:30	07:34	08:28 (1)	06:28		06:14
	16:45	17:46	18:40			20:37
22	08:29	07:32	08:28 (1)	06:26		06:12
	16:47	17:48	18:42			20:39
23	08:27	07:30	08:28 (1)	06:23		06:09
	16:49	17:50	18:44			20:41
24	08:26	07:28	08:29 (1)	06:21		06:07
	16:51	17:52	18:45			20:43
25	08:25	07:26	08:29 (1)	06:18		06:05
	16:53	17:54	18:47			20:45
26	08:23	07:23	08:30 (1)	06:16		06:03
	16:54	17:56	18:49			20:46
27	08:22	07:21	08:31 (1)	06:14		06:01
	16:56	17:58	18:51			20:48
28	08:20	07:19	08:32 (1)	06:11		05:59
	16:58	18:00	18:53			20:50
29	08:19	08:47 (3)		07:09		05:56
	17:00	2	08:49 (3)			20:52
30	08:17	08:45 (3)		07:06		05:54
	17:02	5	08:50 (3)			20:54
31	08:15	08:44 (3)		07:04		05:04
	17:04	7	08:51 (3)	19:58		21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case	14	996	203			
Sun reduction	0.24	0.23	0.27			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.61	0.62	0.64			
Total reduction	0.15	0.14	0.17			
Total, real	2	143	35			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KU - H307

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (2) 15 08:07 (2)	07:24 37 08:38 (1)
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (2) 13 08:07 (2)	07:26 35 08:37 (1)
3	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:56 (2) 10 08:06 (2)	07:28 34 08:36 (1)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:58 (2) 8 08:06 (2)	07:30 33 08:34 (1)
5	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	08:00 (2) 5 08:05 (2)	07:32 31 08:33 (1)
6	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:02 (2) 2 08:04 (2)	07:34 27 08:31 (1)
7	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:06 (3) 23 08:29 (1)
8	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:09 (3) 18 08:27 (1)
9	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	09:20 (1) 3 09:23 (1)	07:40 12 08:23 (3)
10	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	09:13 (1) 16 09:29 (1)	07:42 9 08:22 (3)
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	09:10 (1) 22 09:32 (1)	07:44 7 08:22 (3)
12	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	09:08 (1) 27 09:35 (1)	07:46 4 08:21 (3)
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	09:06 (1) 30 09:36 (1)	07:48 2 08:21 (3)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	09:04 (1) 34 09:38 (1)	07:49 16:31
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	09:03 (1) 36 09:39 (1)	07:51 16:29
16	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	09:02 (1) 37 09:39 (1)	07:53 16:28
17	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	09:01 (1) 39 09:40 (1)	07:55 16:26
18	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	09:00 (1) 41 09:41 (1)	07:57 16:25
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	08:59 (1) 42 09:41 (1)	07:59 16:23
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:59 (1) 42 09:41 (1)	08:01 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:58 (1) 43 09:41 (1)	08:02 16:21
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:58 (1) 44 09:42 (1)	08:04 16:19
23	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:58 (1) 43 09:41 (1)	08:06 16:18
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:58 (1) 43 09:41 (1)	08:08 16:17
25	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	07:57 (1) 44 08:41 (1)	08:09 16:16
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 08:02 (2)	07:57 (1) 44 08:41 (1)	08:11 16:15
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 08:05 (2)	07:58 (1) 42 08:40 (1)	08:13 16:14
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 08:06 (2)	07:58 (1) 42 08:40 (1)	08:15 16:13
29	05:34 21:30	06:28 20:26	07:23 19:10	07:19 08:07 (2)	07:58 (1) 41 08:39 (1)	08:16 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:21 08:08 (2)	08:00 (1) 39 08:39 (1)	08:18 16:11
31	05:37 21:27	06:31 20:21		07:22 16:56	08:00 (1) 39 08:39 (1)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case			67	886	272	
Sun reduction			0.32	0.29	0.27	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.66	0.62	0.61	
Total reduction			0.21	0.18	0.16	
Total, real			14	160	44	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KV - H308

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:40 (3)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24					07:24		08:19		11:02 (1)
	16:15	56	11:49 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54					16:54		16:10	28	11:30 (1)
2	08:44		09:41 (3)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26					07:26		08:21		11:01 (1)
	16:16	55	11:50 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52					16:52		16:09	31	11:32 (1)
3	08:44		09:42 (3)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28					07:28		08:22		11:00 (1)
	16:17	51	11:49 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50					16:50		16:08	32	11:32 (1)
4	08:43		09:43 (3)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30					07:30		08:24		11:00 (1)
	16:18	50	11:50 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48					16:48		16:08	34	11:34 (1)
5	08:43		09:44 (3)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32					07:32		08:25		11:00 (1)
	16:20	47	11:49 (1)	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46					16:46		16:07	34	11:34 (1)
6	08:43		09:46 (3)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34					07:34		08:27		10:59 (3)
	16:21	44	11:50 (1)	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:45					16:45		16:07	43	11:36 (1)
7	08:42		09:50 (3)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36					07:36		08:28		10:59 (3)
	16:22	35	11:49 (1)	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43					16:43		16:06	46	11:36 (1)
8	08:42		11:15 (1)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38					07:38		08:29		10:59 (3)
	16:24	34	11:49 (1)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41					16:41		16:06	50	11:38 (1)
9	08:41		11:17 (1)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40					07:40		08:30		10:59 (3)
	16:25	32	11:49 (1)	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39					16:39		16:05	51	11:38 (1)
10	08:41		11:18 (1)	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42					07:42		08:32		10:59 (3)
	16:27	31	11:49 (1)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37					16:37		16:05	54	11:39 (1)
11	08:40		11:20 (1)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44					07:44		08:33		10:59 (3)
	16:28	28	11:48 (1)	17:26	1	08:23 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36					16:36		16:05	56	11:40 (1)
12	08:39		11:21 (1)	07:53		08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34					07:46		08:34		10:59 (3)
	16:30	26	11:47 (1)	17:28	4	08:24 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34					16:34		16:05	56	11:41 (1)
13	08:38		11:23 (1)	07:51		08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35					07:48		08:35		10:59 (3)
	16:31	23	11:46 (1)	17:30	8	08:26 (2)	17:30	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32					16:32		16:05	58	11:42 (1)
14	08:37		11:25 (1)	07:49		08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36					07:49		08:36		10:59 (3)
	16:33	20	11:45 (1)	17:32	11	08:26 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31					16:31		16:05	59	11:42 (1)
15	08:36		11:28 (1)	07:47		08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37					07:51		08:37		10:59 (3)
	16:35	15	11:43 (1)	17:34	14	08:27 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29			08:41 (2)	07:53		16:05	61	11:43 (1)	
16	08:36		11:32 (1)	07:45		08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38					07:54		08:38		10:59 (3)
	16:36	7	11:39 (1)	17:36	16	08:27 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05			08:52 (2)	16:28		16:05	60	11:43 (1)	
17	08:35		17:43	07:43		08:09 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39			08:38 (2)	07:55		08:39		10:59 (3)	
	16:38		17:38	19	08:28 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16	16:05			08:54 (2)	16:26		16:05	61	11:43 (1)	
18	08:33		07:41			08:07 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39			08:37 (2)	07:57		08:39		10:59 (3)	
	16:40		17:40	21	08:28 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	19	16:05			08:56 (2)	16:25		16:05	61	11:44 (1)	
19	08:32		07:39			08:04 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:40			08:35 (2)	07:59		08:40		10:59 (3)	
	16:41		17:42	23	08:27 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	21	16:05			08:56 (2)	16:23		16:05	63	11:45 (1)	
20	08:31		07:37			08:03 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:41			08:34 (2)	07:06		08:41		10:59 (3)	
	16:43		17:44	24	08:27 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	23	16:06			08:57 (2)	16:22		16:06	63	11:45 (1)	
21	08:30		07:34			08:04 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:41			08:34 (2)	08:02		08:41		10:59 (3)	
	16:45		17:46	23	08:27 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	23	16:06			08:57 (2)	16:20		16:06	63	11:46 (1)	
22	08:29		07:32			08:03 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42			08:33 (2)	08:04		08:42		10:59 (3)	
	16:47		17:48	23	08:26 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	25	16:07			08:58 (2)	16:19		16:07	63	11:46 (1)	
23	08:27		07:30			08:04 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42			08:35 (2)	08:06		08:42		10:59 (3)	
	16:49		17:50	21	08:25 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	23	16:07			08:58 (2)	16:18		16:07	63	11:47 (1)	
24	08:26		07:28			08:06 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43			08:37 (2)	08:08		08:43		10:59 (3)	
	16:51		17:52	18	08:24 (2)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	20	16:08			08:57 (2)	16:17		16:08	63	11:47 (1)	
25	08:25		07:25			08:07 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:43			07:39 (2)	08:09		08:43		10:59 (3)	
	16:52		17:54	14	08:21 (2)	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	18	16:08			07:57 (2)	16:16		16:08	61	11:47 (1)	
26	08:23		07:23			08:10 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:44			07:41 (2)	08:11				11:10 (1)	
	16:54		17:56	9	08:19 (2)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16	16:09			07:57 (2)	16:15	7			11:17 (1)	
27	08:22		07:21			08:08	06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:44			07:43 (2)	08:13				11:07 (1)	
	16:56		17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	13	16:10			07:56 (2)	16:14	15			11:22 (1)	
28	08:20		07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17		08:44			07:45 (2)	08:14				11:05 (1)	
	16:58		18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	10	16:11			07:55 (2)	16:13	20			11:25 (1)	
29	08:19		07:17			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19		08:44			07:47 (2)	08:16				11:03 (1)	
	17:00		19:55			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	7	16:12			07:54 (2)	16:12	23			11:26 (1)	
30	08:17		07:15			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20		08:44			07:50 (2)	08:18				11:02 (1)	
	17:02		19:56			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	4	16:12			07:54 (2)	16:11	26			1	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn.Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Assumptions for shadow calculations

Shadow receptor: KW - H309

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	12:23 (1)	08:14	2	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		07:54 (2)	08:19						
	16:15	30	12:53 (1)	17:06		08:44 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	28	08:22 (2)	16:10				12:23 (1)	
2	08:44	12:25 (1)	08:12		08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		07:56 (2)	08:21					12:23 (1)	
	16:16	29	12:54 (1)	17:08	6	08:46 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	26	08:22 (2)	16:09	6		12:29 (1)		
3	08:44	12:25 (1)	08:10		08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		07:58 (2)	08:22				12:19 (1)		
	16:17	28	12:53 (1)	17:10	10	08:48 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	23	08:21 (2)	16:08	13		12:32 (1)		
4	08:43	12:27 (1)	08:09		08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		08:00 (2)	08:24				12:18 (1)		
	16:18	26	12:53 (1)	17:12	13	08:49 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	21	08:21 (2)	16:08	17		12:35 (1)		
5	08:43	12:28 (1)	08:07		08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32		08:02 (2)	08:25				12:16 (1)		
	16:20	24	12:52 (1)	17:14	16	08:50 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	18	08:20 (2)	16:07	20		12:36 (1)		
6	08:43	12:30 (1)	08:05		08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34		08:04 (2)	08:27				12:16 (1)		
	16:21	22	12:52 (1)	17:16	19	08:51 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:44	15	08:19 (2)	16:07	22		12:38 (1)		
7	08:42	12:31 (1)	08:03		08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36		08:06 (2)	08:28				12:15 (1)		
	16:22	20	12:51 (1)	17:18	21	08:51 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	12	08:18 (2)	16:06	24		12:39 (1)		
8	08:42	12:32 (1)	08:01		08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38		08:09 (2)	08:29				12:15 (1)		
	16:24	18	12:50 (1)	17:20	24	08:52 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	9	08:18 (2)	16:06	26		12:41 (1)		
9	08:41	12:36 (1)	07:59		08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		08:11 (2)	08:30				12:14 (1)		
	16:25	13	12:49 (1)	17:22	26	08:52 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	6	08:17 (2)	16:05	28		12:42 (1)		
10	08:40	12:39 (1)	07:57		08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42		08:13 (2)	08:32				12:14 (1)		
	16:27	7	12:46 (1)	17:24	29	08:53 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	2	08:15 (2)	16:05	29		12:43 (1)		
11	08:40	12:40 (1)	07:55		08:25 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44		08:12 (2)	16:05				12:14 (1)		
	16:28		17:26	28	08:53 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36		08:11 (2)	16:05	29		12:43 (1)			
12	08:39	12:41 (1)	07:53		08:25 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46		08:14 (2)	16:05				12:13 (1)		
	16:30		17:28	28	08:53 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34		08:12 (2)	16:05	31		12:44 (1)			
13	08:38	12:42 (1)	07:51		08:25 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48		08:15 (2)	16:05				12:14 (1)		
	16:31		17:30	28	08:53 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32		08:16 (2)	16:05	32		12:46 (1)			
14	08:37	12:43 (1)	07:49		08:25 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49		08:17 (2)	16:05				12:14 (1)		
	16:33		17:32	26	08:51 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31		08:18 (2)	16:05	33		12:47 (1)			
15	08:36	12:44 (1)	07:47		08:26 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51		08:19 (2)	16:05				12:15 (1)		
	16:34		17:34	25	08:51 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29		08:20 (2)	16:05	33		12:48 (1)			
16	08:36	12:45 (1)	07:45		08:27 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54		07:53		08:21 (2)	16:05				12:14 (1)		
	16:36		17:36	23	08:50 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28		08:22 (2)	16:05	33		12:47 (1)			
17	08:35	12:46 (1)	07:43		08:28 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55		08:23 (2)	16:05				12:14 (1)		
	16:38		17:38	22	08:50 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26		08:24 (2)	16:05	34		12:48 (1)			
18	08:33	12:47 (1)	07:41		08:28 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57		08:25 (2)	16:05				12:15 (1)		
	16:40		17:40	19	08:47 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25		08:26 (2)	16:05	34		12:49 (1)			
19	08:32	12:48 (1)	07:39		08:30 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		07:59		08:27 (2)	16:05				12:16 (1)		
	16:41		17:42	16	08:46 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22		16:23		08:28 (2)	16:05	34		12:50 (1)			
20	08:31	12:49 (1)	07:37		08:33 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		08:01		08:29 (2)	16:05				12:15 (1)		
	16:43		17:44	10	08:43 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20		16:22		08:30 (2)	16:06	35		12:50 (1)			
21	08:30	12:50 (1)	07:34		08:28 (2)	06:14	06:01	05:16	04:54	05:21	06:13	07:08	08:03		08:02		08:31 (2)	16:06				12:16 (1)		
	16:45		17:46		08:40 (2)	18:37	20:33	21:26	22:01	21:42	20:44	19:29	18:17		16:20		08:32 (2)	16:06	35		12:51 (1)			
22	08:29	12:51 (1)	07:32		08:26 (2)	06:12	06:00	05:15	04:55	05:23	06:15	07:10	08:05		08:04		09:02 (2)	16:07				12:16 (1)		
	16:47		17:48		08:42 (2)	18:39	20:35	21:28	22:03	21:41	20:42	19:27	18:15	12	09:14 (2)		09:00 (2)	16:19				12:17 (1)		
23	08:27	12:52 (1)	07:30		08:23 (2)	06:09	05:13	04:55	05:24	06:17	07:12	08:07	09:00		08:06		09:02 (2)	16:10				12:17 (1)		
	16:49		17:50		08:43 (2)	18:40	20:36	21:29	22:04	21:40	20:39	19:24	18:13	17	09:17 (2)		09:17 (2)	16:18				12:52 (1)		
24	08:26	12:53 (1)	07:28		08:21 (2)	06:07	05:12	04:55	05:26	06:19	07:14	08:09	09:02		08:08		09:18 (2)	16:17				12:17 (1)		
	16:51		17:52		08:45 (2)	18:43	20:39	21:32	22:07	21:38	20:37	19:22	18:11	20	09:18 (2)		09:18 (2)	16:17				12:52 (1)		
25	08:25	12:54 (1)	07:25		08:18 (2)	06:05	05:11	04:56	05:27	06:21	07:15	08:11	09:06		08:09		09:17 (2)	16:17				12:18 (1)		
	16:52		17:54		08:47 (2)	18:44	20:41	21:36	22:01	21:37	20:35	19:19	18:09	22	09:19 (2)		09:19 (2)	16:16				12:52 (1)		
26	08:23	12:55 (1)	07:23		08:16 (2)	06:03	05:09	04:56	05:29	06:22	07:17	08:13	09:08		08:11		09:20 (2)	16:16				12:19 (1)		
	16:54		17:56		08:49 (2)	18:46	20:43	21:37	22:01	21:35	20:33	19:17	18:07	24	09:20 (2)		09:20 (2)	16:15				12:53 (1)		
27	08:22	12:57 (1)	07:21		08:14 (2)	06:01	05:08	04:56	05:31	06:24	07:19	08:15	09:10		08:13		09:21 (2)	16:15				12:20 (1)		
	16:56		17:58		08:51 (2)	18:49	20:45	21:39	22:01	21:33	20:30	19:14	18:04	26	09:21 (2)		09:21 (2)	16:14				12:53 (1)		
28	08:20	12:58 (1)	07:19		08:11 (2)	05:58	05:07	04:57	05:32	06:26	07:21	08:17	09:12		08:14		09:22 (2)	16:14				12:20 (1)		
	16:58		18:00		08:53 (2)																			

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KX - H310

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KY - H311

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KZ - H312

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:26 (5)	07:16	17:18 (4)	07:01	05:52	20:01 (2)	05:03		
	16:15	17:06	8 16:34 (5)	18:02	16	17:34 (4)	20:00	25 20:26 (2)	21:45		
2	08:44	08:12	16:27 (5)	07:14		17:16 (4)	06:59		05:02		
	16:16	17:08	10 16:37 (5)	18:04	20	17:36 (4)	20:02	26 20:27 (2)	21:46		
3	08:43	08:10	16:26 (5)	07:11		17:16 (4)	06:56		05:01		
	16:17	17:10	13 16:39 (5)	18:06	22	17:38 (4)	20:04	28 20:28 (2)	21:48		
4	08:43	08:08	16:26 (5)	07:09		17:15 (4)	06:54		05:00		
	16:18	17:12	15 16:41 (5)	18:07	26	17:41 (4)	20:06	28 20:28 (2)	21:49		
5	08:43	08:07	16:26 (5)	07:07		17:14 (4)	06:51		04:59		
	16:19	17:14	17 16:43 (5)	18:09	28	17:42 (4)	20:07	28 20:28 (2)	21:50		
6	08:42	08:05	16:26 (5)	07:04		17:14 (4)	06:49		04:59		
	16:21	17:16	19 16:45 (5)	18:11	31	17:45 (4)	20:09	27 20:27 (2)	21:51		
7	08:42	08:03	16:26 (5)	07:02		17:13 (4)	06:47		04:58		
	16:22	17:18	21 16:47 (5)	18:13	33	17:46 (4)	20:11	27 20:28 (2)	21:52		
8	08:42	08:01	16:26 (5)	07:00		17:13 (4)	06:44		04:57		
	16:24	17:20	21 16:47 (5)	18:15	34	17:47 (4)	20:13	26 20:27 (2)	21:53		
9	08:41	07:59	16:27 (5)	06:57		17:13 (4)	06:42		04:57		
	16:25	17:22	20 16:47 (5)	18:17	33	17:46 (4)	20:15	24 20:26 (2)	21:54		
10	08:40	07:57	16:28 (5)	06:55		17:13 (4)	06:39		04:56		
	16:26	17:24	18 16:46 (5)	18:19	33	17:46 (4)	20:17	23 20:25 (2)	21:55		
11	08:40	07:55	16:29 (5)	06:52		17:14 (4)	06:37		04:56		
	16:28	17:26	16 16:45 (5)	18:21	32	17:46 (4)	20:19	21 20:25 (2)	21:55		
12	08:39	07:53	16:29 (5)	06:50		17:14 (4)	06:35		04:55		
	16:30	17:28	14 16:43 (5)	18:23	31	17:45 (4)	20:20	19 20:23 (2)	21:56		
13	08:38	07:51	16:32 (5)	06:48		17:15 (4)	06:32		04:55		
	16:31	17:30	9 16:41 (5)	18:25	29	17:44 (4)	20:22	16 20:21 (2)	21:57		
14	08:37	07:49		06:45		17:15 (4)	06:30		04:55		
	16:33	17:32		18:27	27	17:42 (4)	20:24	12 20:20 (2)	21:57		
15	08:36	07:47		06:43		17:17 (4)	06:28		04:54		
	16:34	17:34		18:28	27	18:02 (3)	20:26	7 20:17 (2)	21:58		
16	08:35	07:45		06:40		17:18 (4)	06:25		04:54		
	16:36	17:36		18:30	27	18:04 (3)	20:28		21:59		
17	08:34	07:43		06:38		17:21 (4)	06:23		04:54		
	16:38	17:38		18:32	25	18:06 (3)	20:30		21:59		
18	08:33	07:41		06:35		17:24 (4)	06:21		04:54		
	16:40	17:40		18:34	19	18:07 (3)	20:31		22:00		
19	08:32	07:39		06:33		17:55 (3)	06:18		04:54		
	16:41	17:42		18:36	15	18:10 (3)	20:33		22:00		
20	08:31	07:36		06:31		17:54 (3)	06:16		04:54		
	16:43	17:44		18:38	17	18:11 (3)	20:35		22:00		
21	08:30	07:34		06:28		17:55 (3)	06:14		04:54		
	16:45	17:46		18:40	18	18:13 (3)	20:37		22:01		
22	08:28	07:32		06:26		17:54 (3)	06:12		04:55		
	16:47	17:48		18:41	20	18:14 (3)	20:39		22:01		
23	08:27	07:30		06:23		17:55 (3)	06:09	20:10 (2)	04:55		
	16:49	17:50		18:43	19	18:14 (3)	20:41	2 20:12 (2)	22:01		
24	08:26	07:28		06:21		17:56 (3)	06:07	20:08 (2)	04:55		
	16:50	17:52		18:45	16	18:12 (3)	20:42	6 20:14 (2)	22:01		
25	08:24	07:25		06:18		17:58 (3)	06:05	20:06 (2)	04:55		
	16:52	17:54		18:47	12	18:10 (3)	20:44	9 20:15 (2)	22:01		
26	08:23	07:23		06:16		18:00 (3)	06:03	20:05 (2)	04:56		
	16:54	17:56	4 17:28 (4)	18:49	6 18:06 (3)	20:46	12 20:17 (2)	21:37	22:01		
27	08:22	07:21	17:22 (4)	06:13		06:01	20:04 (2)	05:08	04:56		
	16:56	17:58	9 17:31 (4)	18:51		20:48	15 20:19 (2)	21:39	22:01		
28	08:20	07:18	17:19 (4)	06:11		05:58	20:03 (2)	05:07	04:57		
	16:58	18:00	13 17:32 (4)	18:53		20:50	18 20:21 (2)	21:40	22:01		
29	08:18			07:08		05:56	20:02 (2)	05:06	04:57		
	17:00			19:54		20:52	20 20:22 (2)	21:41	22:01		
30	08:17	16:28 (5)		07:06		05:54	20:02 (2)	05:05	04:58		
	17:02	2 16:30 (5)		19:56		20:53	22 20:24 (2)	21:43	22:00		
31	08:15	16:27 (5)		07:04				05:04			
	17:04	5 16:32 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case		7	227	616		104		337			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	1		35	113		24		83			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: KZ - H312

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:14 (2)	06:33		07:26	17:53 (4)	07:24		15:57 (5)	08:19
	22:00	21:25	20:34 (2)	20:18		19:05	18:23 (4)	16:54	19	16:16 (5)	16:10
2	04:59	05:40	20:14 (2)	06:35		07:28	17:52 (4)	07:26		15:56 (5)	08:21
	22:00	21:23	20:35 (2)	20:16		19:02	18:24 (4)	16:52	20	16:16 (5)	16:09
3	05:00	05:42	20:12 (2)	06:36		07:30	17:51 (4)	07:28		15:56 (5)	08:22
	21:59	21:21	20:35 (2)	20:13		19:00	18:24 (4)	16:50	21	16:17 (5)	16:08
4	05:01	05:44	20:12 (2)	06:38		07:31	17:51 (4)	07:30		15:56 (5)	08:24
	21:59	21:19	20:36 (2)	20:11		18:57	18:24 (4)	16:48	21	16:17 (5)	16:08
5	05:02	05:45	20:11 (2)	06:40		07:33	17:51 (4)	07:32		15:55 (5)	08:25
	21:58	21:17	20:36 (2)	20:09		18:55	18:24 (4)	16:46	20	16:15 (5)	16:07
6	05:03	05:47	20:11 (2)	06:42		07:35	17:50 (4)	07:34		15:55 (5)	08:26
	21:58	21:15	20:37 (2)	20:06		18:52	18:24 (4)	16:44	17	16:12 (5)	16:07
7	05:04	05:49	20:11 (2)	06:43		07:37	17:49 (4)	07:36		15:56 (5)	08:28
	21:57	21:13	20:38 (2)	20:04		18:50	18:21 (4)	16:43	14	16:10 (5)	16:06
8	05:05	05:50	20:10 (2)	06:45		07:39	17:49 (4)	07:38		15:56 (5)	08:29
	21:56	21:11	20:37 (2)	20:01		18:48	18:18 (4)	16:41	12	16:08 (5)	16:06
9	05:06	05:52	20:10 (2)	06:47		07:41	17:49 (4)	07:40		15:56 (5)	08:30
	21:55	21:10	20:38 (2)	19:59		18:45	18:16 (4)	16:39	10	16:06 (5)	16:05
10	05:07	05:54	20:09 (2)	06:49		07:42	17:50 (4)	07:42		15:58 (5)	08:31
	21:55	21:07	20:37 (2)	19:56		18:43	18:14 (4)	16:37	7	16:05 (5)	16:05
11	05:08	05:56	20:09 (2)	06:50		07:44	17:50 (4)	07:44		15:59 (5)	08:33
	21:54	21:05	20:35 (2)	19:54		18:40	18:11 (4)	16:35	4	16:03 (5)	16:05
12	05:09	05:57	20:10 (2)	06:52		07:46	17:51 (4)	07:45		16:00 (5)	08:34
	21:53	21:03	20:34 (2)	19:51		18:38	18:09 (4)	16:34	1	16:01 (5)	16:05
13	05:10	05:59	20:09 (2)	06:54		07:48	17:52 (4)	07:47			08:35
	21:52	21:01	20:31 (2)	19:49		18:36	18:07 (4)	16:32			16:05
14	05:12	06:01	20:10 (2)	06:56		07:50	17:53 (4)	07:49			08:36
	21:51	20:59	20:29 (2)	19:47		18:33	18:04 (4)	16:31			16:04
15	05:13	06:03	20:11 (2)	06:58		07:52	17:55 (4)	07:51			08:37
	21:50	20:57	20:28 (2)	19:44		18:31	18:02 (4)	16:29			16:05
16	05:14	06:04	20:11 (2)	06:59		07:54	17:57 (4)	07:53			08:38
	21:49	20:55	20:25 (2)	19:42		18:29	17:59 (4)	16:27			16:05
17	05:16	06:06	20:12 (2)	07:01	18:51 (3)	07:55		07:55			08:38
	21:47	20:53	20:23 (2)	19:39	1	18:52 (3)	18:26	16:26			16:05
18	05:17	06:08	20:13 (2)	07:03		18:46 (3)	07:57	07:57			08:39
	21:46	20:50	20:22 (2)	19:37	11	18:57 (3)	18:24	16:24			16:05
19	05:18	06:10	20:14 (2)	07:05		18:44 (3)	07:59	07:59			08:40
	21:45	20:48	20:19 (2)	19:34	15	18:59 (3)	18:22	16:23			16:05
20	05:20	06:12		07:06		18:42 (3)	08:01	08:00			08:41
	21:44	20:46		19:32	18	19:00 (3)	18:20	16:22			16:06
21	05:21	06:13		07:08		18:40 (3)	08:03	08:02			08:41
	21:42	20:44		19:29	20	19:00 (3)	18:17	16:20			16:06
22	05:23	06:15		07:10		18:39 (3)	08:05	08:04			08:42
	21:41	20:42		19:27	19	18:58 (3)	18:15	16:19			16:06
23	05:24	06:17		07:12		18:39 (3)	08:07	08:06			08:42
	21:39	20:39		19:24	17	18:56 (3)	18:13	16:18			16:07
24	05:26	06:19		07:13		18:39 (3)	08:09	08:08			08:43
	21:38	20:37		19:22	15	18:54 (3)	18:11	16:17			16:08
25	05:27	06:20		07:15		18:38 (3)	07:11	08:09			08:43
	21:36	20:35		19:19	13	18:51 (3)	17:09	16:16			16:08
26	05:29	06:22		07:17		18:03 (4)	07:13	08:11			08:43
	21:35	20:32		19:17	24	18:48 (3)	17:06	16:14			16:09
27	05:30	06:24		07:19		18:01 (4)	07:14	08:13			08:44
	21:33	20:30		19:14	25	18:46 (3)	17:04	16:13			16:10
28	05:32	06:26		07:21		17:58 (4)	07:16	16:05 (5)	08:14		08:44
	21:32	20:28		19:12	28	18:44 (3)	17:02	16:07 (5)	16:12		16:11
29	05:34	20:19 (2)	06:27	07:22		17:57 (4)	07:18	16:01 (5)	08:16		08:44
	21:30	20:29 (2)	20:25	19:09	25	18:22 (4)	17:00	16:11 (5)	16:12		16:11
30	05:35	20:17 (2)	06:29	07:24		17:54 (4)	07:20	15:59 (5)	08:18		08:44
	21:28	20:31 (2)	20:23	19:07	28	18:22 (4)	16:58	16:13 (5)	16:11		16:12
31	05:37	20:16 (2)	06:31				07:22	15:57 (5)			08:44
	21:26	20:33 (2)	20:21				16:56	16:14 (5)			16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case		41		396		259		424		166	
Sun reduction		0.32		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.65		0.65		0.68		0.68		0.66	
Total reduction		0.21		0.22		0.22		0.20		0.17	
Total, real		9		87		56		84		29	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LA - H313

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	19:09 (3)	05:52
	16:15	17:06	18:02	20:00	5	19:14 (3)
2	08:44	08:12	07:14	06:59		20:55
	16:16	17:08	18:04	20:02		05:50
3	08:43	08:10	16:38 (5)	07:11		20:57
	16:17	17:10	16:39 (5)	18:06		4
4	08:43	08:08	16:36 (5)	07:09		20:58
	16:18	17:12	16:41 (5)	18:07		8
5	08:43	08:07	16:35 (5)	07:07		20:59
	16:19	17:14	16:43 (5)	18:09		11
6	08:42	08:05	16:34 (5)	07:04		20:54
	16:21	17:16	16:45 (5)	18:11		15
7	08:42	08:03	16:34 (5)	07:02		20:52
	16:22	17:18	16:47 (5)	18:13		17
8	08:42	08:01	16:33 (5)	07:00		20:51
	16:24	17:20	16:50 (5)	18:15		20
9	08:41	07:59	16:33 (5)	06:57		20:50
	16:25	17:22	16:52 (5)	18:17		22
10	08:40	07:57	16:33 (5)	06:55		20:49
	16:26	17:24	16:54 (5)	18:19		25
11	08:40	07:55	16:33 (5)	06:52		20:48
	16:28	17:26	16:55 (5)	18:21		26
12	08:39	07:53	16:32 (5)	06:50		20:47
	16:30	17:28	16:54 (5)	18:23		28
13	08:38	07:51	16:32 (5)	06:48		20:46
	16:31	17:30	16:54 (5)	18:25		28
14	08:37	07:49	16:33 (5)	06:45		20:45
	16:33	17:32	16:54 (5)	18:27		28
15	08:36	07:47	16:34 (5)	06:43		20:44
	16:34	17:34	16:53 (5)	18:28		28
16	08:35	07:45	16:35 (5)	06:40		20:43
	16:36	17:36	16:52 (5)	18:30		28
17	08:34	07:43	16:37 (5)	06:38		20:42
	16:38	17:38	16:51 (5)	18:32		27
18	08:33	07:41	16:38 (5)	06:35		20:41
	16:40	17:40	16:48 (5)	18:34		27
19	08:32	07:39		06:33		20:40
	16:41	17:42		18:36		26
20	08:31	07:36		06:31		20:39
	16:43	17:44		18:38		25
21	08:30	07:34		06:28		20:38
	16:45	17:46		18:40		24
22	08:28	07:32		06:26		20:37
	16:47	17:48		18:41		23
23	08:27	07:30		06:23		20:36
	16:49	17:50		18:43		21
24	08:26	07:28		06:21		20:35
	16:50	17:52		18:45		20
25	08:24	07:25		06:18		20:34
	16:52	17:54		18:47		18
26	08:23	07:23		06:16		20:33
	16:54	17:56		18:49		17
27	08:22	07:21		06:13		20:32
	16:56	17:58		18:51		15
28	08:20	07:18		06:11		20:31
	16:58	18:00		18:53		12
29	08:18			07:08		20:30
	17:00			19:54		9
30	08:17			07:06		20:29
	17:02			19:56		2
31	08:15			07:04		
	17:04			19:58		
Potential sun hours	250	273	367	420	494	510
Total, worst case		242	754	5	582	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.64	
Total reduction		0.15	0.18	0.24	0.24	
Total, real		37	138	1	142	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LA - H313

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:24 (2)	06:33		07:26	18:05 (4)	07:24	16:02 (5)	08:19	
	22:00	21:25	28 20:52 (2)	20:18		19:05	31 18:36 (4)	16:54	21 16:23 (5)	16:10	
2	04:59	05:40	20:25 (2)	06:35		07:28	18:06 (4)	07:26	16:02 (5)	08:21	
	22:00	21:23	27 20:52 (2)	20:16		19:02	27 18:33 (4)	16:52	19 16:21 (5)	16:09	
3	05:00	05:42	20:24 (2)	06:36		07:30	18:07 (4)	07:28	16:03 (5)	08:22	
	21:59	21:21	26 20:50 (2)	20:13		19:00	24 18:31 (4)	16:50	16 16:19 (5)	16:08	
4	05:01	05:44	20:25 (2)	06:38		07:31	18:08 (4)	07:30	16:03 (5)	08:24	
	21:59	21:19	23 20:48 (2)	20:11		18:57	21 18:29 (4)	16:48	14 16:17 (5)	16:08	
5	05:02	05:45	20:25 (2)	06:40		07:33	18:09 (4)	07:32	16:04 (5)	08:25	
	21:58	21:17	21 20:46 (2)	20:09		18:55	17 18:26 (4)	16:46	11 16:15 (5)	16:07	
6	05:03	05:47	20:26 (2)	06:42		07:35	18:10 (4)	07:34	16:05 (5)	08:26	
	21:58	21:15	19 20:45 (2)	20:06		18:52	14 18:24 (4)	16:44	7 16:12 (5)	16:07	
7	05:04	05:49	20:27 (2)	06:43		07:37	18:11 (4)	07:36	16:06 (5)	08:28	
	21:57	21:13	16 20:43 (2)	20:04		18:50	10 18:21 (4)	16:43	4 16:10 (5)	16:06	
8	05:05	05:50	20:27 (2)	06:45		07:39	18:15 (4)	07:38		08:29	
	21:56	21:11	14 20:41 (2)	20:01		18:48	3 18:18 (4)	16:41		16:06	
9	05:06	05:52	20:29 (2)	06:47		07:41		07:40		08:30	
	21:55	21:09	10 20:39 (2)	19:59		18:45		16:39		16:05	
10	05:07	05:54	20:30 (2)	06:49		07:42		07:42		08:31	
	21:55	21:07	7 20:37 (2)	19:56		18:43		16:37		16:05	
11	05:08	05:56	20:32 (2)	06:50		07:44		07:44		08:33	
	21:54	21:05	3 20:35 (2)	19:54	4	19:06 (3)		16:35		16:05	
12	05:09	05:57		06:52		18:58 (3)		07:45		08:34	
	21:53	21:03		19:51	11	19:09 (3)		16:34		16:05	
13	05:10	05:59		06:54		18:56 (3)		07:47		08:35	
	21:52	21:01		19:49	15	19:11 (3)		16:32		16:05	
14	05:12	20:34 (2)	06:01	06:56		18:53 (3)		07:49		08:36	
	21:51	7 20:41 (2)	20:59	19:47	18	19:11 (3)		16:31		16:04	
15	05:13	20:32 (2)	06:03	06:58		18:52 (3)		07:51		08:37	
	21:50	11 20:43 (2)	20:57	19:44	20	19:12 (3)		16:29		16:05	
16	05:14	20:30 (2)	06:04	06:59		18:24 (4)		07:53		08:38	
	21:49	14 20:44 (2)	20:55	19:42	30	19:13 (3)		16:27		16:05	
17	05:16	20:30 (2)	06:06	07:01		18:19 (4)		07:55		08:38	
	21:47	16 20:46 (2)	20:53	19:39	38	19:11 (3)		16:26		16:05	
18	05:17	20:29 (2)	06:08	07:03		18:16 (4)		07:57		08:39	
	21:46	18 20:47 (2)	20:50	19:37	40	19:08 (3)		16:24		16:05	
19	05:18	20:28 (2)	06:10	07:05		18:14 (4)		07:59		08:40	
	21:45	19 20:47 (2)	20:48	19:34	41	19:06 (3)		16:23		16:05	
20	05:20	20:28 (2)	06:12	07:06		18:13 (4)		08:00		08:41	
	21:44	21 20:49 (2)	20:46	19:32	42	19:04 (3)		16:22		16:06	
21	05:21	20:27 (2)	06:13	07:08		18:11 (4)		08:02		08:41	
	21:42	22 20:49 (2)	20:44	19:29	41	19:01 (3)		16:20		16:06	
22	05:23	20:26 (2)	06:15	07:10		18:10 (4)		08:05		08:42	
	21:41	23 20:49 (2)	20:42	19:27	39	18:58 (3)		16:19		16:06	
23	05:24	20:26 (2)	06:17	07:12		18:09 (4)		08:07		08:42	
	21:39	25 20:51 (2)	20:39	19:24	37	18:56 (3)		17:12 (5)		16:07	
24	05:26	20:25 (2)	06:19	07:13		18:08 (4)		17:08 (5)		08:43	
	21:38	26 20:51 (2)	20:37	19:22	35	18:54 (3)		17:19 (5)		16:08	
25	05:27	20:25 (2)	06:20	07:15		18:07 (4)		16:06 (5)		08:43	
	21:36	27 20:52 (2)	20:35	19:19	35	18:42 (4)		16:21 (5)		16:08	
26	05:29	20:25 (2)	06:22	07:17		18:06 (4)		16:04 (5)		08:43	
	21:35	27 20:52 (2)	20:32	19:17	36	18:42 (4)		16:22 (5)		16:09	
27	05:30	20:24 (2)	06:24	07:19		18:06 (4)		16:03 (5)		08:44	
	21:33	27 20:51 (2)	20:30	19:14	35	18:41 (4)		16:23 (5)		16:10	
28	05:32	20:24 (2)	06:26	07:21		18:06 (4)		16:02 (5)		08:44	
	21:32	28 20:52 (2)	20:28	19:12	35	18:41 (4)		16:23 (5)		16:11	
29	05:34	20:24 (2)	06:27	07:22		18:06 (4)		16:02 (5)		08:44	
	21:30	28 20:52 (2)	20:25	19:09	35	18:41 (4)		16:24 (5)		16:11	
30	05:35	20:24 (2)	06:29	07:24		18:05 (4)		16:02 (5)		08:44	
	21:28	28 20:52 (2)	20:23	19:07	33	18:38 (4)		16:24 (5)		16:12	
31	05:37	20:24 (2)	06:31					16:01 (5)		08:44	
	21:26	29 20:53 (2)	20:21			16:56	23	16:24 (5)		16:13	
Potential sun hours	512		460		382		328		259		233
Total, worst case		396		194		620			92		
Sun reduction		0.32		0.34		0.32			0.27		
Oper. time red.		1.00		1.00		1.00			1.00		
Wind dir. red.		0.64		0.64		0.68			0.65		
Total reduction		0.21		0.22		0.22			0.17		
Total, real		82		42		134			16		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LB - H314

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14		07:16		07:01		18:44 (4)	05:52		05:03
	16:15	17:06		18:02		20:00	49	19:33 (3)	20:55		21:45
2	08:44	08:12		07:14		06:59		18:44 (4)	05:50		05:02
	16:16	17:08		18:04		20:02	49	19:34 (3)	20:57		21:46
3	08:43	08:10		07:11		06:56		18:46 (4)	05:48		05:01
	16:17	17:10		18:06		20:04	43	19:33 (3)	20:59		21:48
4	08:43	08:08		07:09		06:54		18:48 (4)	05:46		05:00
	16:18	17:12		18:07		20:06	39	19:33 (3)	21:01		21:49
5	08:43	08:07		07:07		06:51		18:50 (4)	05:44		04:59
	16:19	17:14		18:09		20:07	31	19:31 (3)	21:03		21:50
6	08:42	08:05		07:04		06:49		18:54 (4)	05:42		04:59
	16:21	17:16		18:11		20:09	19	19:29 (3)	21:04		21:51
7	08:42	08:03		07:02		06:47		19:20 (3)	05:40		04:58
	16:22	17:18		18:13		20:11	4	19:24 (3)	21:06		21:52
8	08:42	08:01		07:00		06:44			05:38		04:57
	16:24	17:20		18:15		20:13			21:08		21:53
9	08:41	07:59		06:57		06:42			05:36		04:57
	16:25	17:22		18:17		20:15			21:10	1	20:39 (2)
10	08:40	07:57		06:55		06:39			05:34		20:35 (2)
	16:26	17:24	3	16:54 (5)	18:19	20:17			21:11	5	20:40 (2)
11	08:40	07:55		06:52		06:37			05:33		20:34 (2)
	16:28	17:26	7	16:56 (5)	18:21	20:19			21:13	8	20:42 (2)
12	08:39	07:53		06:50		06:35			05:31		20:33 (2)
	16:30	17:28	11	16:58 (5)	18:23	20:20			21:15	10	20:43 (2)
13	08:38	07:51		06:48		06:32			05:29		20:31 (2)
	16:31	17:30	14	17:00 (5)	18:25	20:22			21:17	13	20:44 (2)
14	08:37	07:49		06:45		06:30			05:27		20:31 (2)
	16:33	17:32	16	17:02 (5)	18:27	20:24			21:18	16	20:47 (2)
15	08:36	07:47		06:43		06:28			05:26		20:30 (2)
	16:34	17:34	19	17:05 (5)	18:28	3	18:02 (4)	06:26	21:20	18	20:48 (2)
16	08:35	07:45		06:40		06:25			05:24		20:30 (2)
	16:36	17:36	21	17:07 (5)	18:30	9	18:04 (4)	06:28	21:22	20	20:50 (2)
17	08:34	07:43		06:38		06:23			05:22		20:29 (2)
	16:38	17:38	22	17:08 (5)	18:32	13	18:06 (4)	06:30	21:23	22	20:51 (2)
18	08:33	07:41		06:35		06:21			05:21		20:29 (2)
	16:40	17:40	22	17:07 (5)	18:34	17	18:07 (4)	06:31	21:25	24	20:53 (2)
19	08:32	07:39		06:33		06:18			05:19		20:29 (2)
	16:41	17:42	22	17:07 (5)	18:36	21	18:10 (4)	06:33	21:27	25	20:54 (2)
20	08:31	07:36		06:31		06:16			05:18		20:29 (2)
	16:43	17:44	21	17:07 (5)	18:38	24	18:11 (4)	06:35	21:28	26	20:55 (2)
21	08:30	07:34		06:28		06:14			05:16		20:29 (2)
	16:45	17:46	19	17:06 (5)	18:40	27	18:13 (4)	06:37	21:30	27	20:56 (2)
22	08:28	07:32		06:26		06:12			05:15		20:29 (2)
	16:47	17:48	16	17:04 (5)	18:41	30	18:15 (4)	06:39	21:31	27	20:56 (2)
23	08:27	07:30		06:23		06:09			05:13		20:28 (2)
	16:49	17:50	14	17:03 (5)	18:43	33	18:17 (4)	06:41	21:33	28	20:56 (2)
24	08:26	07:28		06:21		06:07			05:12		20:29 (2)
	16:50	17:52	9	17:01 (5)	18:45	35	18:18 (4)	06:42	21:34	27	20:56 (2)
25	08:24	07:25		06:18		06:05			05:11		20:29 (2)
	16:52	17:54		18:47		06:44	36	18:19 (4)	21:36	27	20:56 (2)
26	08:23	07:23		06:16		06:03			05:09		20:30 (2)
	16:54	17:56		18:49		06:46	40	18:22 (3)	21:37	26	20:56 (2)
27	08:22	07:21		06:13		06:01			05:08		20:30 (2)
	16:56	17:58		18:51		06:48	41	18:24 (3)	21:39	26	20:56 (2)
28	08:20	07:18		06:11		05:58			05:07		20:30 (2)
	16:58	18:00		18:53		06:50	43	18:26 (3)	21:40	26	20:56 (2)
29	08:18			07:08		05:56			05:06		20:31 (2)
	17:00			19:54		06:52	46	19:28 (3)	21:41	25	20:56 (2)
30	08:17			07:06		05:54			05:05		20:31 (2)
	17:02			19:56		06:53	47	19:30 (3)	21:43	25	20:56 (2)
31	08:15			07:04		06:51			05:04		20:31 (2)
	17:04			19:58		06:53	48	19:31 (3)	21:44	24	20:55 (2)
Potential sun hours	250	273		367		420			494		510
Total, worst case			236		513		234		476		401
Sun reduction			0.23		0.27		0.35		0.38		0.32
Oper. time red.			1.00		1.00		1.00		1.00		1.00
Wind dir. red.			0.66		0.68		0.67		0.63		0.63
Total reduction			0.15		0.18		0.24		0.24		0.20
Total, real			36		94		56		115		81

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LB - H314

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:43 (2)	05:39	20:43 (2)	06:33		07:26	07:24	16:21 (5)	08:19	
	22:00	14	20:57 (2)	21:25	10	20:53 (2)	20:18		16:54	2	16:23 (5)
2	04:59	20:43 (2)	05:40	20:45 (2)	06:35		07:28	07:26		08:21	
	22:00	15	20:58 (2)	21:23	7	20:52 (2)	20:16		16:52		16:09
3	05:00	20:42 (2)	05:42	20:46 (2)	06:36		07:30	07:28		08:22	
	21:59	16	20:58 (2)	21:21	4	20:50 (2)	20:13		16:50		16:08
4	05:01	20:42 (2)	05:44		06:38		07:31	07:30		08:24	
	21:59	17	20:59 (2)	21:19		20:11	18:57		16:48		16:08
5	05:02	20:42 (2)	05:45		06:40	19:17 (3)	07:33	07:32		08:25	
	21:58	17	20:59 (2)	21:17		19:21 (3)	18:55		16:46		16:07
6	05:03	20:41 (2)	05:47		06:42	18:50 (4)	07:35	07:34		08:26	
	21:58	19	21:00 (2)	21:15		19:25 (3)	18:52		16:44		16:07
7	05:04	20:41 (2)	05:49		06:43	18:45 (4)	07:37	07:36		08:28	
	21:57	20	21:01 (2)	21:13		19:26 (3)	18:50		16:43		16:06
8	05:05	20:41 (2)	05:51		06:45	18:42 (4)	07:39	07:38		08:29	
	21:56	21	21:02 (2)	21:11		19:27 (3)	18:48		16:41		16:06
9	05:06	20:41 (2)	05:52		06:47	18:40 (4)	07:41	07:40		08:30	
	21:55	21	21:02 (2)	21:09		19:28 (3)	18:45		16:39		16:05
10	05:07	20:41 (2)	05:54		06:49	18:38 (4)	07:42	07:42		08:31	
	21:55	22	21:03 (2)	21:07		19:27 (3)	18:43		16:37		16:05
11	05:08	20:40 (2)	05:56		06:50	18:36 (4)	07:44	07:44		08:33	
	21:54	23	21:03 (2)	21:05		19:26 (3)	18:40		16:35		16:05
12	05:09	20:40 (2)	05:57		06:52	18:35 (4)	07:46	07:45		08:34	
	21:53	24	21:04 (2)	21:03		19:24 (3)	18:38		16:34		16:05
13	05:10	20:40 (2)	05:59		06:54	18:35 (4)	07:48	07:47		08:35	
	21:52	24	21:04 (2)	21:01		19:22 (3)	18:36		16:32		16:05
14	05:12	20:39 (2)	06:01		06:56	18:33 (4)	07:50	07:49		08:36	
	21:51	25	21:04 (2)	20:59		19:18 (3)	18:33		16:31		16:04
15	05:13	20:39 (2)	06:03		06:58	18:32 (4)	07:52	07:51		08:37	
	21:50	25	21:04 (2)	20:57		19:16 (3)	18:31		16:29		16:05
16	05:14	20:39 (2)	06:04		06:59	18:32 (4)	07:54	07:53		08:38	
	21:49	25	21:04 (2)	20:55		19:14 (3)	18:29		16:27		16:05
17	05:16	20:39 (2)	06:06		07:01	18:31 (4)	07:55	07:55		08:38	
	21:47	27	21:06 (2)	20:53		19:11 (3)	18:26		16:26		16:05
18	05:17	20:39 (2)	06:08		07:03	18:31 (4)	07:57	17:22 (5)	07:57		08:39
	21:46	27	21:06 (2)	20:50		19:06 (4)	18:24	11	17:33 (5)	16:24	16:05
19	05:18	20:39 (2)	06:10		07:05	18:31 (4)	07:59	17:20 (5)	07:59		08:40
	21:45	26	21:05 (2)	20:48		19:06 (4)	18:22	15	17:35 (5)	16:23	16:05
20	05:20	20:39 (2)	06:12		07:06	18:31 (4)	08:01	17:18 (5)	08:00		08:41
	21:44	27	21:06 (2)	20:46		19:04 (4)	18:20	18	17:36 (5)	16:22	16:06
21	05:21	20:39 (2)	06:13		07:08	18:30 (4)	08:03	17:17 (5)	08:02		08:41
	21:42	27	21:06 (2)	20:44		19:01 (4)	18:17	20	17:37 (5)	16:20	16:06
22	05:23	20:39 (2)	06:15		07:10	18:31 (4)	08:05	17:16 (5)	08:04		08:42
	21:41	27	21:06 (2)	20:42		19:27	18:58 (4)	21	17:37 (5)	16:19	16:06
23	05:24	20:39 (2)	06:17		07:12	18:31 (4)	08:07	17:16 (5)	08:06		08:42
	21:39	27	21:06 (2)	20:39		19:24	18:56 (4)	22	17:38 (5)	16:18	16:07
24	05:26	20:39 (2)	06:19		07:13	18:32 (4)	08:09	17:15 (5)	08:08		08:43
	21:38	26	21:05 (2)	20:37		19:22	18:54 (4)	23	17:38 (5)	16:17	16:08
25	05:27	20:40 (2)	06:20		07:15	18:32 (4)	07:11	16:15 (5)	08:09		08:43
	21:36	24	21:04 (2)	20:35		19:19	18:51 (4)	23	16:38 (5)	16:16	16:08
26	05:29	20:40 (2)	06:22		07:17	18:34 (4)	07:13	16:15 (5)	08:11		08:43
	21:35	22	21:02 (2)	20:32		19:17	18:48 (4)	21	16:36 (5)	16:14	16:09
27	05:30	20:40 (2)	06:24		07:19	18:36 (4)	07:14	16:15 (5)	08:13		08:44
	21:33	20	21:00 (2)	20:30		19:14	18:46 (4)	19	16:34 (5)	16:13	16:10
28	05:32	20:41 (2)	06:26		07:21	18:38 (4)	07:16	16:15 (5)	08:14		08:44
	21:32	18	20:59 (2)	20:28		19:12	18:44 (4)	16	16:31 (5)	16:12	16:11
29	05:34	20:41 (2)	06:27		07:22		07:18	16:16 (5)	08:16		08:44
	21:30	16	20:52 (2)	20:25		19:09	17:00	13	16:29 (5)	16:12	16:11
30	05:35	20:42 (2)	06:29		07:24		07:20	16:17 (5)	08:18		08:44
	21:28	14	20:56 (2)	20:23		19:07	16:58	10	16:27 (5)	16:11	16:12
31	05:37	20:43 (2)	06:31				07:22		16:18 (5)		08:44
	21:26	12	20:55 (2)	20:21			16:56	7	16:25 (5)		16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	668		21		759		239		2		
Sun reduction	0.32		0.34		0.32		0.29		0.27		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.63		0.63		0.67		0.66		0.66		
Total reduction	0.20		0.22		0.22		0.19		0.18		
Total, real	137		5		164		46		0		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LC - H315

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	17:06	07:01	20:00	05:52	20:02 (3)	05:03	20:08 (4)			
2	08:44	16:16	08:12	17:08	18:04	07:11	18:04	17:06	06:59	20:04	20:55	20:26 (4)	21:45	20:43 (4)			
3	08:43	16:17	08:10	17:10	18:06	07:09	18:06	17:06	06:56	20:04	20:50	20:02 (3)	05:02	20:10 (4)			
4	08:43	16:18	08:08	17:12	18:07	07:07	18:07	17:06	06:54	20:06	20:57	20:27 (4)	21:46	20:43 (4)			
5	08:43	16:20	08:07	17:14	18:09	07:04	18:09	17:06	06:51	20:07	20:54	20:03 (3)	04:59	20:11 (4)			
6	08:42	16:21	08:05	17:16	18:11	2	17:45 (5)	17:43 (5)	06:49	20:09	21:03	20:32 (4)	21:50	20:43 (4)			
7	08:42	16:22	08:03	17:18	18:13	9	17:46 (5)	17:37 (5)	06:47	20:11	21:04	20:33 (4)	21:51	20:42 (4)			
8	08:41	16:24	08:01	17:20	18:15	13	17:48 (5)	17:35 (5)	06:44	20:13	21:06	20:36 (4)	21:52	20:42 (4)			
9	08:41	16:25	07:59	17:22	18:17	18	17:50 (5)	17:32 (5)	06:42	20:15	21:08	20:37 (4)	21:53	20:42 (4)			
10	08:40	16:27	07:57	17:24	18:19	21	17:52 (5)	17:31 (5)	06:39	20:17	21:10	20:39 (4)	21:54	20:41 (4)			
11	08:40	16:28	07:55	17:26	18:21	24	17:55 (5)	17:29 (5)	06:37	20:19	21:11	20:40 (4)	21:55	20:41 (4)			
12	08:39	16:30	07:53	17:28	18:23	26	17:57 (5)	17:28 (5)	06:35	20:20	21:13	20:42 (4)	21:55	20:42 (4)			
13	08:38	16:31	07:51	17:30	18:25	27	17:56 (5)	17:29 (5)	06:32	20:22	21:15	20:43 (4)	21:56	20:42 (4)			
14	08:37	16:33	07:49	17:32	18:27	27	17:55 (5)	17:28 (5)	06:30	20:24	21:18	20:44 (4)	21:57	20:41 (4)			
15	08:36	16:34	07:47	17:34	18:28	27	17:55 (5)	17:28 (5)	06:28	20:26	21:20	20:44 (4)	21:58	20:41 (4)			
16	08:35	16:36	07:45	17:36	18:30	26	17:54 (5)	17:28 (5)	06:25	20:28	21:22	20:44 (4)	21:59	20:41 (4)			
17	08:34	16:38	07:43	17:38	18:32	26	17:54 (5)	17:28 (5)	06:23	20:30	21:23	20:44 (4)	21:59	20:41 (4)			
18	08:33	16:40	07:41	17:40	18:34	25	17:53 (5)	17:29 (5)	06:21	20:31	21:25	20:45 (4)	22:00	20:41 (4)			
19	08:32	16:41	07:39	17:42	18:36	23	17:52 (5)	17:29 (5)	06:18	20:33	21:27	20:45 (4)	22:00	20:41 (4)			
20	08:31	16:43	07:36	17:44	18:38	21	17:50 (5)	17:29 (5)	06:16	20:35	21:28	20:44 (4)	22:00	20:42 (4)			
21	08:30	16:45	07:34	17:46	18:40	18	17:49 (5)	17:31 (5)	06:14	20:37	21:30	20:45 (4)	22:00	20:42 (4)			
22	08:28	16:47	07:32	17:48	18:42	13	17:46 (5)	17:33 (5)	06:12	20:39	21:31	20:45 (4)	22:01	20:43 (4)			
23	08:27	16:49	07:30	17:50	18:43	5	17:42 (5)	17:37 (5)	06:09	20:41	21:33	20:44 (4)	22:01	20:42 (4)			
24	08:26	16:51	07:28	17:52	18:45			20:42	06:07	20:42	21:34	20:44 (4)	22:01	20:42 (4)			
25	08:24	16:52	07:25	17:54	18:47			20:44	06:05	20:44	21:36	20:44 (4)	22:01	20:43 (4)			
26	08:23	16:54	07:23	17:56	18:49			20:46	06:03	20:46	21:37	20:44 (4)	22:01	20:43 (4)			
27	08:22	16:56	07:21	17:58	18:51			20:48	06:01	20:48	21:39	20:44 (4)	22:01	20:43 (4)			
28	08:20	16:58	07:18	18:00	18:53			20:50	05:58	20:50	21:40	20:44 (4)	22:01	20:44 (4)			
29	08:18	17:00			19:54			20:52	05:56	20:52	21:41	20:44 (4)	22:01	20:44 (4)			
30	08:17	17:02			19:56			20:53	05:54	20:53	21:43	20:43 (4)	22:00	20:45 (4)			
31	08:15	17:04			19:58												
Potential sun hours	250		273		367			420			494		510				
Total, worst case					351			117			1090		804				
Sun reduction					0.27			0.35			0.38		0.32				
Oper. time red.					1.00			1.00			1.00		1.00				
Wind dir. red.					0.68			0.65			0.64		0.64				
Total reduction					0.18			0.23			0.24		0.20				
Total, real					64			27			266		165				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LC - H315

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:19 (4)	05:39	20:16 (4)	06:33	07:26	18:08 (5)	07:24	08:19		
	22:00	27	20:46 (4)	21:25	37	20:53 (4)	20:18			16:10	
2	05:00	20:19 (4)	05:40	20:17 (4)	06:35	07:28	18:34 (5)	16:54	16:10		
	22:00	28	20:47 (4)	21:23	35	20:52 (4)	20:16	18:08 (5)	07:26	08:21	
3	05:00	20:18 (4)	05:42	20:17 (4)	06:36	07:30	18:33 (5)	16:52	16:09		
	21:59	28	20:46 (4)	21:21	33	20:50 (4)	20:13	18:09 (5)	07:28	08:22	
4	05:01	20:18 (4)	05:44	20:18 (4)	06:38	07:31	18:31 (5)	16:50	16:08		
	21:59	29	20:47 (4)	21:19	30	20:48 (4)	20:11	18:10 (5)	07:30	08:24	
5	05:02	20:18 (4)	05:45	20:16 (3)	06:40	07:33	18:29 (5)	16:48	16:08		
	21:58	30	20:48 (4)	21:17	30	20:46 (4)	20:09	18:11 (5)	07:32	08:25	
6	05:03	20:18 (4)	05:47	20:15 (3)	06:42	07:35	18:26 (5)	16:46	16:07		
	21:57	30	20:48 (4)	21:15	30	20:45 (4)	20:06	18:13 (5)	07:34	08:26	
7	05:04	20:18 (4)	05:49	20:14 (3)	06:43	07:37	18:24 (5)	16:44	16:07		
	21:57	31	20:49 (4)	21:13	29	20:43 (4)	20:04	18:14 (5)	07:36	08:28	
8	05:05	20:18 (4)	05:51	20:12 (3)	06:45	07:39	18:50	16:43	16:06		
	21:56	32	20:50 (4)	21:11	29	20:41 (4)	20:01	18:21 (5)	07:38	08:29	
9	05:06	20:17 (4)	05:52	20:12 (3)	06:47	07:41		16:41	16:06		
	21:55	33	20:50 (4)	21:09	27	20:39 (4)	19:59	07:40	08:30		
10	05:07	20:17 (4)	05:54	20:11 (3)	06:49	07:42	18:45	16:39	16:05		
	21:55	34	20:51 (4)	21:07	26	20:37 (4)	19:56	07:42	08:31		
11	05:08	20:17 (4)	05:56	20:10 (3)	06:50	07:44	18:43	16:37	16:05		
	21:54	34	20:51 (4)	21:05	25	20:35 (4)	19:54	07:44	08:33		
12	05:09	20:17 (4)	05:57	20:10 (3)	06:52	07:46	18:40	16:36	16:05		
	21:53	34	20:51 (4)	21:03	24	20:34 (4)	19:51	07:45	08:34		
13	05:11	20:16 (4)	05:59	20:10 (3)	06:54	07:48	18:38	16:34	16:05		
	21:52	36	20:52 (4)	21:01	21	20:31 (3)	19:49	07:47	08:35		
14	05:12	20:16 (4)	06:01	20:10 (3)	06:56	07:50	18:36	16:32	16:05		
	21:51	36	20:52 (4)	20:59	19	20:29 (3)	19:47	07:49	08:36		
15	05:13	20:16 (4)	06:03	20:10 (3)	06:58	07:52	07:50	16:31	16:05		
	21:50	36	20:52 (4)	20:57	18	20:28 (3)	19:44	16:27	16:05		
16	05:14	20:16 (4)	06:05	20:10 (3)	06:59	07:54	18:33	07:51	08:37		
	21:49	38	20:54 (4)	20:55	15	20:25 (3)	19:42	16:29	16:05		
17	05:16	20:16 (4)	06:06	20:10 (3)	07:01	07:55	18:29	07:53	08:38		
	21:47	38	20:54 (4)	20:53	13	20:23 (3)	19:39	16:27	16:05		
18	05:17	20:15 (4)	06:08	20:11 (3)	07:03	07:57	18:26	07:55	08:39		
	21:46	39	20:54 (4)	20:50	11	20:22 (3)	19:37	16:26	16:05		
19	05:18	20:15 (4)	06:10	20:11 (3)	07:05	07:59	18:24	07:57	08:40		
	21:45	39	20:54 (4)	20:48	8	20:19 (3)	19:34	16:25	16:05		
20	05:20	20:16 (4)	06:12	20:13 (3)	07:06	08:01	18:22	08:00	08:41		
	21:44	39	20:55 (4)	20:46	4	20:17 (3)	19:32	16:22	16:06		
21	05:21	20:15 (4)	06:13	07:08		18:19 (5)	08:03	16:22	16:06		
	21:42	39	20:54 (4)	20:44		19:29	12	08:02	08:41		
22	05:23	20:15 (4)	06:15	07:10		18:16 (5)	18:17	16:20	16:06		
	21:41	39	20:54 (4)	20:42		19:27	17	08:04	08:42		
23	05:24	20:15 (4)	06:17	07:12		18:14 (5)	08:07	16:19	16:06		
	21:39	40	20:55 (4)	20:39		19:24	20	08:06	08:42		
24	05:26	20:15 (4)	06:19	07:13		18:13 (5)	08:09	16:18	16:07		
	21:38	40	20:55 (4)	20:37		19:22	22	08:08	08:43		
25	05:27	20:15 (4)	06:20	07:15		18:11 (5)	07:11	16:17	16:08		
	21:36	40	20:55 (4)	20:35		19:19	24	08:09	08:43		
26	05:29	20:15 (4)	06:22	07:17		18:10 (5)	17:13	16:16	16:08		
	21:35	40	20:55 (4)	20:32		19:17	26	08:11	08:43		
27	05:30	20:16 (4)	06:24	07:19		18:36 (5)	17:06	16:15	16:09		
	21:33	39	20:55 (4)	20:30		18:10 (5)	07:14	08:13	08:44		
28	05:32	20:15 (4)	06:26	07:21		18:09 (5)	07:16	16:13	16:10		
	21:32	40	20:55 (4)	20:28		19:12	27	08:14	08:44		
29	05:34	20:16 (4)	06:28	07:22		18:36 (5)	17:02	16:12	16:11		
	21:30	39	20:55 (4)	20:25		18:09 (5)	07:18	16:12	16:11		
30	05:35	20:16 (4)	06:29	07:24		18:36 (5)	17:00	08:16	08:44		
	21:28	38	20:54 (4)	20:23		19:07	27	16:12	16:11		
31	05:37	20:16 (4)	06:31					16:17	08:44		
	21:26	38	20:54 (4)	20:21				16:11	16:12		
Potential sun hours	512		460		382		328		259		233
Total, worst case	1103		464		228		125				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.64		0.64		0.68		0.68				
Total reduction	0.21		0.22		0.22		0.20				
Total, real	228		102		49		25				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LD - H316

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	05:52	20:15 (3)
	16:15	17:06	18:02	20:00	20:55	11 20:26 (3)
2	08:44	08:12	07:14	06:59	05:50	20:14 (3)
	16:16	17:08	18:04	20:02	20:57	13 20:27 (3)
3	08:43	08:10	07:11	06:56	05:48	20:13 (3)
	16:17	17:10	18:06	20:04	20:59	16 20:29 (3)
4	08:43	08:08	07:09	06:54	05:46	20:13 (3)
	16:18	17:12	18:07	20:06	21:01	17 20:30 (3)
5	08:43	08:07	07:07	06:51	05:44	20:13 (3)
	16:20	17:14	18:09	20:07	21:03	19 20:32 (3)
6	08:42	08:05	07:04	06:49	05:42	20:12 (3)
	16:21	17:16	18:11	20:09	21:04	21 20:33 (3)
7	08:42	08:03	07:02	06:47	05:40	20:13 (3)
	16:22	17:18	18:13	20:11	21:06	23 20:36 (3)
8	08:41	08:01	07:00	06:44	05:38	20:13 (3)
	16:24	17:20	18:15	20:13	21:08	23 20:36 (3)
9	08:41	07:59	06:57	06:42	05:36	20:13 (3)
	16:25	17:22	18:17	20:15	21:10	22 20:35 (3)
10	08:40	07:57	06:55	06:39	05:34	20:13 (3)
	16:27	17:24	18:19	20:17	21:11	21 20:34 (3)
11	08:40	07:55	06:52	17:54 (5) 06:37	05:33	20:15 (3)
	16:28	17:26	18:21	17:55 (5) 20:19	21:13	19 20:34 (3)
12	08:39	07:53	06:50	17:47 (5) 06:35	05:31	20:15 (3)
	16:30	17:28	18:23	17:56 (5) 20:20	21:15	23 20:43 (4)
13	08:38	07:51	06:48	17:45 (5) 06:32	05:29	20:16 (3)
	16:31	17:30	18:25	17:58 (5) 20:22	21:17	25 20:44 (4)
14	08:37	07:49	06:45	17:43 (5) 06:30	05:27	20:17 (3)
	16:33	17:32	18:27	18:00 (5) 20:24	21:18	27 20:47 (4)
15	08:36	07:47	06:43	17:42 (5) 06:28	05:26	20:18 (3)
	16:34	17:34	18:28	18:02 (5) 20:26	21:20	27 20:48 (4)
16	08:35	07:45	06:40	17:40 (5) 06:25	05:24	20:22 (3)
	16:36	17:36	18:30	18:04 (5) 20:28	21:22	23 20:50 (4)
17	08:34	07:43	06:38	17:39 (5) 06:23	05:22	20:30 (4)
	16:38	17:38	18:32	18:06 (5) 20:30	21:23	21 20:51 (4)
18	08:33	07:41	06:35	17:38 (5) 06:21	05:21	20:30 (4)
	16:40	17:40	18:34	18:06 (5) 20:31	21:25	23 20:53 (4)
19	08:32	07:39	06:33	17:38 (5) 06:18	05:19	20:29 (4)
	16:41	17:42	18:36	18:06 (5) 20:33	21:27	25 20:54 (4)
20	08:31	07:36	06:31	17:37 (5) 06:16	05:18	20:28 (4)
	16:43	17:44	18:38	18:05 (5) 20:35	21:28	27 20:55 (4)
21	08:30	07:34	06:28	17:38 (5) 06:14	05:16	20:28 (4)
	16:45	17:46	18:40	18:05 (5) 20:37	21:30	29 20:57 (4)
22	08:28	07:32	06:26	17:37 (5) 06:12	05:15	20:28 (4)
	16:47	17:48	18:42	18:04 (5) 20:39	21:31	31 20:59 (4)
23	08:27	07:30	06:23	17:38 (5) 06:09	05:13	20:27 (4)
	16:49	17:50	18:43	18:04 (5) 20:41	21:33	32 20:59 (4)
24	08:26	07:28	06:21	17:38 (5) 06:07	05:12	20:26 (4)
	16:51	17:52	18:45	18:02 (5) 20:42	21:34	35 21:01 (4)
25	08:24	07:25	06:18	17:39 (5) 06:05	05:11	20:26 (4)
	16:52	17:54	18:47	18:01 (5) 20:44	21:36	36 21:02 (4)
26	08:23	07:23	06:16	17:40 (5) 06:03	05:09	20:26 (4)
	16:54	17:56	18:49	18:00 (5) 20:46	21:37	38 21:04 (4)
27	08:22	07:21	06:13	17:41 (5) 06:01	05:08	20:26 (4)
	16:56	17:58	18:51	17:58 (5) 20:48	21:39	39 21:05 (4)
28	08:20	07:18	06:11	17:44 (5) 05:58	20:19 (3) 05:07	20:26 (4)
	16:58	18:00	18:53	17:55 (5) 20:50	2 20:21 (3) 21:40	39 21:05 (4)
29	08:18		07:09	05:56	20:17 (3) 05:06	20:26 (4)
	17:00		19:54	20:52	5 20:22 (3) 21:41	40 21:06 (4)
30	08:17		07:06	05:54	20:16 (3) 05:05	20:26 (4)
	17:02		19:56	20:53	8 20:24 (3) 21:43	40 21:06 (4)
31	08:15		07:04		05:04	20:26 (4)
	17:04		19:58		21:44	40 21:06 (4)
Potential sun hours	250	273	367	420	494	510
Total, worst case			369	15	825	1195
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.64	0.63	0.63
Total reduction			0.18	0.23	0.24	0.20
Total, real			67	3	199	240

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LD - H316

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:32 (4)	05:39	20:25 (3)	06:33	07:26	18:25 (5)	07:24	08:19		
	22:00	40	21:12 (4)	21:25	22	20:53 (4)	20:18	19:05	11	18:36 (5)	16:54
2	05:00	20:33 (4)	05:40	20:25 (3)	06:35	07:28	18:28 (5)	07:26	08:21		
	22:00	40	21:13 (4)	21:23	20	20:45 (3)	20:16	19:02	5	18:33 (5)	16:52
3	05:00	20:32 (4)	05:42	20:23 (3)	06:36	07:30		07:28	08:22		
	21:59	40	21:12 (4)	21:21	22	20:45 (3)	20:13	19:00		16:50	16:08
4	05:01	20:33 (4)	05:44	20:23 (3)	06:38	07:31		07:30	08:24		
	21:59	40	21:13 (4)	21:19	23	20:46 (3)	20:11	18:57		16:48	16:08
5	05:02	20:33 (4)	05:45	20:22 (3)	06:40	07:33		07:32	08:25		
	21:58	40	21:13 (4)	21:17	23	20:45 (3)	20:09	18:55		16:46	16:07
6	05:03	20:33 (4)	05:47	20:23 (3)	06:42	07:35		07:34	08:26		
	21:57	41	21:14 (4)	21:15	22	20:45 (3)	20:06	18:52		16:44	16:07
7	05:04	20:34 (4)	05:49	20:23 (3)	06:43	07:37		07:36	08:28		
	21:57	40	21:14 (4)	21:13	20	20:43 (3)	20:04	18:50		16:43	16:06
8	05:05	20:34 (4)	05:51	20:22 (3)	06:45	07:39		07:38	08:29		
	21:56	40	21:14 (4)	21:11	19	20:41 (3)	20:01	18:48		16:41	16:06
9	05:06	20:34 (4)	05:52	20:22 (3)	06:47	07:41		07:40	08:30		
	21:55	40	21:14 (4)	21:09	17	20:39 (3)	19:59	18:45		16:39	16:05
10	05:07	20:34 (4)	05:54	20:22 (3)	06:49	07:42		07:42	08:31		
	21:55	40	21:14 (4)	21:07	15	20:37 (3)	19:56	18:43		16:37	16:05
11	05:08	20:34 (4)	05:56	20:23 (3)	06:50	07:44		07:44	08:33		
	21:54	40	21:14 (4)	21:05	12	20:35 (3)	19:54	18:40		16:36	16:05
12	05:09	20:34 (4)	05:57	20:24 (3)	06:52	07:46		07:45	08:34		
	21:53	40	21:14 (4)	21:03	10	20:34 (3)	19:51	18:38		16:34	16:05
13	05:11	20:34 (4)	05:59	20:24 (3)	06:54	07:48		07:47	08:35		
	21:52	40	21:14 (4)	21:01	7	20:31 (3)	19:49	18:36		16:32	16:05
14	05:12	20:35 (4)	06:01	20:25 (3)	06:56	07:50		07:49	08:36		
	21:51	39	21:14 (4)	20:59	4	20:29 (3)	19:47	18:33		16:31	16:05
15	05:13	20:35 (4)	06:03	20:27 (3)	06:58	18:34 (5)	07:52	16:31	08:37		
	21:50	39	21:14 (4)	20:57	1	20:28 (3)	19:44	10	18:44 (5)	18:31	16:29
16	05:14	20:36 (4)	06:05	19:42	16	18:47 (5)	18:29	16:27	16:05		
	21:49	39	21:15 (4)	20:55		18:28 (5)	07:55	16:26	16:05		
17	05:16	20:36 (4)	06:06	19:39	19	18:47 (5)	18:26	16:25	16:04		
	21:47	38	21:14 (4)	20:53		18:26 (5)	07:57	16:24	16:03		
18	05:17	20:36 (4)	06:08	19:37	23	18:49 (5)	18:24	16:23	16:02		
	21:46	36	21:12 (4)	20:50		18:25 (5)	07:59	16:22	16:01		
19	05:18	20:36 (4)	06:10	19:34	25	18:50 (5)	18:22	16:21	16:00		
	21:45	35	21:11 (4)	20:48		18:24 (5)	08:01	16:20	16:00		
20	05:20	20:37 (4)	06:12	19:32	26	18:50 (5)	18:20	16:19	16:00		
	21:44	33	21:10 (4)	20:46		18:23 (5)	08:03	16:18	16:00		
21	05:21	20:37 (4)	06:13	19:29	27	18:50 (5)	18:17	16:17	16:00		
	21:42	32	21:09 (4)	20:44		18:22 (5)	08:05	16:16	16:00		
22	05:23	20:37 (4)	06:15	19:27	28	18:50 (5)	18:15	16:15	16:00		
	21:41	30	21:07 (4)	20:42		18:22 (5)	08:07	16:14	16:00		
23	05:24	20:39 (4)	06:17	19:24	28	18:50 (5)	18:13	16:13	16:00		
	21:39	28	21:07 (4)	20:39		18:22 (5)	08:09	16:12	16:00		
24	05:26	20:39 (4)	06:19	19:22	28	18:50 (5)	18:11	16:11	16:00		
	21:38	26	21:05 (4)	20:37		18:21 (5)	07:11	16:10	16:00		
25	05:27	20:40 (4)	06:20	19:19	27	18:48 (5)	17:09	16:09	16:00		
	21:36	24	21:04 (4)	20:35		18:21 (5)	07:13	16:08	16:00		
26	05:29	20:40 (4)	06:22	19:17	27	18:48 (5)	17:06	16:07	16:00		
	21:35	22	21:02 (4)	20:32		18:21 (5)	07:14	16:06	16:00		
27	05:30	20:42 (4)	06:24	19:14	25	18:46 (5)	17:04	16:05	16:00		
	21:33	19	21:01 (4)	20:30		18:22 (5)	07:16	16:04	16:00		
28	05:32	20:31 (3)	06:26	19:12	22	18:44 (5)	17:02	16:03	16:00		
	21:32	25	20:59 (4)	20:28		18:23 (5)	07:18	16:02	16:00		
29	05:34	20:29 (3)	06:28	19:09	18	18:41 (5)	17:00	16:01	16:00		
	21:30	26	20:58 (4)	20:25		18:23 (5)	07:20	16:00	16:00		
30	05:35	20:27 (3)	06:29	19:07	15	18:38 (5)	16:58	16:00	16:00		
	21:28	26	20:56 (4)	20:23			07:22	16:00	16:00		
31	05:37	20:26 (3)	06:31					16:00	16:00		
	21:26	24	20:55 (4)	20:21				16:00	16:00		
Potential sun hours	512		460	382	364	16	259	233			
Total, worst case	1062		237								
Sun reduction	0.32		0.34		0.32	0.29					
Oper. time red.	1.00		1.00		1.00	1.00					
Wind dir. red.	0.63		0.64		0.67	0.67					
Total reduction	0.20		0.22		0.22	0.20					
Total, real	216		52	78	3						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LE - H317
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01	18:50 (5)	05:52				05:03	20:44 (4)	
	16:15	17:06	18:02						20:00	14 19:04 (5)	20:55				21:45	26 21:10 (4)	
2	08:44	08:12	07:14						06:59	18:53 (5)	05:50				05:02	20:45 (4)	
	16:16	17:08	18:04						20:02	6 18:59 (5)	20:57				21:46	27 21:12 (4)	
3	08:43	08:10	07:12						06:56		05:48		20:25 (3)	05:01		20:44 (4)	
	16:17	17:10	18:06						20:04		20:59	4	20:29 (3)	21:48	29	21:13 (4)	
4	08:43	08:08	07:09						06:54		05:46		20:24 (3)	05:00		20:44 (4)	
	16:18	17:12	18:07						20:06		21:01	6	20:30 (3)	21:49	30	21:14 (4)	
5	08:43	08:07	07:07						06:51		05:44		20:23 (3)	04:59		20:44 (4)	
	16:20	17:14	18:09						20:07		21:03	9	20:32 (3)	21:50	31	21:15 (4)	
6	08:42	08:05	07:04						06:49		05:42		20:22 (3)	04:59		20:44 (4)	
	16:21	17:16	18:11						20:09		21:04	11	20:33 (3)	21:51	32	21:16 (4)	
7	08:42	08:03	07:02						06:47		05:40		20:22 (3)	04:58		20:43 (4)	
	16:22	17:18	18:13						20:11		21:06	14	20:36 (3)	21:52	33	21:16 (4)	
8	08:41	08:01	07:00						06:44		05:38		20:22 (3)	04:57		20:44 (4)	
	16:24	17:20	18:15						20:13		21:08	15	20:37 (3)	21:53	34	21:18 (4)	
9	08:41	07:59	06:57						06:42		05:36		20:21 (3)	04:57		20:43 (4)	
	16:25	17:22	18:17						20:15		21:10	17	20:38 (3)	21:54	35	21:18 (4)	
10	08:40	07:57	06:55						06:39		05:34		20:21 (3)	04:56		20:44 (4)	
	16:27	17:24	18:19						20:17		21:11	19	20:40 (3)	21:55	35	21:19 (4)	
11	08:40	07:55	06:52						06:37		05:33		20:21 (3)	04:56		20:44 (4)	
	16:28	17:26	18:21						20:19		21:13	21	20:42 (3)	21:55	36	21:20 (4)	
12	08:39	07:53	06:50						06:35		05:31		20:21 (3)	04:55		20:45 (4)	
	16:30	17:28	18:23						20:20		21:15	22	20:43 (3)	21:56	36	21:21 (4)	
13	08:38	07:51	06:48						06:32		05:29		20:21 (3)	04:55		20:44 (4)	
	16:31	17:30	18:25						20:22		21:17	23	20:44 (3)	21:57	37	21:21 (4)	
14	08:37	07:49	06:45						06:30		05:27		20:22 (3)	04:55		20:44 (4)	
	16:33	17:32	18:27						20:24		21:18	22	20:44 (3)	21:57	38	21:22 (4)	
15	08:36	07:47	06:43					18:00 (5)	06:28		05:26		20:22 (3)	04:55		20:45 (4)	
	16:34	17:34	18:28	2				18:02 (5)	20:26		21:20	21	20:43 (3)	21:58	37	21:22 (4)	
16	08:35	07:45	06:40					17:54 (5)	06:25		05:24		20:23 (3)	04:54		20:45 (4)	
	16:36	17:36	18:30	10				18:04 (5)	20:28		21:22	20	20:43 (3)	21:59	38	21:23 (4)	
17	08:34	07:43	06:38					17:52 (5)	06:23		05:22		20:23 (3)	04:54		20:45 (4)	
	16:38	17:38	18:32	14				18:06 (5)	20:30		21:23	19	20:42 (3)	21:59	38	21:23 (4)	
18	08:33	07:41	06:35					17:50 (5)	06:21		05:21		20:24 (3)	04:54		20:45 (4)	
	16:40	17:40	18:34	17				18:07 (5)	20:31		21:25	18	20:42 (3)	22:00	39	21:24 (4)	
19	08:32	07:39	06:33					17:49 (5)	06:18		05:19		20:25 (3)	04:54		20:45 (4)	
	16:41	17:42	18:36	21				18:10 (5)	20:33		21:27	16	20:41 (3)	22:00	39	21:24 (4)	
20	08:31	07:36	06:31					17:47 (5)	06:16		05:18		20:26 (3)	04:54		20:45 (4)	
	16:43	17:44	18:38	24				18:11 (5)	20:35		21:28	13	20:39 (3)	22:00	39	21:24 (4)	
21	08:30	07:34	06:28					17:46 (5)	06:14		05:16		20:27 (3)	04:54		20:45 (4)	
	16:45	17:46	18:40	27				18:13 (5)	20:37		21:30	14	20:57 (4)	22:00	39	21:24 (4)	
22	08:28	07:32	06:26					17:45 (5)	06:12		05:15		20:30 (3)	04:55		20:46 (4)	
	16:47	17:48	18:42	28				18:13 (5)	20:39		21:31	14	20:59 (4)	22:01	39	21:25 (4)	
23	08:27	07:30	06:23					17:45 (5)	06:09		05:13		20:50 (4)	04:55		20:46 (4)	
	16:49	17:50	18:43	29				18:14 (5)	20:41		21:33	9	20:59 (4)	22:01	39	21:25 (4)	
24	08:26	07:28	06:21					17:44 (5)	06:07		05:12		20:49 (4)	04:55		20:46 (4)	
	16:51	17:52	18:45	29				18:13 (5)	20:42		21:34	12	21:01 (4)	22:01	39	21:25 (4)	
25	08:24	07:25	06:18					17:44 (5)	06:05		05:11		20:48 (4)	04:56		20:47 (4)	
	16:52	17:54	18:47	29				18:13 (5)	20:44		21:36	14	21:02 (4)	22:01	38	21:25 (4)	
26	08:23	07:23	06:16					17:45 (5)	06:03		05:09		20:47 (4)	04:56		20:47 (4)	
	16:54	17:56	18:49	28				18:13 (5)	20:46		21:37	17	21:04 (4)	22:01	38	21:25 (4)	
27	08:22	07:21	06:13					17:44 (5)	06:01		05:08		20:47 (4)	04:56		20:47 (4)	
	16:56	17:58	18:51	27				18:11 (5)	20:48		21:39	18	21:05 (4)	22:01	37	21:24 (4)	
28	08:20	07:18	06:11					17:45 (5)	05:58		05:07		20:46 (4)	04:57		20:47 (4)	
	16:58	18:00	18:53	26				18:11 (5)	20:50		21:40	20	21:06 (4)	22:01	38	21:25 (4)	
29	08:18		07:09					18:45 (5)	05:56		05:06		20:46 (4)	04:58		20:48 (4)	
	17:00		19:54	24				19:09 (5)	20:52		21:41	21	21:07 (4)	22:01	37	21:25 (4)	
30	08:17		07:06					18:46 (5)	05:54		05:05		20:45 (4)	04:58		20:48 (4)	
	17:02		19:56	22				19:08 (5)	20:53		21:43	23	21:08 (4)	22:00	36	21:24 (4)	
31	08:15		07:04					18:47 (5)			05:04		20:45 (4)				
	17:04		19:58	19				19:06 (5)			21:44	24	21:09 (4)				
Potential sun hours	250	273	367					420			494			510			
Total, worst case					376				20			476			1069		
Sun reduction					0.27				0.35			0.38			0.32		
Oper. time red.					1.00				1.00			1.00			1.00		
Wind dir. red.					0.67				0.67			0.63			0.61		
Total reduction					0.18				0.24			0.24			0.20		
Total, real					69				5			114			210		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LE - H317

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:48 (4)	05:39	20:31 (3)	06:33	07:26	07:24	08:19			
	22:00	21:24 (4)	21:25	20:53 (3)	20:18	19:05	16:54	16:10			
2	05:00	20:49 (4)	05:40	20:32 (3)	06:35	07:28	07:26	08:21			
	22:00	21:24 (4)	21:23	20:52 (3)	20:16	19:02	16:52	16:09			
3	05:00	20:49 (4)	05:42	20:31 (3)	06:36	07:30	07:28	08:22			
	21:59	21:23 (4)	21:21	20:50 (3)	20:13	19:00	16:50	16:08			
4	05:01	20:49 (4)	05:44	20:32 (3)	06:38	07:31	07:30	08:24			
	21:59	21:23 (4)	21:19	20:48 (3)	20:11	18:57	16:48	16:08			
5	05:02	20:50 (4)	05:45	20:31 (3)	06:40	07:33	07:32	08:25			
	21:58	21:23 (4)	21:17	20:46 (3)	20:09	18:55	16:46	16:07			
6	05:03	20:50 (4)	05:47	20:32 (3)	06:42	07:35	07:34	08:26			
	21:57	21:22 (4)	21:15	20:45 (3)	20:06	18:52	16:44	16:07			
7	05:04	20:51 (4)	05:49	20:33 (3)	06:43	07:37	07:36	08:28			
	21:57	21:22 (4)	21:13	20:43 (3)	20:04	18:50	16:43	16:06			
8	05:05	20:51 (4)	05:51	20:33 (3)	06:45	07:39	07:38	08:29			
	21:56	21:21 (4)	21:11	20:41 (3)	20:01	18:48	16:41	16:06			
9	05:06	20:52 (4)	05:52	20:34 (3)	06:47	07:41	07:40	08:30			
	21:55	21:21 (4)	21:09	20:39 (3)	19:59	18:45	16:39	16:05			
10	05:07	20:52 (4)	05:54	20:34 (3)	06:49	07:42	07:42	08:31			
	21:55	21:20 (4)	21:07	20:37 (3)	19:56	18:43	16:37	16:05			
11	05:08	20:53 (4)	05:56	06:50		18:42 (5)	07:44	08:33			
	21:54	21:19 (4)	21:05	19:54	14	18:56 (5)	18:40	16:36			
12	05:09	20:53 (4)	05:57	06:52		18:40 (5)	07:46	08:34			
	21:53	21:18 (4)	21:03	19:51	18	18:58 (5)	18:38	16:34			
13	05:11	20:53 (4)	05:59	06:54		18:38 (5)	07:48	08:35			
	21:52	21:17 (4)	21:01	19:49	21	18:59 (5)	18:36	16:32			
14	05:12	20:54 (4)	06:01	06:56		18:36 (5)	07:50	08:36			
	21:51	21:16 (4)	20:59	19:47	23	18:59 (5)	18:33	16:31			
15	05:13	20:54 (4)	06:03	06:58		18:35 (5)	07:52	08:37			
	21:50	21:15 (4)	20:57	19:44	25	19:00 (5)	18:31	16:29			
16	05:14	20:56 (4)	06:05	06:59		18:34 (5)	07:54	08:38			
	21:48	21:15 (4)	20:55	19:42	27	19:01 (5)	18:29	16:27			
17	05:16	20:57 (4)	06:06	07:01		18:32 (5)	07:55	08:38			
	21:47	21:14 (4)	20:53	19:39	28	19:00 (5)	18:26	16:26			
18	05:17	20:57 (4)	06:08	07:03		18:32 (5)	07:57	08:39			
	21:46	21:12 (4)	20:50	19:37	28	19:00 (5)	18:24	16:25			
19	05:18	20:58 (4)	06:10	07:05		18:31 (5)	07:59	08:40			
	21:45	21:11 (4)	20:48	19:34	29	19:00 (5)	18:22	16:23			
20	05:20	21:00 (4)	06:12	07:06		18:31 (5)	08:01	08:41			
	21:44	21:10 (4)	20:46	19:32	29	19:00 (5)	18:20	16:22			
21	05:21	20:41 (3)	06:13	07:08		18:30 (5)	08:03	08:42			
	21:42	21:09 (4)	20:44	19:29	29	18:59 (5)	18:17	16:20			
22	05:23	20:38 (3)	06:15	07:10		18:31 (5)	08:05	08:43			
	21:41	21:07 (4)	20:42	19:27	27	18:58 (5)	18:15	16:19			
23	05:24	20:37 (3)	06:17	07:12		18:31 (5)	08:07	08:44			
	21:39	21:07 (4)	20:39	19:24	25	18:56 (5)	18:13	16:18			
24	05:26	20:36 (3)	06:19	07:13		18:32 (5)	08:09	08:43			
	21:38	20:50 (3)	20:37	19:22	22	18:54 (5)	18:11	16:17			
25	05:27	20:35 (3)	06:20	07:15		18:32 (5)	07:11	08:09			
	21:36	20:52 (3)	20:35	19:19	19	18:51 (5)	17:09	16:16			
26	05:29	20:34 (3)	06:22	07:17		18:33 (5)	07:13	08:11			
	21:35	20:52 (3)	20:32	19:17	15	18:48 (5)	17:06	16:15			
27	05:30	20:34 (3)	06:24	07:19		18:35 (5)	07:14	08:13			
	21:33	20:53 (3)	20:30	19:14	11	18:46 (5)	17:04	16:13			
28	05:32	20:33 (3)	06:26	07:21		18:38 (5)	07:16	08:14			
	21:32	20:54 (3)	20:28	19:12	6	18:44 (5)	17:02	16:13			
29	05:34	20:33 (3)	06:28	07:22		07:18	08:16	08:44			
	21:30	20:55 (3)	20:25	19:09		17:00	16:12	16:11			
30	05:35	20:32 (3)	06:29	07:24		07:20	08:17	08:44			
	21:28	20:54 (3)	20:23	19:07		16:58	16:11	16:12			
31	05:37	20:32 (3)	06:31			07:22		08:44			
	21:26	20:55 (3)	20:21			16:56		16:13			
Potential sun hours	512		460	382		328	259	233			
Total, worst case	709		131	400							
Sun reduction	0.32		0.34	0.32							
Oper. time red.	1.00		1.00	1.00							
Wind dir. red.	0.62		0.64	0.67							
Total reduction	0.20		0.22	0.22							
Total, real	142		29	86							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LF - H318
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01	18:56 (5)	05:52				05:03	21:04 (4)	
	16:15	17:06	18:02						20:00	28	19:24 (5)	20:55			21:45	6	21:10 (4)
2	08:44	08:12	07:14						06:59		18:56 (5)	05:50			05:02		21:04 (4)
	16:16	17:08	18:04						20:02	26	19:22 (5)	20:57			21:46	8	21:12 (4)
3	08:43	08:10	07:11						06:56		18:57 (5)	05:48			05:01		21:03 (4)
	16:17	17:10	18:06						20:04	25	19:22 (5)	20:59			21:48	10	21:13 (4)
4	08:43	08:08	07:09						06:54		18:58 (5)	05:46			05:00		21:02 (4)
	16:18	17:12	18:07						20:06	23	19:21 (5)	21:01			21:49	12	21:14 (4)
5	08:43	08:07	07:07						06:51		18:58 (5)	05:44			04:59		21:02 (4)
	16:20	17:14	18:09						20:07	20	19:18 (5)	21:03			21:50	13	21:15 (4)
6	08:42	08:05	07:04						06:49		19:00 (5)	05:42			04:59		21:02 (4)
	16:21	17:16	18:11						20:09	17	19:17 (5)	21:04			21:51	14	21:16 (4)
7	08:42	08:03	07:02						06:47		19:02 (5)	05:40			04:58		21:01 (4)
	16:22	17:18	18:13						20:11	11	19:13 (5)	21:06	2	20:36 (3)	21:52	15	21:16 (4)
8	08:41	08:01	07:00						06:44			05:38			04:57		21:01 (4)
	16:24	17:20	18:15						20:13			21:08	4	20:37 (3)	21:53	17	21:18 (4)
9	08:41	07:59	06:57						06:42			05:36			04:57		21:01 (4)
	16:25	17:22	18:17						20:15			21:10	6	20:38 (3)	21:54	18	21:19 (4)
10	08:40	07:57	06:55						06:39			05:34			04:56		21:01 (4)
	16:27	17:24	18:19						20:17			21:11	9	20:40 (3)	21:55	18	21:19 (4)
11	08:40	07:55	06:52						06:37			05:33			04:56		21:01 (4)
	16:28	17:26	18:21						20:19			21:13	11	20:42 (3)	21:55	19	21:20 (4)
12	08:39	07:53	06:50						06:35			05:31			04:55		21:01 (4)
	16:30	17:28	18:23						20:20			21:15	13	20:43 (3)	21:56	20	21:21 (4)
13	08:38	07:51	06:48						06:32			05:29			04:55		21:00 (4)
	16:31	17:30	18:25						20:22			21:17	15	20:44 (3)	21:57	21	21:21 (4)
14	08:37	07:49	06:45						06:30			05:27			04:55		21:01 (4)
	16:33	17:32	18:27						20:24			21:18	17	20:47 (3)	21:57	21	21:22 (4)
15	08:36	07:47	06:43						06:28			05:26			04:55		21:01 (4)
	16:34	17:34	18:28						20:26			21:20	19	20:48 (3)	21:58	21	21:22 (4)
16	08:35	07:45	06:40						06:25			05:24			04:54		21:01 (4)
	16:36	17:36	18:30						20:28			21:22	20	20:50 (3)	21:59	22	21:23 (4)
17	08:34	07:43	06:38						06:23			05:22			04:54		21:01 (4)
	16:38	17:38	18:32						20:30			21:23	21	20:51 (3)	21:59	22	21:23 (4)
18	08:33	07:41	06:35						06:21			05:21			04:54		21:01 (4)
	16:40	17:40	18:34						20:31			21:25	22	20:52 (3)	22:00	23	21:24 (4)
19	08:32	07:39	06:33						06:18			05:19			04:54		21:01 (4)
	16:41	17:42	18:36						20:33			21:27	21	20:52 (3)	22:00	23	21:24 (4)
20	08:31	07:36	06:31						06:16			05:18			04:54		21:01 (4)
	16:43	17:44	18:38						20:35			21:28	20	20:51 (3)	22:00	23	21:24 (4)
21	08:30	07:34	06:28					18:09 (5)	06:14			05:16			04:54		21:02 (4)
	16:45	17:46	18:40	4	18:13 (5)	20:37			20:37			21:30	19	20:51 (3)	22:00	22	21:24 (4)
22	08:28	07:32	06:26					18:05 (5)	06:12			05:15			04:55		21:02 (4)
	16:47	17:48	18:42	10	18:15 (5)	20:39			20:39			21:31	18	20:51 (3)	22:01	23	21:25 (4)
23	08:27	07:30	06:23					18:03 (5)	06:09			05:13			04:55		21:02 (4)
	16:49	17:50	18:43	14	18:17 (5)	20:41			20:41			21:33	16	20:49 (3)	22:01	23	21:25 (4)
24	08:26	07:28	06:21					18:01 (5)	06:07			05:12			04:55		21:02 (4)
	16:51	17:52	18:45	17	18:18 (5)	20:42			20:42			21:34	15	20:49 (3)	22:01	23	21:25 (4)
25	08:24	07:25	06:18					18:00 (5)	06:05			05:11			04:56		21:03 (4)
	16:52	17:54	18:47	21	18:21 (5)	20:44			20:44			21:36	13	20:48 (3)	22:01	22	21:25 (4)
26	08:23	07:23	06:16					17:59 (5)	06:03			05:09			04:56		21:03 (4)
	16:54	17:56	18:49	24	18:23 (5)	20:46			20:46			21:37	11	20:47 (3)	22:01	22	21:25 (4)
27	08:22	07:21	06:13					17:58 (5)	06:01			05:08			04:56		21:03 (4)
	16:56	17:58	18:51	26	18:24 (5)	20:48			20:48			21:39	8	20:46 (3)	22:01	21	21:24 (4)
28	08:20	07:18	06:11					17:57 (5)	05:58			05:07			04:57		21:04 (4)
	16:58	18:00	18:53	28	18:25 (5)	20:50			20:50			21:40	2	20:43 (3)	22:01	21	21:25 (4)
29	08:18		07:09					18:56 (5)	05:56			05:06			04:58		21:05 (4)
	17:00		19:54	29	19:25 (5)	20:52			20:52			21:41			22:01	20	21:25 (4)
30	08:17		07:06					18:57 (5)	05:54			05:05			04:58		21:04 (4)
	17:02		19:56	28	19:25 (5)	20:53			20:53			21:43	2	21:08 (4)	22:00	20	21:24 (4)
31	08:15		07:04					18:56 (5)				05:04			21:05 (4)		
	17:04		19:58	28	19:24 (5)							21:44	4	21:09 (4)			
Potential sun hours	250	273	367					420				494			510		
Total, worst case				229				150				308			563		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.68				0.68				0.63			0.61		
Total reduction				0.18				0.24				0.24			0.19		
Total, real				42				36				74			109		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LF - H318

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	21:05 (4)	05:39	20:41 (3)	06:33	07:26	07:24	08:19			
	22:00	19	21:24 (4)	21:25	20:53 (3)	20:18	19:05	16:54	16:10		
2	05:00	21:06 (4)	05:40	20:41 (3)	06:35	07:28	07:26	08:21			
	22:00	18	21:24 (4)	21:23	20:52 (3)	20:16	19:02	16:52	16:09		
3	05:00	21:06 (4)	05:42	20:41 (3)	06:36	07:30	07:28	08:22			
	21:59	17	21:23 (4)	21:21	20:50 (3)	20:13	19:00	16:50	16:08		
4	05:01	21:06 (4)	05:44	20:42 (3)	06:38	07:31	07:30	08:24			
	21:59	17	21:23 (4)	21:19	20:48 (3)	20:11	18:57	16:48	16:08		
5	05:02	21:07 (4)	05:45	20:42 (3)	06:40	18:59 (5)	07:33	07:32	08:25		
	21:58	16	21:23 (4)	21:17	20:46 (3)	20:09	19:10 (5)	18:55	16:46	16:07	
6	05:03	21:08 (4)	05:47	20:44 (3)	06:42	18:57 (5)	07:35	07:34	08:26		
	21:57	14	21:22 (4)	21:15	20:45 (3)	20:06	19:13 (5)	18:52	16:44	16:07	
7	05:04	21:08 (4)	05:49		06:43	18:54 (5)	07:37	07:36	08:28		
	21:57	14	21:22 (4)	21:13	20:04	19	19:13 (5)	18:50	16:43	16:06	
8	05:05	21:09 (4)	05:51		06:45	18:52 (5)	07:39	07:38	08:29		
	21:56	12	21:21 (4)	21:11	20:01	23	19:15 (5)	18:48	16:41	16:06	
9	05:06	21:10 (4)	05:52		06:47	18:51 (5)	07:41	07:40	08:30		
	21:55	11	21:21 (4)	21:09	19:59	25	19:16 (5)	18:45	16:39	16:05	
10	05:07	21:11 (4)	05:54		06:49	18:49 (5)	07:42	07:42	08:31		
	21:55	9	21:20 (4)	21:07	19:56	26	19:15 (5)	18:43	16:37	16:05	
11	05:08	21:12 (4)	05:56		06:50	18:49 (5)	07:44	07:44	08:33		
	21:54	7	21:19 (4)	21:05	19:54	27	19:16 (5)	18:40	16:36	16:05	
12	05:09	21:13 (4)	05:57		06:52	18:48 (5)	07:46	07:45	08:34		
	21:53	5	21:18 (4)	21:03	19:51	28	19:16 (5)	18:38	16:34	16:05	
13	05:11	21:14 (4)	05:59		06:54	18:48 (5)	07:48	07:47	08:35		
	21:52	3	21:17 (4)	21:01	19:49	28	19:16 (5)	18:36	16:32	16:05	
14	05:12	21:15 (4)	06:01		06:56	18:47 (5)	07:50	07:49	08:36		
	21:51	1	21:16 (4)	20:59	19:47	28	19:15 (5)	18:33	16:31	16:05	
15	05:13		06:03		06:58	18:47 (5)	07:52	07:51	08:37		
	21:50		20:57		19:44	28	19:15 (5)	18:31	16:29	16:05	
16	05:14	20:49 (3)	06:05		06:59	18:47 (5)	07:54	07:53	08:38		
	21:48	5	20:54 (3)	20:55	19:42	27	19:14 (5)	18:29	16:27	16:05	
17	05:16	20:47 (3)	06:06		07:01	18:46 (5)	07:55	07:55	08:38		
	21:47	9	20:56 (3)	20:53	19:39	25	19:11 (5)	18:26	16:26	16:05	
18	05:17	20:45 (3)	06:08		07:03	18:47 (5)	07:57	07:57	08:39		
	21:46	12	20:57 (3)	20:50	19:37	21	19:08 (5)	18:24	16:25	16:05	
19	05:18	20:44 (3)	06:10		07:05	18:48 (5)	07:59	07:59	08:40		
	21:45	14	20:58 (3)	20:48	19:34	18	19:06 (5)	18:22	16:23	16:05	
20	05:20	20:44 (3)	06:12		07:06	18:49 (5)	08:01	08:00	08:41		
	21:44	16	21:00 (3)	20:46	19:32	15	19:04 (5)	18:20	16:22	16:06	
21	05:21	20:43 (3)	06:13		07:08	18:50 (5)	08:03	08:02	08:41		
	21:42	17	21:00 (3)	20:44	19:29	11	19:01 (5)	18:17	16:20	16:06	
22	05:23	20:42 (3)	06:15		07:10	18:52 (5)	08:05	08:04	08:42		
	21:41	18	21:00 (3)	20:42	19:27	7	18:59 (5)	18:15	16:19	16:07	
23	05:24	20:42 (3)	06:17		07:12		08:07	08:06	08:42		
	21:39	20	21:02 (3)	20:39	19:24		18:13	16:18	16:07		
24	05:26	20:41 (3)	06:19		07:13		08:09	08:08	08:43		
	21:38	21	21:02 (3)	20:37	19:22		18:11	16:17	16:08		
25	05:27	20:41 (3)	06:20		07:15		07:11	08:09	08:43		
	21:36	22	21:03 (3)	20:35	19:19		17:09	16:16	16:08		
26	05:29	20:41 (3)	06:22		07:17		07:13	08:11	08:43		
	21:35	21	21:02 (3)	20:32	19:17		17:06	16:15	16:09		
27	05:30	20:41 (3)	06:24		07:19		07:14	08:13	08:44		
	21:33	20	21:01 (3)	20:30	19:14		17:04	16:13	16:10		
28	05:32	20:40 (3)	06:26		07:21		07:16	08:14	08:44		
	21:32	19	20:59 (3)	20:28	19:12		17:02	16:13	16:11		
29	05:34	20:41 (3)	06:28		07:22		07:18	08:16	08:44		
	21:30	17	20:58 (3)	20:25	19:09		17:00	16:12	16:11		
30	05:35	20:40 (3)	06:29		07:24		07:20	08:17	08:44		
	21:28	16	20:56 (3)	20:23	19:07		16:58	16:11	16:12		
31	05:37	20:41 (3)	06:31				07:22		08:44		
	21:26	14	20:55 (3)	20:21			16:56		16:13		
Potential sun hours	512		460		382		328	259	233		
Total, worst case	424		43		383						
Sun reduction	0.32		0.34		0.32						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.62		0.63		0.68						
Total reduction	0.20		0.22		0.22						
Total, real	86		9		83						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LG - H319
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		18:56 (5)	05:52			05:03		20:41 (3)
	16:15	17:06	18:02						20:00	30	19:26 (5)	20:55			21:45	11	20:52 (3)
2	08:44	08:12	07:14						06:59		18:55 (5)	05:50			05:02		20:44 (3)
	16:16	17:08	18:04						20:02	29	19:24 (5)	20:57			21:46	8	20:52 (3)
3	08:43	08:10	07:12						06:56		18:56 (5)	05:48			05:01		20:46 (3)
	16:17	17:10	18:06						20:04	28	19:24 (5)	20:59			21:48	4	20:50 (3)
4	08:43	08:08	07:09						06:54		18:57 (5)	05:46			05:00		
	16:18	17:12	18:07						20:06	27	19:24 (5)	21:01			21:49		
5	08:43	08:07	07:07						06:51		18:57 (5)	05:44			04:59		
	16:20	17:14	18:09						20:07	25	19:22 (5)	21:03			21:50		
6	08:42	08:05	07:04						06:49		18:58 (5)	05:42			04:59		
	16:21	17:16	18:11						20:09	23	19:21 (5)	21:04			21:51		
7	08:42	08:03	07:02						06:47		18:59 (5)	05:40			04:58		
	16:22	17:18	18:13						20:11	19	19:18 (5)	21:06			21:52		
8	08:41	08:01	07:00						06:44		19:01 (5)	05:38			04:57		
	16:24	17:20	18:15						20:13	15	19:16 (5)	21:08			21:53		
9	08:41	07:59	06:57						06:42		19:04 (5)	05:36			04:57		
	16:25	17:22	18:17						20:15	9	19:13 (5)	21:10			21:54		
10	08:40	07:57	06:55						06:39			05:34			04:56		21:18 (4)
	16:27	17:24	18:19						20:17			21:11	3	20:40 (3)	21:55	1	21:19 (4)
11	08:40	07:55	06:52						06:37			05:33			04:56		21:18 (4)
	16:28	17:26	18:21						20:19			21:13	5	20:42 (3)	21:55	2	21:20 (4)
12	08:39	07:53	06:50						06:35			05:31			04:55		21:17 (4)
	16:30	17:28	18:23						20:20			21:15	7	20:43 (3)	21:56	4	21:21 (4)
13	08:38	07:51	06:48						06:32			05:29			04:55		21:16 (4)
	16:31	17:30	18:25						20:22			21:17	9	20:44 (3)	21:57	5	21:21 (4)
14	08:37	07:49	06:45						06:30			05:27			04:55		21:16 (4)
	16:33	17:32	18:27						20:24			21:18	12	20:47 (3)	21:57	6	21:22 (4)
15	08:36	07:47	06:43						06:28			05:26			04:55		21:16 (4)
	16:34	17:34	18:28						20:26			21:20	14	20:48 (3)	21:58	6	21:22 (4)
16	08:35	07:45	06:40						06:25			05:24			04:54		21:16 (4)
	16:36	17:36	18:30						20:28			21:22	16	20:50 (3)	21:59	7	21:23 (4)
17	08:34	07:43	06:38						06:23			05:22			04:54		21:16 (4)
	16:38	17:38	18:32						20:30			21:23	17	20:51 (3)	21:59	7	21:23 (4)
18	08:33	07:41	06:35						06:21			05:21			04:54		21:16 (4)
	16:40	17:40	18:34						20:31			21:25	19	20:53 (3)	22:00	8	21:24 (4)
19	08:32	07:39	06:33						06:18			05:19			04:54		21:16 (4)
	16:41	17:42	18:36						20:33			21:27	20	20:54 (3)	22:00	8	21:24 (4)
20	08:31	07:36	06:31						06:16			05:18			04:54		21:16 (4)
	16:43	17:44	18:38						20:35			21:28	21	20:55 (3)	22:00	8	21:24 (4)
21	08:30	07:34	06:28						06:14			05:16			04:54		21:16 (4)
	16:45	17:46	18:40						20:37			21:30	23	20:57 (3)	22:00	8	21:24 (4)
22	08:28	07:32	06:26					18:08 (5)	06:12			05:15			04:55		21:17 (4)
	16:47	17:48	18:42	7				18:15 (5)	20:39			21:31	23	20:58 (3)	22:01	8	21:25 (4)
23	08:27	07:30	06:23					18:05 (5)	06:09			05:13			04:55		21:17 (4)
	16:49	17:50	18:43	12				18:17 (5)	20:41			21:33	22	20:57 (3)	22:01	8	21:25 (4)
24	08:26	07:28	06:21					18:02 (5)	06:07			05:12			04:55		21:17 (4)
	16:51	17:52	18:45	16				18:18 (5)	20:42			21:34	21	20:56 (3)	22:01	8	21:25 (4)
25	08:24	07:25	06:18					18:01 (5)	06:05			05:11			04:56		21:18 (4)
	16:52	17:54	18:47	20				18:21 (5)	20:44			21:36	20	20:56 (3)	22:01	7	21:25 (4)
26	08:23	07:23	06:16					18:00 (5)	06:03			05:09			04:56		21:18 (4)
	16:54	17:56	18:49	23				18:23 (5)	20:46			21:37	20	20:56 (3)	22:01	7	21:25 (4)
27	08:22	07:21	06:13					17:59 (5)	06:01			05:08			04:56		21:18 (4)
	16:56	17:58	18:51	25				18:24 (5)	20:48			21:39	19	20:56 (3)	22:01	6	21:24 (4)
28	08:20	07:18	06:11					17:58 (5)	05:58			05:07			04:57		21:19 (4)
	16:58	18:00	18:53	28				18:26 (5)	20:50			21:40	17	20:55 (3)	22:01	6	21:25 (4)
29	08:18		07:09					18:57 (5)	05:56			05:06			04:58		21:20 (4)
	17:00		19:54	29				19:26 (5)	20:52			21:41	16	20:55 (3)	22:01	5	21:25 (4)
30	08:17		07:06					18:57 (5)	05:54			05:05			04:58		21:20 (4)
	17:02		19:56	29				19:26 (5)	20:53			21:43	14	20:54 (3)	22:00	4	21:24 (4)
31	08:15		07:04					18:56 (5)				05:04			20:40 (3)		
	17:04		19:58	30				19:26 (5)				21:44	13	20:53 (3)			
Potential sun hours	250	273	367					420				494			510		
Total, worst case				219				205				351			152		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.68				0.68				0.63			0.61		
Total reduction				0.18				0.24				0.24			0.20		
Total, real				40				49				84			30		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LG - H319

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	21:22 (4)	05:39	20:46 (3)	06:33	07:26	07:24	08:19			
	22:00	21:24 (4)	21:25	20:53 (3)	20:18	19:05	16:54	16:10			
2	05:00	21:23 (4)	05:40	20:48 (3)	06:35	07:28	07:26	08:21			
	22:00	21:24 (4)	21:23	20:52 (3)	20:16	19:02	16:52	16:09			
3	05:00		05:42	20:48 (3)	06:36	19:02 (5)	07:30	08:22			
	21:59		21:21	20:50 (3)	20:13	19:11 (5)	19:00	16:08			
4	05:01		05:44		06:38	18:58 (5)	07:31	08:24			
	21:59		21:19		20:11	19:13 (5)	18:57	16:08			
5	05:02		05:45		06:40	18:56 (5)	07:33	08:25			
	21:58		21:17		20:09	19:15 (5)	18:55	16:07			
6	05:03		05:47		06:42	18:54 (5)	07:35	08:26			
	21:57		21:15		20:06	19:17 (5)	18:52	16:07			
7	05:04		05:49		06:43	18:52 (5)	07:37	08:28			
	21:57		21:13		20:04	19:17 (5)	18:50	16:06			
8	05:05		05:51		06:45	18:51 (5)	07:39	08:29			
	21:56		21:11		20:01	19:18 (5)	18:48	16:06			
9	05:06		05:52		06:47	18:50 (5)	07:41	08:30			
	21:55		21:09		19:59	19:18 (5)	18:45	16:05			
10	05:07	20:52 (3)	05:54		06:49	18:49 (5)	07:42	08:31			
	21:55	6	20:58 (3)	21:07	19:56	19:18 (5)	18:43	16:05			
11	05:08		20:50 (3)	05:56	06:50	18:48 (5)	07:44	08:33			
	21:54	10	21:00 (3)	21:05	19:54	19:18 (5)	18:40	16:05			
12	05:09		20:49 (3)	05:57	06:52	18:48 (5)	07:46	08:34			
	21:53	12	21:01 (3)	21:03	19:51	19:18 (5)	18:38	16:05			
13	05:11		20:48 (3)	05:59	06:54	18:48 (5)	07:48	08:35			
	21:52	14	21:02 (3)	21:01	19:49	19:18 (5)	18:36	16:05			
14	05:12		20:48 (3)	06:01	06:56	18:47 (5)	07:50	08:36			
	21:51	15	21:03 (3)	20:59	19:47	19:16 (5)	18:33	16:05			
15	05:13		20:47 (3)	06:03	06:58	18:47 (5)	07:52	08:37			
	21:50	16	21:03 (3)	20:57	19:44	19:16 (5)	18:31	16:05			
16	05:14		20:47 (3)	06:05	06:59	18:48 (5)	07:54	08:38			
	21:48	18	21:05 (3)	20:55	19:42	19:14 (5)	18:29	16:05			
17	05:16		20:46 (3)	06:06	07:01	18:47 (5)	07:55	08:38			
	21:47	19	21:05 (3)	20:53	19:39	19:11 (5)	18:26	16:05			
18	05:17		20:46 (3)	06:08	07:03	18:48 (5)	07:57	08:39			
	21:46	20	21:06 (3)	20:50	19:37	19:08 (5)	18:24	16:05			
19	05:18		20:45 (3)	06:10	07:05	18:49 (5)	07:59	08:40			
	21:45	21	21:06 (3)	20:48	19:34	19:06 (5)	18:22	16:05			
20	05:20		20:45 (3)	06:12	07:06	18:51 (5)	08:01	08:41			
	21:44	22	21:07 (3)	20:46	19:32	19:04 (5)	18:20	16:06			
21	05:21		20:45 (3)	06:13	07:08	18:52 (5)	08:03	08:41			
	21:42	22	21:07 (3)	20:44	19:29	19:01 (5)	18:17	16:06			
22	05:23		20:44 (3)	06:15	07:10		08:05	08:42			
	21:41	23	21:07 (3)	20:42	19:27		18:15	16:07			
23	05:24		20:45 (3)	06:17	07:12		08:07	08:42			
	21:39	22	21:07 (3)	20:39	19:24		18:13	16:07			
24	05:26		20:44 (3)	06:19	07:13		08:09	08:43			
	21:38	21	21:05 (3)	20:37	19:22		18:11	16:08			
25	05:27		20:45 (3)	06:20	07:15		07:11	08:43			
	21:36	19	21:04 (3)	20:35	19:19		17:09	16:08			
26	05:29		20:44 (3)	06:22	07:17		07:13	08:43			
	21:35	18	21:02 (3)	20:32	19:17		17:06	16:09			
27	05:30		20:45 (3)	06:24	07:19		07:14	08:44			
	21:33	16	21:01 (3)	20:30	19:14		17:04	16:10			
28	05:32		20:45 (3)	06:26	07:21		07:16	08:44			
	21:32	14	20:59 (3)	20:28	19:12		17:02	16:11			
29	05:34		20:45 (3)	06:28	07:22		07:18	08:44			
	21:30	13	20:58 (3)	20:25	19:09		17:00	16:11			
30	05:35		20:45 (3)	06:29	07:24		07:20	08:44			
	21:28	11	20:56 (3)	20:23	19:07		16:58	16:12			
31	05:37		20:46 (3)	06:31			07:22	08:44			
	21:26	9	20:55 (3)	20:21			16:56	16:13			
Potential sun hours	512		460		382		328	259	233		
Total, worst case	364		13		432						
Sun reduction	0.32		0.34		0.32						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.63		0.63		0.68						
Total reduction	0.20		0.22		0.22						
Total, real	74		3		93						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LH - H320

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LI - H321

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LJ - H322

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LK - H323

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LL - H324

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LM - H325

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:22 (5)	07:16	17:07 (4)	07:01	05:52	19:51 (2)	05:03		
	16:15	17:06	12 16:34 (5)	18:02	27 17:34 (4)	20:00	20:55	23 20:14 (2)	21:45		
2	08:44	08:12	16:22 (5)	07:14	17:06 (4)	06:59	05:50	19:52 (2)	05:02		
	16:16	17:08	15 16:37 (5)	18:04	30 17:36 (4)	20:02	20:57	21 20:13 (2)	21:46		
3	08:43	08:10	16:22 (5)	07:11	17:06 (4)	06:56	05:48	19:53 (2)	05:01		
	16:17	17:10	17 16:39 (5)	18:06	32 17:38 (4)	20:04	20:59	19 20:12 (2)	21:48		
4	08:43	08:08	16:22 (5)	07:09	17:07 (4)	06:54	05:46	19:54 (2)	05:00		
	16:18	17:12	19 16:41 (5)	18:07	31 17:38 (4)	20:06	21:01	16 20:10 (2)	21:49		
5	08:43	08:07	16:23 (5)	07:07	17:06 (4)	06:51	05:44	19:56 (2)	04:59		
	16:19	17:14	20 16:43 (5)	18:09	31 17:37 (4)	20:07	21:03	12 20:08 (2)	21:50		
6	08:42	08:05	16:23 (5)	07:04	17:07 (4)	06:49	05:42	19:59 (2)	04:59		
	16:21	17:16	19 16:42 (5)	18:11	30 17:37 (4)	20:09	21:04	5 20:04 (2)	21:51		
7	08:42	08:03	16:24 (5)	07:02	17:07 (4)	06:47	05:40		04:58		
	16:22	17:18	18 16:42 (5)	18:13	28 17:35 (4)	20:11	21:06		21:52		
8	08:42	08:01	16:25 (5)	07:00	17:08 (4)	06:44	05:38		04:57		
	16:24	17:20	16 16:41 (5)	18:15	26 17:34 (4)	20:13	21:08		21:53		
9	08:41	07:59	16:26 (5)	06:57	17:09 (4)	06:42	05:36		04:57		
	16:25	17:22	14 16:40 (5)	18:17	23 17:32 (4)	20:15	21:10		21:54		
10	08:40	07:57	16:28 (5)	06:55	17:11 (4)	06:39	05:34		04:56		
	16:26	17:24	10 16:38 (5)	18:19	20 17:31 (4)	20:17	21:11		21:55		
11	08:40	07:55		06:52	17:14 (4)	06:37	05:33		04:56		
	16:28	17:26		18:21	16 17:55 (3)	20:19	21:13		21:55		
12	08:39	07:53		06:50	17:18 (4)	06:35	05:31		04:55		
	16:30	17:28		18:23	10 17:56 (3)	20:20	21:15		21:56		
13	08:38	07:51		06:48	17:51 (3)	06:32	05:29		04:55		
	16:31	17:30		18:25	7 17:58 (3)	20:22	21:17		21:57		
14	08:37	07:49		06:45	17:50 (3)	06:30	05:27		04:55		
	16:33	17:32		18:27	10 18:00 (3)	20:24	21:18		21:57		
15	08:36	07:47		06:43	17:50 (3)	06:28	05:26		04:54		
	16:34	17:34		18:28	12 18:02 (3)	20:26	21:20		21:58		
16	08:35	07:45		06:40	17:49 (3)	06:25	05:24		04:54		
	16:36	17:36		18:30	15 18:04 (3)	20:28	21:22		21:59		
17	08:34	07:43		06:38	17:49 (3)	06:23	19:58 (2)	05:22	04:54		
	16:38	17:38		18:32	17 18:06 (3)	20:30	20:01 (2)	21:23	21:59		
18	08:33	07:41		06:35	17:49 (3)	06:21	19:56 (2)	05:21	04:54		
	16:40	17:40		18:34	18 18:07 (3)	20:31	7 20:03 (2)	21:25	22:00		
19	08:32	07:39		06:33	17:50 (3)	06:18	19:54 (2)	05:19	04:54		
	16:41	17:42		18:36	17 18:07 (3)	20:33	11 20:05 (2)	21:27	22:00		
20	08:31	07:36		06:31	17:50 (3)	06:16	19:53 (2)	05:18	04:54		
	16:43	17:44		18:38	15 18:05 (3)	20:35	14 20:07 (2)	21:28	22:00		
21	08:30	07:34		17:15 (4)	06:28	17:53 (3)	06:14	19:51 (2)	05:16	04:54	
	16:45	17:46	3	17:18 (4)	18:40	10 18:03 (3)	20:37	17 20:08 (2)	21:30	22:01	
22	08:28	07:32		17:13 (4)	06:26		06:12	19:51 (2)	05:15	04:55	
	16:47	17:48	6	17:19 (4)	18:41		20:39	19 20:10 (2)	21:31	22:01	
23	08:27	07:30		17:11 (4)	06:23		06:09	19:50 (2)	05:13	04:55	
	16:49	17:50	11	17:22 (4)	18:43		20:41	22 20:12 (2)	21:33	22:01	
24	08:26	07:28		17:11 (4)	06:21		06:07	19:50 (2)	05:12	04:55	
	16:50	17:52	13	17:24 (4)	18:45		20:42	24 20:14 (2)	21:34	22:01	
25	08:24	07:25		17:09 (4)	06:18		06:05	19:50 (2)	05:11	04:55	
	16:52	17:54	17	17:26 (4)	18:47		20:44	25 20:15 (2)	21:36	22:01	
26	08:23	07:23		17:08 (4)	06:16		06:03	19:50 (2)	05:09	04:56	
	16:54	17:56	20	17:28 (4)	18:49		20:46	27 20:17 (2)	21:37	22:01	
27	08:22	07:21		17:08 (4)	06:13		06:00	19:50 (2)	05:08	04:56	
	16:56	17:58	23	17:31 (4)	18:51		20:48	27 20:17 (2)	21:39	22:01	
28	08:20	07:18		17:07 (4)	06:11		05:58	19:50 (2)	05:07	04:57	
	16:58	16:26 (5)	18:00	17:32 (4)	18:53		20:50	26 20:16 (2)	21:40	22:01	
29	08:18	16:23 (5)			07:08		05:56	19:50 (2)	05:06	04:57	
	17:00	5 16:28 (5)			19:54		20:52	26 20:16 (2)	21:41	22:01	
30	08:17	16:22 (5)			07:06		05:54	19:51 (2)	05:05	04:58	
	17:02	8 16:30 (5)			19:56		20:53	24 20:15 (2)	21:43	22:00	
31	08:15	16:22 (5)			07:04				05:04		
	17:04	10 16:32 (5)			19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case	25		278		425		272		96		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.67		0.68		0.65		0.65		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	4		43		78		62		24		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LM - H325

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:30 (3) 16:54	15:58 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:36 (3) 16:52	16:08 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:50 (4) 16:50	15:54 (5) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:48 (4) 16:48	15:54 (5) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:46 (4) 16:46	15:53 (5) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:45 (4) 16:44	15:52 (5) 16:07
7	05:04 21:57	05:49 21:13	20:08 (2) 20:04	07:37 18:50	17:43 (4) 16:43	15:52 (5) 16:06
8	05:05 21:56	05:50 21:11	20:05 (2) 20:01	07:39 18:48	17:42 (4) 16:41	15:52 (5) 16:06
9	05:06 21:55	05:52 21:09	20:03 (2) 19:59	07:41 18:45	17:41 (4) 16:39	15:52 (5) 16:05
10	05:07 21:55	05:54 21:07	20:01 (2) 19:56	07:42 18:43	17:41 (4) 16:37	15:53 (5) 16:05
11	05:08 21:54	05:56 21:05	20:00 (2) 19:54	07:44 18:40	17:40 (4) 16:35	15:54 (5) 16:05
12	05:09 21:53	05:57 21:03	20:22 (2) 19:51	07:46 18:38	17:40 (4) 16:34	16:03 (5) 16:05
13	05:10 21:52	05:59 21:01	20:23 (2) 19:49	07:48 18:36	17:40 (4) 16:32	15:55 (5) 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 19:47	07:50 18:33	17:40 (4) 16:31	15:59 (5) 16:04
15	05:13 21:50	06:03 20:57	20:23 (2) 19:44	07:52 18:31	18:04 (4) 16:29	15:58 (5) 16:05
16	05:14 21:49	06:04 20:55	19:56 (2) 19:42	07:54 18:29	17:41 (4) 16:27	16:29 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 19:39	07:55 18:26	17:41 (4) 16:26	16:27 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 19:37	07:57 18:24	17:42 (4) 16:24	16:26 16:05
19	05:18 21:45	06:10 20:48	20:22 (2) 19:34	07:59 18:22	17:43 (4) 16:23	16:25 16:05
20	05:20 21:44	06:12 20:46	19:56 (2) 19:32	08:01 18:20	17:45 (4) 16:22	16:24 16:06
21	05:21 21:42	06:13 20:44	19:57 (2) 19:29	08:03 18:17	17:46 (4) 16:20	16:23 16:06
22	05:23 21:41	06:15 20:42	19:56 (2) 19:27	18:38 (3) 18:47 (3)	08:05 18:15	16:20 16:06
23	05:24 21:39	06:17 20:39	19:57 (2) 19:24	18:36 (3) 18:49 (3)	08:07 18:13	16:19 16:07
24	05:26 21:38	06:19 20:37	19:58 (2) 19:22	18:34 (3) 18:51 (3)	08:09 18:11	16:18 16:08
25	05:27 21:36	06:20 20:35	19:59 (2) 20:06 (2)	18:32 (3) 18:50 (3)	07:11 17:09	16:17 16:08
26	05:29 21:35	06:22 20:32	20:01 (2) 20:04 (2)	18:31 (3) 18:48 (3)	07:13 17:06	16:16 16:09
27	05:30 21:33	06:24 20:30	19:19 19:14	18:31 (3) 18:46 (3)	07:14 17:04	16:15 16:10
28	05:32 21:32	06:26 20:28	19:14 19:12	18:30 (3) 18:44 (3)	17:04 17:02	16:14 16:11
29	05:34 21:30	06:27 20:25	19:12 19:09	18:30 (3) 18:41 (3)	17:18 17:00	16:16 16:11
30	05:35 21:28	06:29 20:23	19:07 19:07	18:30 (3) 18:38 (3)	17:20 16:58	16:18 16:12
31	05:37 21:26	06:31 20:21		07:22 16:56	16:00 (5) 16:04 (5)	16:11 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		372	122	431	180	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		82	26	85	31	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LN - H326

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:54 (5) 20:18 (5)	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:55 (5) 20:17 (5)	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:55 (5) 20:17 (5)	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:54 21:01	19:55 (5) 20:16 (5)	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:56 (5) 20:14 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:10 (5) 20:20 (5)	06:40 20:09	07:33 18:55	08:25 16:46
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:57 (5) 20:13 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:08 (5) 20:22 (5)	06:42 20:06	07:35 18:52	08:26 16:44
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:00 (5) 20:12 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:07 (5) 20:24 (5)	06:43 20:04	07:37 18:50	08:28 16:43
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:02 (5) 20:10 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:05 (5) 20:24 (5)	06:45 20:01	07:39 18:48	08:29 16:41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10		04:57 21:54	05:06 21:55	05:52 21:09	20:05 (5) 20:25 (5)	06:47 19:59	07:41 18:45	08:30 16:39
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11		04:56 21:54	05:07 21:54	05:54 21:07	20:03 (5) 20:25 (5)	06:49 19:56	07:42 18:43	08:31 16:37
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13		04:56 21:55	05:08 21:54	05:56 21:05	20:03 (5) 20:26 (5)	06:50 19:54	07:44 18:40	08:33 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15		04:55 21:56	05:09 21:53	05:57 21:03	20:03 (5) 20:27 (5)	06:52 19:51	07:46 18:38	08:34 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	20:02 (5) 20:26 (5)	06:54 19:49	07:48 18:36	08:35 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	05:12 21:51	06:01 20:59	20:02 (5) 20:26 (5)	06:56 19:47	07:50 18:33	08:36 16:31
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	05:13 21:50	06:03 20:57	20:02 (5) 20:26 (5)	06:58 19:44	07:52 18:31	08:37 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	20:01 (5) 20:25 (5)	06:59 19:42	07:54 18:29	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	20:02 (5) 20:23 (5)	07:01 19:39	07:55 18:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25		04:54 21:59	05:17 21:46	06:08 20:50	20:02 (5) 20:22 (5)	07:03 19:37	07:57 18:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27		04:54 22:00	05:18 21:45	06:10 20:48	20:02 (5) 20:19 (5)	07:05 19:34	07:59 18:22	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:04 (5)	04:54 22:00	05:20 21:43	06:12 20:46	20:03 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:00 (5)	04:54 22:00	05:21 21:42	06:13 20:44	20:05 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	19:59 (5)	04:55 22:01	05:23 21:41	06:15 20:42	20:05 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	19:57 (5)	04:55 22:01	05:24 21:39	06:17 20:39	20:09 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	19:56 (5)	04:55 22:01	05:26 21:38	06:19 20:37		07:13 19:22	08:09 18:11	08:43 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	19:56 (5)	04:56 22:01	05:27 21:36	06:20 20:35		07:15 19:19	08:09 17:09	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	19:55 (5)	04:56 22:01	05:29 21:35	06:22 20:32		07:17 19:17	08:11 17:06	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	19:55 (5)	04:56 22:01	05:30 21:33	06:24 20:30		07:19 19:14	08:13 17:04	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	19:54 (5)	04:57 22:01	05:32 21:32	06:26 20:28		07:21 19:12	08:14 17:02	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	19:54 (5)	04:58 22:00	05:34 21:30	06:28 20:25		07:22 19:09	08:16 17:00	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	19:54 (5)	04:58 22:00	05:35 21:28	06:29 20:23		07:24 19:07	08:17 16:58	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44	20:18 (5)		05:37 21:26	06:31 20:21		07:22 16:56	08:14 16:13	
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233
Total, worst case				193	143				335				
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.65	0.65				0.65				
Total reduction				0.23	0.25				0.22				
Total, real				44	35				74				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LO - H327

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	19:51 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:55	20:10 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	19:52 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	20:09 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:43	08:10	07:11	06:56	05:48	19:53 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	20:07 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08		
4	08:43	08:08	07:09	06:54	05:46	19:55 (5)	05:00	05:01	05:44	06:38	07:31	07:30	08:23		
	16:18	17:12	18:07	20:06	21:01	20:05 (5)	21:49	21:59	21:19	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	06:51	05:44		04:59	05:02	05:45	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:03		21:50	21:58	21:17	20:09	18:55	16:46	16:07		
6	08:42	08:05	07:04	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04		21:51	21:57	21:15	20:06	18:52	16:44	16:07		
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:13	20:04	18:50	16:43	16:06		
8	08:41	08:01	07:00	06:44	05:38		04:57	05:05	05:51	20:07 (5)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:11	4	20:11 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	20:04 (5)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	11	20:15 (5)	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	20:01 (5)	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	15	20:16 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:00 (5)	06:50	07:44	07:43	08:33	
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	17	20:17 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:57	19:59 (5)	06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	20	20:19 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:58 (5)	06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	21	20:19 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:57 (5)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	22	20:19 (5)	19:47	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	19:57 (5)	06:58	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	23	20:20 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	19:56 (5)	06:59	07:54	07:53	08:38	
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	23	20:19 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	19:59 (5)	05:22	04:54	05:16	06:06	19:56 (5)	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	2	20:01 (5)	21:59	21:47	20:53	24	20:20 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	19:56 (5)	05:21	04:54	05:17	06:08	19:56 (5)	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	7	20:03 (5)	21:59	21:46	20:50	24	20:20 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	19:54 (5)	05:19	04:54	05:18	06:10	19:55 (5)	07:05	07:59	07:59	08:40	
	16:41	17:42	18:36	20:33	11	20:05 (5)	22:00	21:45	20:48	24	20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:53 (5)	05:18	04:54	05:20	06:12	19:56 (5)	07:06	08:01	08:00	08:41	
	16:43	17:44	18:38	20:35	14	20:07 (5)	22:00	21:43	20:46	21	20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:51 (5)	05:16	04:54	05:21	06:13	19:56 (5)	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	17	20:08 (5)	22:00	21:42	20:44	19	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:50 (5)	05:15	04:55	05:23	06:15	19:56 (5)	07:10	08:05	08:04	08:42	
	16:47	17:48	18:41	20:39	20	20:10 (5)	22:01	21:41	20:42	16	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:50 (5)	05:13	04:55	05:24	06:17	19:57 (5)	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	22	20:12 (5)	22:01	21:39	20:39	13	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:49 (5)	05:12	04:55	05:26	06:19	19:58 (5)	07:13	08:09	08:07	08:43	
	16:51	17:52	18:45	20:42	24	20:13 (5)	22:01	21:38	20:37	11	20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:49 (5)	05:11	04:56	05:27	06:20	19:59 (5)	07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	24	20:13 (5)	22:01	21:36	20:35	7	20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:49 (5)	05:09	04:56	05:29	06:22	20:03 (5)	07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	24	20:13 (5)	22:01	21:35	20:32	1	20:04 (5)	19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	19:49 (5)	05:08	04:56	05:30	06:24		07:19	07:14	08:13	08:43	
	16:56	17:58	18:51	20:48	24	20:13 (5)	22:01	21:33	20:30		19:14	17:04	16:13	16:10	
28	08:20	07:18	06:11	05:58	19:49 (5)	05:07	04:57	05:32	06:26		07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	23	20:12 (5)	22:01	21:32	20:28		19:12	17:02	16:13	16:11	
29	08:18		07:08	05:56	19:50 (5)	05:06	04:58	05:34	06:28		07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	22	20:12 (5)	22:00	21:30	20:25		19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	19:50 (5)	05:05	04:58	05:35	06:29		07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	21	20:11 (5)	22:00	21:28	20:23		19:07	16:58	16:11	16:12	
31	08:15		07:04			05:04		05:37	06:31			07:22		08:44	
	17:04		19:58			21:44		21:26	20:21			16:56		16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233	
Total, worst case				255	60				316						
Sun reduction				0.35	0.38				0.34						
Oper. time red.				1.00	1.00				1.00						
Wind dir. red.				0.65	0.65				0.65						
Total reduction				0.23	0.25				0.22						
Total, real				58	15				70						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LP - H328

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	19:53 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:55	20:02 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50		05:02	05:00	05:40	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57		21:46	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:43	08:10	07:11	06:56	05:48		05:01	05:00	05:42	06:36	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59		21:48	21:59	21:21	20:13	19:00	16:50	16:08		
4	08:43	08:08	07:09	06:54	05:46		05:00	05:01	05:44	06:38	07:31	07:30	08:23		
	16:18	17:12	18:07	20:06	21:01		21:49	21:59	21:19	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	06:51	05:44		04:59	05:02	05:45	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:02		21:50	21:58	21:17	20:09	18:55	16:46	16:07		
6	08:42	08:05	07:04	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04		21:51	21:57	21:15	20:06	18:52	16:44	16:07		
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:13	20:04	18:50	16:43	16:06		
8	08:41	08:01	07:00	06:44	05:38		04:57	05:05	05:51	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:11	20:01	18:48	16:41	16:06		
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	19:59	18:45	16:39	16:05		
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	06:49	07:42	07:42	08:31		
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	19:56	18:43	16:37	16:05		
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:04 (5)	06:50	07:44	08:33		
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	4	20:08 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:57	20:01 (5)	06:52	07:46	07:45	08:34	16:05
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	11	20:12 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:58 (5)	06:54	07:48	07:47	08:35	16:05
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	15	20:13 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:57 (5)	06:56	07:50	07:49	08:36	16:05
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	17	20:14 (5)	19:46	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	19:56 (5)	06:58	07:52	07:51	08:37	16:05
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	19	20:15 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	5	19:55 (5)	04:54	05:14	06:05	19:54 (5)	06:59	07:54	07:53	08:37	16:05
	16:36	17:36	18:30	20:28	20:00 (5)	21:22	21:59	21:48	20:55	21	20:15 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	19:52 (5)	05:22	04:54	05:16	06:06	19:54 (5)	07:01	07:55	07:55	08:38	16:05
	16:38	17:38	18:32	20:30	9	20:01 (5)	21:59	21:47	20:53	22	20:16 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	19:51 (5)	05:21	04:54	05:17	06:08	19:54 (5)	07:03	07:57	07:57	08:39	16:05
	16:40	17:40	18:34	20:31	12	20:03 (5)	21:59	21:46	20:50	22	20:16 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	19:50 (5)	05:19	04:54	05:18	06:10	19:53 (5)	07:05	07:59	07:59	08:40	16:05
	16:41	17:42	18:36	20:33	15	20:05 (5)	22:00	21:45	20:48	22	20:15 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:49 (5)	05:18	04:54	05:20	06:12	19:53 (5)	07:06	08:01	08:00	08:41	16:06
	16:43	17:44	18:38	20:35	18	20:07 (5)	22:00	21:43	20:46	23	20:16 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:48 (5)	05:16	04:54	05:21	06:13	19:53 (5)	07:08	08:03	08:02	08:41	16:06
	16:45	17:46	18:40	20:37	20	20:08 (5)	22:00	21:42	20:44	22	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:47 (5)	05:15	04:55	05:23	06:15	19:52 (5)	07:10	08:05	08:04	08:42	16:07
	16:47	17:48	18:41	20:39	23	20:10 (5)	22:01	21:41	20:42	20	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:47 (5)	05:13	04:55	05:24	06:17	19:53 (5)	07:12	08:07	08:06	08:42	16:07
	16:49	17:50	18:43	20:41	23	20:10 (5)	22:01	21:39	20:39	17	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:47 (5)	05:12	04:55	05:26	06:19	19:54 (5)	07:13	08:09	08:07	08:43	16:08
	16:51	17:52	18:45	20:42	23	20:10 (5)	22:01	21:38	20:37	15	20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:47 (5)	05:11	04:56	05:27	06:20	19:54 (5)	07:15	07:11	08:09	08:43	16:08
	16:52	17:54	18:47	20:44	22	20:09 (5)	22:01	21:36	20:35	12	20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:48 (5)	05:09	04:56	05:29	06:22	19:55 (5)	07:17	07:13	08:11	08:43	16:09
	16:54	17:56	18:49	20:46	21	20:09 (5)	22:01	21:35	20:32	9	20:04 (5)	19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	19:48 (5)	05:08	04:56	05:30	06:24	19:58 (5)	07:19	07:14	08:13	08:43	16:10
	16:56	17:58	18:51	20:48	20	20:08 (5)	22:01	21:33	20:30	4	20:02 (5)	19:14	17:04	16:13	16:10
28	08:20	07:18	06:11	05:58	19:49 (5)	05:07	04:57	05:32	06:26		07:21	07:16	08:14	08:44	16:11
	16:58	18:00	18:53	20:50	18	20:07 (5)	22:01	21:32	20:28		19:12	17:02	16:13	16:11	16:11
29	08:18		07:08	05:56	19:50 (5)	05:06	04:58	05:34	06:28		07:22	07:18	08:16	08:44	16:12
	17:00		19:54	20:52	16	20:06 (5)	22:00	21:30	20:25		19:09	17:00	16:12	16:11	16:11
30	08:17		07:06	05:54	19:51 (5)	05:05	04:58	05:35	06:29		07:24	07:20	08:17	08:44	16:12
	17:02		19:56	20:53	14	20:05 (5)	22:00	21:28	20:23		19:07	16:58	16:11	16:12	16:12
31	08:15		07:04			05:04		05:37	06:31			07:22		08:44	16:13
	17:04		19:58			21:44		21:26	20:21			16:56			16:13
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233		
Total, worst case				259	9				275						
Sun reduction				0.35	0.38				0.34						
Oper. time red.				1.00	1.00				1.00						
Wind dir. red.				0.65	0.65				0.65						
Total reduction				0.23	0.25				0.22						
Total, real				59	2				61						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LQ - H329

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:52 (5) 21:17	05:29 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:49 (5) 21:18	05:27 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:47 (5) 21:20	05:26 21:58	05:13 21:50	06:03 20:57	19:56 (5) 20:05 (5)	06:58 19:44	07:52 18:31	08:37 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:58 (5) 21:22	05:24 21:59	05:14 21:48	06:05 20:55	19:53 (5) 20:06 (5)	06:59 19:42	07:54 18:29	08:37 16:27
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:46 (5) 21:23	05:22 21:59	05:16 21:47	06:06 20:53	19:51 (5) 20:08 (5)	07:01 19:39	07:55 18:26	08:38 16:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:44 (5) 21:25	05:21 21:59	05:17 21:46	06:08 20:50	19:50 (5) 20:09 (5)	07:03 19:37	07:57 18:24	08:39 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	20:03 (5) 21:27	05:19 22:00	05:18 21:45	06:10 20:48	19:49 (5) 20:09 (5)	07:05 19:34	07:59 18:22	08:40 16:23
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:43 (5) 21:28	05:18 22:00	05:18 21:43	06:12 20:46	19:48 (5) 20:10 (5)	07:06 19:32	08:01 18:20	08:41 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:42 (5) 21:30	05:16 22:00	05:21 21:42	06:13 20:44	19:48 (5) 20:10 (5)	07:08 19:29	08:03 18:17	08:42 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	20:05 (5) 21:31	05:15 22:01	05:23 21:41	06:15 20:42	19:47 (5) 20:09 (5)	07:10 19:27	08:05 18:15	08:42 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:43 (5) 21:33	05:13 22:01	05:24 21:39	06:17 20:39	19:47 (5) 20:09 (5)	07:12 19:24	08:07 18:13	08:42 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:43 (5) 21:34	05:12 22:01	05:26 21:38	06:19 20:37	19:47 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:43 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	20:03 (5) 21:36	05:11 22:01	05:27 21:36	06:20 20:35	19:47 (5) 20:06 (5)	07:15 19:19	07:11 17:09	08:43 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:45 (5) 21:37	05:09 22:01	05:29 21:35	06:22 20:32	19:47 (5) 20:04 (5)	07:17 19:17	07:13 17:06	08:43 16:15
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:46 (5) 21:39	05:08 22:01	05:30 21:33	06:24 20:30	19:48 (5) 20:02 (5)	07:19 19:14	07:14 17:04	08:43 16:13
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	19:49 (5) 21:40	05:07 22:01	05:32 21:32	06:26 20:28	19:48 (5) 19:59 (5)	07:21 19:12	07:16 17:02	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	19:57 (5) 21:40	05:06 22:01	05:34 21:32	06:28 20:25	19:50 (5) 19:57 (5)	07:22 19:09	07:18 17:00	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53		05:05 22:00	05:35 21:32	06:29 20:23	19:53 (5) 19:55 (5)	07:24 19:07	07:20 16:58	08:44 16:11
31	08:15 17:04		07:04 19:58			05:04 21:44	05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				257				258				
Sun reduction				0.35				0.34				
Oper. time red.				1.00				1.00				
Wind dir. red.				0.65				0.65				
Total reduction				0.23				0.22				
Total, real				59				57				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LR - H330

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 19:53 (5)	04:55 19:56 (5)	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 19:51 (5)	04:55 19:58 (5)	05:13 21:50	06:03 20:57	06:57 19:57 (5)	07:52 19:44	07:51 18:31	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 19:49 (5)	04:54 19:59 (5)	05:14 21:52	06:05 21:48	06:59 19:55 (5)	07:54 19:42	07:53 18:29	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 19:48 (5)	04:54 20:01 (5)	05:16 21:53	06:06 21:47	07:01 20:09 (5)	07:55 19:39	07:55 18:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 19:47 (5)	04:54 20:03 (5)	05:17 21:55	06:08 21:46	07:03 20:10 (5)	07:57 19:37	07:57 18:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 19:47 (5)	04:54 20:05 (5)	05:18 21:56	06:10 21:45	07:05 20:10 (5)	07:59 19:34	07:59 18:22	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 19:46 (5)	04:54 20:07 (5)	05:20 21:58	06:12 21:43	07:06 20:11 (5)	08:01 19:32	08:00 18:20	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 19:45 (5)	04:54 20:06 (5)	05:21 21:59	06:13 21:42	07:08 20:11 (5)	08:03 19:29	08:02 18:17	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 19:46 (5)	04:55 20:05 (5)	05:23 21:59	06:15 21:41	07:10 20:10 (5)	08:05 19:27	08:04 18:15	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 19:46 (5)	04:55 20:05 (5)	05:24 21:59	06:17 21:39	07:12 20:10 (5)	08:07 19:24	08:06 18:13	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 19:47 (5)	04:55 20:04 (5)	05:26 21:58	06:19 21:38	07:13 20:09 (5)	08:09 19:22	08:07 18:11	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 19:47 (5)	04:56 20:03 (5)	05:27 21:56	06:20 21:36	07:15 20:06 (5)	07:11 19:19	07:11 18:09	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 19:49 (5)	04:56 20:02 (5)	05:29 21:57	06:22 21:35	07:17 20:04 (5)	07:13 19:17	07:13 18:06	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 19:51 (5)	04:56 20:00 (5)	05:30 21:59	06:24 21:33	07:19 20:02 (5)	07:14 19:14	07:14 18:04	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 19:50 (5)	04:57 20:01 (5)	05:32 21:58	06:26 21:32	07:21 20:02 (5)	07:16 19:12	07:16 18:04	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 19:47 (5)	04:58 20:01 (5)	05:34 21:59	06:27 21:30	07:22 20:02 (5)	07:18 19:12	07:18 18:06	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 19:47 (5)	04:58 20:01 (5)	05:35 21:58	06:29 21:30	07:24 20:02 (5)	07:20 19:07	07:20 18:04	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 19:47 (5)	05:04 20:01 (5)	05:37 21:58	06:31 21:26		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				202				208				
Sun reduction				0.35				0.34				
Oper. time red.				1.00				1.00				
Wind dir. red.				0.65				0.65				
Total reduction				0.23				0.22				
Total, real				46				46				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LS - H331

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:21 (4) 21:25	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:22 (4) 21:24 (4)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	21:22 (4) 21:23 (4)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 19:56 (5)	04:55 21:18	05:12 21:57	06:01 21:51	06:01 21:51	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 19:51 (5)	04:55 21:20	05:13 21:58	06:03 21:50	06:03 21:50	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 19:49 (5)	04:54 21:22	05:14 21:59	06:04 21:48	06:04 21:48	19:59 (5) 20:04 (5)	06:59 19:42	07:54 18:29	08:37 16:07
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 19:48 (5)	04:54 21:23	05:16 21:59	06:06 20:53	06:06 20:53	19:56 (5) 20:07 (5)	07:01 19:39	07:55 18:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 19:47 (5)	04:54 21:25	05:17 21:59	06:08 20:50	06:08 20:50	19:55 (5) 20:09 (5)	07:03 19:37	07:57 18:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 19:47 (5)	04:54 21:26	05:18 22:00	06:10 20:48	06:10 20:48	19:53 (5) 20:09 (5)	07:05 19:34	07:59 18:22	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	06:16 19:47 (5)	05:18 21:28	05:54 22:00	06:12 21:43	06:12 21:43	19:52 (5) 20:10 (5)	07:06 19:32	08:01 18:20	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	06:14 19:46 (5)	05:16 21:30	05:54 22:00	06:13 21:42	06:13 21:42	19:52 (5) 20:11 (5)	07:08 19:29	08:03 18:17	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	06:12 19:46 (5)	05:15 21:31	04:55 22:01	06:15 21:41	06:15 21:41	19:51 (5) 20:10 (5)	07:10 19:27	08:05 18:15	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	06:09 19:47 (5)	05:13 21:33	04:55 22:01	06:17 21:39	06:17 21:39	19:51 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	06:07 19:47 (5)	05:12 21:34	04:55 22:01	06:19 21:38	06:19 21:38	19:51 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	06:05 19:49 (5)	05:11 21:36	04:56 22:01	06:20 20:35	06:20 20:35	19:50 (5) 20:06 (5)	07:15 19:19	07:11 17:09	08:09 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	06:03 19:50 (5)	05:09 21:37	04:56 22:01	06:22 21:35	06:22 21:35	19:51 (5) 20:04 (5)	07:17 19:17	07:13 17:06	08:11 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	06:01 19:54 (5)	05:08 21:39	04:56 22:01	06:24 21:33	06:24 21:33	19:52 (5) 20:02 (5)	07:19 19:14	07:14 16:13	08:13 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:58 21:40	05:07 22:01	04:57 21:32	06:26 20:28	06:26 20:28	19:52 (5) 19:59 (5)	07:21 19:12	07:16 16:12	08:14 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:56 21:41	04:58 22:00	05:34 21:30	06:27 20:25	06:27 20:25	19:54 (5) 19:57 (5)	07:22 19:09	07:18 17:00	08:16 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:54 21:43	04:58 22:00	05:35 21:28	06:29 20:23	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21	06:31 20:21		07:22 16:56	08:18 16:13	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233
Total, worst case				182		111		6		188			
Sun reduction				0.35		0.32		0.32		0.34			
Oper. time red.				1.00		1.00		1.00		1.00			
Wind dir. red.				0.65		0.61		0.61		0.65			
Total reduction				0.23		0.19		0.20		0.22			
Total, real				42		22		1		42			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LT - H332

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	20:38 (4)	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:55	21:45	22:00	21:25	15	20:53 (4)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40		20:39 (4)	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:46	21:59	21:23	13	20:52 (4)	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48	05:01	05:00	05:42		20:38 (4)	06:36	07:30	07:28	08:22
	16:17	17:10	18:05	20:04	20:59	21:48	21:59	21:21	12	20:50 (4)	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	05:00	05:01	05:44		20:39 (4)	06:38	07:31	07:30	08:23
	16:18	17:12	18:07	20:06	21:01	21:49	21:59	21:19	9	20:48 (4)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	04:59	05:02	05:45		20:39 (4)	06:40	07:33	07:32	08:25
	16:19	17:14	18:09	20:07	21:02	21:50	21:58	21:17	7	20:46 (4)	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	20:31 (4)	04:59	05:03		20:40 (4)	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	2	20:33 (4)	21:51	5	20:45 (4)	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	20:31 (4)	04:58	05:04		20:42 (4)	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	5	20:36 (4)	21:52	1	20:43 (4)	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	20:29 (4)	04:57	05:05		20:43 (4)	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	8	20:37 (4)	21:53		20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36	20:29 (4)	04:57	05:06		20:44 (4)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	9	20:38 (4)	21:54		20:02	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34	20:28 (4)	04:56	05:07		20:45 (4)	06:49	07:42	07:42	08:31
	16:26	17:24	18:19	20:17	21:11	12	20:40 (4)	21:54		20:03	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33	20:28 (4)	04:56	05:08		20:46 (4)	06:50	07:44	07:43	08:32
	16:28	17:26	18:21	20:18	21:13	14	20:42 (4)	21:55		20:04	18:40	16:35	16:05	
12	08:39	07:53	06:50	06:35	05:31	20:27 (4)	04:55	05:09		20:47 (4)	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15	16	20:43 (4)	21:56		20:05	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29	20:27 (4)	04:55	05:10		20:48 (4)	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17	17	20:44 (4)	21:57		20:06	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27	20:28 (4)	04:55	05:12		20:49 (4)	06:56	07:50	07:49	08:36
	16:33	17:32	18:26	20:24	21:18	19	20:47 (4)	21:57		20:07	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26	20:27 (4)	04:55	05:13		20:50 (4)	06:57	07:52	07:51	08:37
	16:34	17:34	18:28	20:26	21:20	20	20:47 (4)	21:58		20:08	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24	20:28 (4)	04:54	05:14		20:51 (4)	06:59	07:54	07:53	08:37
	16:36	17:36	18:30	20:28	21:22	20	20:48 (4)	21:59		20:09	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22	20:28 (4)	04:54	05:16		20:52 (4)	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30	21:23	19	20:47 (4)	21:59		20:10	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21	20:29 (4)	04:54	05:17		20:53 (4)	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31	21:25	18	20:47 (4)	21:59		20:11	18:24	16:24	16:05	
19	08:32	07:39	06:33	06:18	05:19	20:30 (4)	04:54	05:18		20:54 (4)	07:05	07:59	07:58	08:40
	16:41	17:42	18:36	20:33	21:26	17	20:47 (4)	22:00		20:12	18:22	16:23	16:05	
20	08:31	07:36	06:31	06:16	05:18	20:30 (4)	04:54	05:20		20:55 (4)	07:06	08:01	08:00	08:40
	16:43	17:44	18:38	20:35	21:28	15	20:45 (4)	22:00	7	20:52 (4)	07:08	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	20:31 (4)	04:54	05:21		20:43 (4)	07:10	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30	14	20:45 (4)	22:00	10	20:53 (4)	07:12	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	05:15	20:33 (4)	04:55	05:23		20:41 (4)	07:15	08:05	08:04	08:42
	16:47	17:48	18:41	20:39	21:31	11	20:44 (4)	22:01	13	20:54 (4)	07:17	18:15	16:19	16:06
23	08:27	07:30	06:23	06:09	05:13	20:33 (4)	04:55	05:24		20:41 (4)	07:19	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	21:33	9	20:42 (4)	22:01	15	20:56 (4)	07:22	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	20:36 (4)	04:55	05:26		20:40 (4)	07:24	18:09	08:07	08:43
	16:50	17:52	18:45	20:42	21:34	4	20:40 (4)	22:01	16	20:56 (4)	07:26	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	05:11	04:56	05:27	20:40 (4)		20:40 (4)	07:28	18:09	08:09	08:43
	16:52	17:54	18:47	20:44	21:36	22:01	21:36	20:57 (4)	17	20:57 (4)	07:30	18:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	20:39 (4)		20:39 (4)	07:32	18:11	08:11	08:43
	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:57 (4)	18	20:57 (4)	07:34	18:13	16:14	16:09
27	08:21	07:21	06:13	06:00	05:08	04:56	05:30	20:38 (4)		20:38 (4)	07:36	18:15	08:13	08:43
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:57 (4)	19	20:57 (4)	07:38	18:17	16:13	16:10
28	08:20	07:18	06:11	05:58	05:07	04:57	05:32	20:38 (4)		20:38 (4)	07:40	18:19	08:14	08:44
	16:58	18:00	18:53	20:50	21:40	22:01	21:31	20:58 (4)	20	20:58 (4)	07:42	18:21	16:12	16:11
29	08:18		07:08	05:56	05:06	04:57	05:34	20:38 (4)		20:38 (4)	07:44	18:23	08:16	08:44
	17:00		19:54	20:52	21:41	22:00	21:30	20:57 (4)	19	20:57 (4)	07:46	18:25	16:12	16:11
30	08:17		07:06	05:54	05:05	04:58	05:35	20:38 (4)		20:38 (4)	07:48	18:27	08:17	08:44
	17:02		19:56	20:53	21:43	22:00	21:28	20:56 (4)	18	20:56 (4)	07:50	18:29	16:11	16:12
31	08:15		07:04		05:04		05:37	20:38 (4)		20:38 (4)	07:52	18:31		08:44
	17:04		19:58		21:44		21:26	20:55 (4)	17	20:55 (4)	07:54	18:33		16:13
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233	
Total, worst case					249					62				
Sun reduction					0.38					0.34				
Oper. time red.					1.00					1.00				
Wind dir. red.					0.64					0.64				
Total reduction					0.24					0.22				
Total, real					60					13				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LU - H333

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LV - H334

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:28 (5)	07:16	17:19 (4)	07:01	05:52	19:58 (2)	05:03		
	16:15	17:06	6 16:34 (5)	18:02	15 17:34 (4)	20:00	20:55	27 20:25 (2)	21:45		
2	08:44	08:12	16:29 (5)	07:14	17:17 (4)	06:59	05:50	19:58 (2)	05:02		
	16:16	17:08	8 16:37 (5)	18:04	19 17:36 (4)	20:02	20:57	27 20:25 (2)	21:46		
3	08:43	08:10	16:28 (5)	07:11	17:17 (4)	06:56	05:48	19:58 (2)	05:01		
	16:17	17:10	11 16:39 (5)	18:06	21 17:38 (4)	20:04	20:59	26 20:24 (2)	21:48		
4	08:43	08:08	16:28 (5)	07:09	17:16 (4)	06:54	05:46	19:58 (2)	05:00		
	16:18	17:12	13 16:41 (5)	18:07	25 17:41 (4)	20:06	21:01	26 20:24 (2)	21:49		
5	08:43	08:07	16:28 (5)	07:07	17:15 (4)	06:51	05:44	19:58 (2)	04:59		
	16:19	17:14	15 16:43 (5)	18:09	27 17:42 (4)	20:07	21:03	25 20:23 (2)	21:50		
6	08:42	08:05	16:28 (5)	07:04	17:15 (4)	06:49	05:42	19:59 (2)	04:59		
	16:21	17:16	17 16:45 (5)	18:11	30 17:45 (4)	20:09	21:04	23 20:22 (2)	21:51		
7	08:42	08:03	16:28 (5)	07:02	17:14 (4)	06:47	05:40	20:00 (2)	04:58		
	16:22	17:18	19 16:47 (5)	18:13	32 17:46 (4)	20:11	21:06	22 20:22 (2)	21:52		
8	08:42	08:01	16:28 (5)	07:00	17:15 (4)	06:44	05:38	20:01 (2)	04:57		
	16:24	17:20	21 16:49 (5)	18:15	32 17:47 (4)	20:13	21:08	20 20:21 (2)	21:53		
9	08:41	07:59	16:29 (5)	06:57	17:14 (4)	06:42	05:36	20:02 (2)	04:57		
	16:25	17:22	19 16:48 (5)	18:17	32 17:46 (4)	20:15	21:10	17 20:19 (2)	21:54		
10	08:40	07:57	16:30 (5)	06:55	17:15 (4)	06:39	05:34	20:03 (2)	04:56		
	16:26	17:24	18 16:48 (5)	18:19	31 17:46 (4)	20:17	21:11	14 20:17 (2)	21:55		
11	08:40	07:55	16:31 (5)	06:52	17:16 (4)	06:37	05:33	20:06 (2)	04:56		
	16:28	17:26	16 16:47 (5)	18:21	29 17:45 (4)	20:19	21:13	10 20:16 (2)	21:55		
12	08:39	07:53	16:31 (5)	06:50	17:16 (4)	06:35	05:31		04:55		
	16:30	17:28	14 16:45 (5)	18:23	28 17:44 (4)	20:20	21:15		21:56		
13	08:38	07:51	16:33 (5)	06:48	17:17 (4)	06:32	05:29		04:55		
	16:31	17:30	10 16:43 (5)	18:25	26 17:43 (4)	20:22	21:17		21:57		
14	08:37	07:49		06:45	17:17 (4)	06:30	05:27		04:55		
	16:33	17:32		18:27	25 18:00 (3)	20:24	21:18		21:57		
15	08:36	07:47		06:43	17:20 (4)	06:28	05:26		04:54		
	16:34	17:34		18:28	23 18:02 (3)	20:26	21:20		21:58		
16	08:35	07:45		06:40	17:21 (4)	06:25	05:24		04:54		
	16:36	17:36		18:30	23 18:04 (3)	20:28	21:22		21:59		
17	08:34	07:43		06:38	17:26 (4)	06:23	05:22		04:54		
	16:38	17:38		18:32	15 18:06 (3)	20:30	21:23		21:59		
18	08:33	07:41		06:35	17:55 (3)	06:21	05:21		04:54		
	16:40	17:40		18:34	12 18:07 (3)	20:31	21:25		22:00		
19	08:32	07:39		06:33	17:55 (3)	06:18	05:19		04:54		
	16:41	17:42		18:36	15 18:10 (3)	20:33	21:27		22:00		
20	08:31	07:36		06:31	17:54 (3)	06:16	05:18		04:54		
	16:43	17:44		18:38	17 18:11 (3)	20:35	21:28		22:00		
21	08:30	07:34		06:28	17:55 (3)	06:14	20:07 (2)	05:16	04:54		
	16:45	17:46		18:40	18 18:13 (3)	20:37	20:08 (2)	21:30	22:01		
22	08:28	07:32		06:26	17:55 (3)	06:12	20:04 (2)	05:15	04:55		
	16:47	17:48		18:41	18 18:13 (3)	20:39	6 20:10 (2)	21:31	22:01		
23	08:27	07:30		06:23	17:56 (3)	06:09	20:03 (2)	05:13	04:55		
	16:49	17:50		18:43	16 18:12 (3)	20:41	9 20:12 (2)	21:33	22:01		
24	08:26	07:28		06:21	17:57 (3)	06:07	20:02 (2)	05:12	04:55		
	16:50	17:52		18:45	12 18:09 (3)	20:42	12 20:14 (2)	21:34	22:01		
25	08:24	07:25		06:18	18:00 (3)	06:05	20:01 (2)	05:11	04:55		
	16:52	17:54		18:47	6 18:06 (3)	20:44	14 20:15 (2)	21:36	22:01		
26	08:23	07:23		06:16		06:03	20:00 (2)	05:09	04:56		
	16:54	17:56	4 17:28 (4)	18:49		20:46	17 20:17 (2)	21:37	22:01		
27	08:22	07:21		06:13		06:00	19:59 (2)	05:08	04:56		
	16:56	17:58	9 17:31 (4)	18:51		20:48	20 20:19 (2)	21:39	22:01		
28	08:20	07:18		06:11		05:58	19:59 (2)	05:07	04:57		
	16:58	18:00	12 17:32 (4)	18:53		20:50	22 20:21 (2)	21:40	22:01		
29	08:18			07:08		05:56	19:58 (2)	05:06	04:57		
	17:00			19:54		20:52	24 20:22 (2)	21:41	22:01		
30	08:17			07:06		05:54	19:58 (2)	05:05	04:58		
	17:02			19:56		20:53	26 20:24 (2)	21:43	22:00		
31	08:15	16:30 (5)		07:04				05:04			
	17:04	2 16:32 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case	2		212	547		151		237			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	0		32	100		34		58			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LV - H334

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:18 (2) 20:24 (2)	06:33 20:18	07:26 19:05	17:55 (4) 16:54
2	04:59 22:00	05:40 21:23	20:15 (2) 20:27 (2)	06:35 20:16	07:26 19:02	17:54 (4) 16:52
3	05:00 21:59	05:42 21:21	20:13 (2) 20:28 (2)	06:36 20:13	07:28 19:00	17:53 (4) 16:50
4	05:01 21:59	05:44 21:19	20:12 (2) 20:30 (2)	06:38 20:11	07:30 18:57	17:52 (4) 16:48
5	05:02 21:58	05:45 21:17	20:10 (2) 20:30 (2)	06:40 20:09	07:32 18:55	17:52 (4) 16:46
6	05:03 21:58	05:47 21:15	20:09 (2) 20:32 (2)	06:42 20:06	07:34 18:52	17:51 (4) 16:44
7	05:04 21:57	05:49 21:13	20:09 (2) 20:33 (2)	06:43 20:04	07:36 18:50	17:50 (4) 16:43
8	05:05 21:56	05:50 21:11	20:08 (2) 20:32 (2)	06:45 20:01	07:38 18:48	17:50 (4) 16:41
9	05:06 21:55	05:52 21:09	20:07 (2) 20:33 (2)	06:47 19:59	07:40 18:45	17:50 (4) 16:39
10	05:07 21:55	05:54 21:07	20:06 (2) 20:33 (2)	06:49 19:56	07:42 18:43	17:50 (4) 16:37
11	05:08 21:54	05:56 21:05	20:06 (2) 20:33 (2)	06:50 19:54	07:44 18:40	17:51 (4) 16:35
12	05:09 21:53	05:57 21:03	20:06 (2) 20:33 (2)	06:52 19:51	07:46 18:38	17:51 (4) 16:34
13	05:10 21:52	05:59 21:01	20:05 (2) 20:31 (2)	06:54 19:49	07:48 18:36	17:52 (4) 16:32
14	05:12 21:51	06:01 20:59	20:06 (2) 20:29 (2)	06:56 19:47	07:50 18:33	17:53 (4) 16:31
15	05:13 21:50	06:03 20:57	20:06 (2) 20:28 (2)	06:58 19:44	07:52 18:31	17:55 (4) 16:29
16	05:14 21:49	06:04 20:55	20:06 (2) 20:25 (2)	06:59 19:42	07:54 18:29	17:57 (4) 16:27
17	05:16 21:47	06:06 20:53	20:06 (2) 20:23 (2)	07:01 19:39	07:55 18:26	17:59 (4) 16:26
18	05:17 21:46	06:08 20:50	20:07 (2) 20:22 (2)	07:03 19:37	07:57 18:24	16:26 16:24
19	05:18 21:45	06:10 20:48	20:07 (2) 20:19 (2)	07:05 19:34	07:59 18:22	16:24 16:23
20	05:20 21:44	06:12 20:46	20:09 (2) 20:17 (2)	07:06 19:32	08:01 18:20	16:23 16:22
21	05:21 21:42	06:13 20:44	20:10 (2) 20:15 (2)	07:08 19:29	08:03 18:17	16:22 16:20
22	05:23 21:41	06:15 20:42	20:11 (2) 19:27	07:10 19:27	08:05 18:15	16:20 16:19
23	05:24 21:39	06:17 20:39	20:12 (2) 19:24	07:12 19:24	08:07 18:13	16:19 16:18
24	05:26 21:38	06:19 20:37	20:13 (2) 19:22	07:13 19:22	08:09 18:11	16:18 16:17
25	05:27 21:36	06:20 20:35	20:14 (2) 19:19	07:14 19:19	08:11 18:09	16:17 16:16
26	05:29 21:35	06:22 20:32	20:15 (2) 19:17	07:15 19:17	08:13 18:07	16:16 16:15
27	05:30 21:33	06:24 20:30	20:16 (2) 19:14	07:16 19:14	08:15 18:05	16:15 16:14
28	05:32 21:32	06:26 20:28	20:17 (2) 19:12	07:17 19:12	08:17 18:03	16:14 16:13
29	05:34 21:30	06:27 20:25	20:18 (2) 19:09	07:18 19:09	08:19 18:01	16:13 16:12
30	05:35 21:28	06:29 20:23	20:19 (2) 19:07	07:19 19:07	08:21 17:59	16:12 16:11
31	05:37 21:26	06:31 20:21	20:20 (2) 19:06	07:20 19:06	08:23 17:57	16:11 16:10
Potential sun hours	512	460	382	328	259	233
Total, worst case		396	218	412	147	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.68	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		87	47	81	26	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LW - H335

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:25 (5)	07:16	17:13 (4)	07:01	05:52	19:55 (2)	05:03		
	16:15	17:06	16:34 (5)	18:02	17:34 (4)	20:00	20:55	20:21 (2)	21:45		
2	08:44	08:12	16:26 (5)	07:14	17:12 (4)	06:59	05:50	19:55 (2)	05:02		
	16:16	17:08	16:37 (5)	18:04	17:36 (4)	20:02	20:57	20:20 (2)	21:46		
3	08:43	08:10	16:25 (5)	07:11	17:11 (4)	06:56	05:48	19:55 (2)	05:01		
	16:17	17:10	16:39 (5)	18:06	17:38 (4)	20:04	20:59	20:19 (2)	21:48		
4	08:43	08:08	16:25 (5)	07:09	17:12 (4)	06:54	05:46	19:56 (2)	05:00		
	16:18	17:12	16:41 (5)	18:07	17:41 (4)	20:06	21:01	20:18 (2)	21:49		
5	08:43	08:07	16:25 (5)	07:07	17:11 (4)	06:51	05:44	19:57 (2)	04:59		
	16:19	17:14	16:43 (5)	18:09	17:42 (4)	20:07	21:03	20:17 (2)	21:50		
6	08:42	08:05	16:25 (5)	07:04	17:11 (4)	06:49	05:42	19:57 (2)	04:59		
	16:21	17:16	16:45 (5)	18:11	17:43 (4)	20:09	21:04	20:16 (2)	21:51		
7	08:42	08:03	16:26 (5)	07:02	17:11 (4)	06:47	05:40	20:00 (2)	04:58		
	16:22	17:18	16:46 (5)	18:13	17:42 (4)	20:11	21:06	20:15 (2)	21:52		
8	08:42	08:01	16:27 (5)	07:00	17:11 (4)	06:44	05:38	20:01 (2)	04:57		
	16:24	17:20	16:45 (5)	18:15	17:42 (4)	20:13	21:08	20:13 (2)	21:53		
9	08:41	07:59	16:27 (5)	06:57	17:11 (4)	06:42	05:36	20:04 (2)	04:57		
	16:25	17:22	16:45 (5)	18:17	17:40 (4)	20:15	21:10	20:10 (2)	21:54		
10	08:40	07:57	16:29 (5)	06:55	17:12 (4)	06:39	05:34		04:56		
	16:26	17:24	16:44 (5)	18:19	17:40 (4)	20:17	21:11		21:55		
11	08:40	07:55	16:30 (5)	06:52	17:14 (4)	06:37	05:33		04:56		
	16:28	17:26	16:42 (5)	18:21	17:39 (4)	20:19	21:13		21:55		
12	08:39	07:53	16:32 (5)	06:50	17:15 (4)	06:35	05:31		04:55		
	16:30	17:28	16:39 (5)	18:23	17:37 (4)	20:20	21:15		21:56		
13	08:38	07:51		06:48	17:17 (4)	06:32	05:29		04:55		
	16:31	17:30		18:25	17:58 (3)	20:22	21:17		21:57		
14	08:37	07:49		06:45	17:19 (4)	06:30	05:27		04:55		
	16:33	17:32		18:27	18:00 (3)	20:24	21:18		21:57		
15	08:36	07:47		06:43	17:54 (3)	06:28	05:26		04:54		
	16:34	17:34		18:28	18:02 (3)	20:26	21:20		21:58		
16	08:35	07:45		06:40	17:53 (3)	06:25	05:24		04:54		
	16:36	17:36		18:30	18:04 (3)	20:28	21:22		21:59		
17	08:34	07:43		06:38	17:53 (3)	06:23	05:22		04:54		
	16:38	17:38		18:32	18:06 (3)	20:30	21:23		21:59		
18	08:33	07:41		06:35	17:52 (3)	06:21	05:21		04:54		
	16:40	17:40		18:34	18:07 (3)	20:31	21:25		22:00		
19	08:32	07:39		06:33	17:52 (3)	06:18	20:04 (2)	05:19	04:54		
	16:41	17:42		18:36	18:10 (3)	20:33	20:05 (2)	21:27	22:00		
20	08:31	07:36		06:31	17:52 (3)	06:16	20:02 (2)	05:18	04:54		
	16:43	17:44		18:38	18:11 (3)	20:35	20:07 (2)	21:28	22:00		
21	08:30	07:34		06:28	17:53 (3)	06:14	19:59 (2)	05:16	04:54		
	16:45	17:46		18:40	18:10 (3)	20:37	20:08 (2)	21:30	22:01		
22	08:28	07:32		06:26	17:54 (3)	06:12	19:58 (2)	05:15	04:55		
	16:47	17:48		18:41	18:08 (3)	20:39	20:10 (2)	21:31	22:01		
23	08:27	07:30	17:21 (4)	06:23	17:56 (3)	06:09	19:57 (2)	05:13	04:55		
	16:49	17:50	17:22 (4)	18:43	18:06 (3)	20:41	20:12 (2)	21:33	22:01		
24	08:26	07:28	17:19 (4)	06:21		06:07	19:56 (2)	05:12	04:55		
	16:50	17:52	17:24 (4)	18:45		20:42	20:14 (2)	21:34	22:01		
25	08:24	07:25	17:17 (4)	06:18		06:05	19:56 (2)	05:11	04:55		
	16:52	17:54	17:26 (4)	18:47		20:44	20:15 (2)	21:36	22:01		
26	08:23	07:23	17:16 (4)	06:16		06:03	19:55 (2)	05:09	04:56		
	16:54	17:56	17:28 (4)	18:49		20:46	20:17 (2)	21:37	22:01		
27	08:22	07:21	17:15 (4)	06:13		06:00	19:55 (2)	05:08	04:56		
	16:56	17:58	17:31 (4)	18:51		20:48	20:19 (2)	21:39	22:01		
28	08:20	07:18	17:13 (4)	06:11		05:58	19:55 (2)	05:07	04:57		
	16:58	18:00	17:32 (4)	18:53		20:50	20:21 (2)	21:40	22:01		
29	08:18			07:08		05:56	19:54 (2)	05:06	04:57		
	17:00			19:54		20:52	20:22 (2)	21:41	22:01		
30	08:17	16:26 (5)		07:06		05:54	19:55 (2)	05:05	04:58		
	17:02	16:30 (5)		19:56		20:53	20:21 (2)	21:43	22:00		
31	08:15	16:26 (5)		07:04				05:04			
	17:04	16:32 (5)		19:58				21:44			
Potential sun hours	250	273		367		420	494		510		
Total, worst case	10	240		493		205	169				
Sun reduction	0.24	0.23		0.27		0.35	0.38				
Oper. time red.	1.00	1.00		1.00		1.00	1.00				
Wind dir. red.	0.66	0.66		0.68		0.65	0.65				
Total reduction	0.16	0.15		0.18		0.23	0.25				
Total, real	2	37		90		47	42				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LW - H335

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:54 (4) 16:54	15:58 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:52 (4) 16:52	15:57 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:51 (4) 16:50	15:56 (5) 16:08
4	05:01 21:59	05:44 21:19	20:13 (2) 20:11	07:31 18:57	17:50 (4) 16:48	15:56 (5) 16:08
5	05:02 21:58	05:45 21:17	20:10 (2) 20:09	07:33 18:55	17:49 (4) 16:46	15:55 (5) 16:07
6	05:03 21:58	05:47 21:15	20:08 (2) 20:06	07:35 18:52	17:48 (4) 16:44	15:55 (5) 16:07
7	05:04 21:57	05:49 21:13	20:07 (2) 20:04	07:37 18:50	17:46 (4) 16:43	15:55 (5) 16:06
8	05:05 21:56	05:50 21:11	20:06 (2) 20:01	07:39 18:48	17:46 (4) 16:41	15:55 (5) 16:06
9	05:06 21:55	05:52 21:09	20:05 (2) 19:59	07:41 18:45	17:46 (4) 16:39	15:55 (5) 16:05
10	05:07 21:55	05:54 21:07	20:04 (2) 19:56	07:42 18:43	17:46 (4) 16:37	15:57 (5) 16:05
11	05:08 21:54	05:56 21:05	20:03 (2) 19:54	07:44 18:40	17:46 (4) 16:35	15:58 (5) 16:05
12	05:09 21:53	05:57 21:03	20:03 (2) 19:51	07:46 18:38	17:46 (4) 16:34	15:58 (5) 16:05
13	05:10 21:52	05:59 21:01	20:02 (2) 19:49	07:48 18:36	17:46 (4) 16:32	16:05
14	05:12 21:51	06:01 20:59	20:02 (2) 19:47	07:50 18:33	17:47 (4) 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	20:02 (2) 19:44	07:52 18:31	17:47 (4) 16:29	08:37 16:05
16	05:14 21:49	06:04 20:55	20:01 (2) 19:42	07:54 18:29	17:48 (4) 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	20:02 (2) 19:39	07:55 18:26	17:50 (4) 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:02 (2) 19:37	07:57 18:24	17:51 (4) 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	20:02 (2) 19:34	07:59 18:22	17:55 (4) 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	20:03 (2) 19:32	08:01 18:20	08:00	08:41 16:06
21	05:21 21:42	06:13 20:44	20:04 (2) 19:29	08:03 18:17	08:02	08:41 16:06
22	05:23 21:41	06:15 20:42	20:04 (2) 19:27	08:05 18:15	08:04	08:42 16:06
23	05:24 21:39	06:17 20:39	20:06 (2) 19:24	08:07 18:13	08:06	08:42 16:07
24	05:26 21:38	06:19 20:37	20:08 (2) 19:22	08:09 18:11	08:08	08:43 16:08
25	05:27 21:36	06:20 20:35	20:09 (2) 19:19	08:11 18:09	16:17	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	16:16	08:11	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	16:14	08:13	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	16:13	08:14	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	16:12	08:16	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	16:12	16:01 (5) 16:09 (5)	08:44 16:12
31	05:37 21:26	06:31 20:21	07:25 16:56	16:11	15:59 (5) 16:11 (5)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		378	158	425	165	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		84	34	84	29	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: LX - H336

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:24 (5)	07:16	17:10 (4)	07:01	05:52	19:52 (2)	05:03		
	16:15	17:06	10 16:34 (5)	18:02	24 17:34 (4)	20:00	20:55	21 20:13 (2)	21:45		
2	08:44	08:12	16:25 (5)	07:14	17:09 (4)	06:59	05:50	19:52 (2)	05:02		
	16:16	17:08	12 16:37 (5)	18:04	27 17:36 (4)	20:02	20:57	19 20:11 (2)	21:46		
3	08:43	08:10	16:25 (5)	07:11	17:09 (4)	06:56	05:48	19:54 (2)	05:01		
	16:17	17:10	14 16:39 (5)	18:06	29 17:38 (4)	20:04	20:59	16 20:10 (2)	21:48		
4	08:43	08:08	16:25 (5)	07:09	17:09 (4)	06:54	05:46	19:55 (2)	05:00		
	16:18	17:12	16 16:41 (5)	18:07	31 17:40 (4)	20:06	21:01	13 20:08 (2)	21:49		
5	08:43	08:07	16:25 (5)	07:07	17:09 (4)	06:51	05:44	19:58 (2)	04:59		
	16:19	17:14	18 16:43 (5)	18:09	30 17:39 (4)	20:07	21:03	6 20:04 (2)	21:50		
6	08:42	08:05	16:25 (5)	07:04	17:10 (4)	06:49	05:42		04:59		
	16:21	17:16	20 16:45 (5)	18:11	29 17:39 (4)	20:09	21:04		21:51		
7	08:42	08:03	16:26 (5)	07:02	17:09 (4)	06:47	05:40		04:58		
	16:22	17:18	19 16:45 (5)	18:13	29 17:38 (4)	20:11	21:06		21:52		
8	08:42	08:01	16:27 (5)	07:00	17:10 (4)	06:44	05:38		04:57		
	16:24	17:20	17 16:44 (5)	18:15	27 17:37 (4)	20:13	21:08		21:53		
9	08:41	07:59	16:28 (5)	06:57	17:11 (4)	06:42	05:36		04:57		
	16:25	17:22	15 16:43 (5)	18:17	24 17:35 (4)	20:15	21:10		21:54		
10	08:40	07:57	16:29 (5)	06:55	17:13 (4)	06:39	05:34		04:56		
	16:26	17:24	13 16:42 (5)	18:19	21 17:34 (4)	20:17	21:11		21:55		
11	08:40	07:55	16:31 (5)	06:52	17:15 (4)	06:37	05:33		04:56		
	16:28	17:26	10 16:41 (5)	18:21	17 17:32 (4)	20:19	21:13		21:55		
12	08:39	07:53		06:50	17:17 (4)	06:35	05:31		04:55		
	16:30	17:28		18:23	15 17:56 (3)	20:20	21:15		21:56		
13	08:38	07:51		06:48	17:52 (3)	06:32	05:29		04:55		
	16:31	17:30		18:25	6 17:58 (3)	20:22	21:17		21:57		
14	08:37	07:49		06:45	17:51 (3)	06:30	05:27		04:55		
	16:33	17:32		18:27	9 18:00 (3)	20:24	21:18		21:57		
15	08:36	07:47		06:43	17:51 (3)	06:28	05:26		04:54		
	16:34	17:34		18:28	11 18:02 (3)	20:26	21:20		21:58		
16	08:35	07:45		06:40	17:50 (3)	06:25	05:24		04:54		
	16:36	17:36		18:30	14 18:04 (3)	20:28	21:22		21:59		
17	08:34	07:43		06:38	17:50 (3)	06:23	19:57 (2)	05:22	04:54		
	16:38	17:38		18:32	16 18:06 (3)	20:30	20:01 (2)	21:23	21:59		
18	08:33	07:41		06:35	17:50 (3)	06:21	19:55 (2)	05:21	04:54		
	16:40	17:40		18:34	17 18:07 (3)	20:31	8 20:03 (2)	21:25	22:00		
19	08:32	07:39		06:33	17:51 (3)	06:18	19:54 (2)	05:19	04:54		
	16:41	17:42		18:36	17 18:08 (3)	20:33	11 20:05 (2)	21:27	22:00		
20	08:31	07:36		06:31	17:51 (3)	06:16	19:53 (2)	05:18	04:54		
	16:43	17:44		18:38	15 18:06 (3)	20:35	14 20:07 (2)	21:28	22:00		
21	08:30	07:34		06:28	17:53 (3)	06:14	19:51 (2)	05:16	04:54		
	16:45	17:46		18:40	12 18:05 (3)	20:37	17 20:08 (2)	21:30	22:01		
22	08:28	07:32		06:26	17:56 (3)	06:12	19:50 (2)	05:15	04:55		
	16:47	17:48	1	17:19 (4)	5 18:01 (3)	20:39	20 20:10 (2)	21:31	22:01		
23	08:27	07:30		06:23		06:09	19:50 (2)	05:13	04:55		
	16:49	17:50	6	17:22 (4)		20:41	22 20:12 (2)	21:33	22:01		
24	08:26	07:28		06:21		06:07	19:50 (2)	05:12	04:55		
	16:50	17:52	9	17:24 (4)		20:42	24 20:14 (2)	21:34	22:01		
25	08:24	07:25		06:18		06:05	19:50 (2)	05:11	04:55		
	16:52	17:54	13	17:26 (4)		20:44	25 20:15 (2)	21:36	22:01		
26	08:23	07:23		06:16		06:03	19:50 (2)	05:09	04:56		
	16:54	17:56	16	17:28 (4)		20:46	26 20:16 (2)	21:37	22:01		
27	08:22	07:21		06:13		06:00	19:50 (2)	05:08	04:56		
	16:56	17:58	20	17:31 (4)		20:48	26 20:16 (2)	21:39	22:01		
28	08:20	07:18		06:11		05:58	19:50 (2)	05:07	04:57		
	16:58	18:00	22	17:32 (4)		20:50	25 20:15 (2)	21:40	22:01		
29	08:18	16:27 (5)		07:08		05:56	19:50 (2)	05:06	04:57		
	17:00	1 16:28 (5)		19:54		20:52	25 20:15 (2)	21:41	22:01		
30	08:17	16:26 (5)		07:06		05:54	19:51 (2)	05:05	04:58		
	17:02	4 16:30 (5)		19:56		20:53	23 20:14 (2)	21:43	22:00		
31	08:15	16:25 (5)		07:04				05:04			
	17:04	7 16:32 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case		12	251	425		270		75			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	2		39	78		62		19			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LX - H336

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:58 (4) 16:54	15:58 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:54 (4) 16:52	15:57 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:51 (4) 16:50	15:56 (5) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:49 (4) 16:48	15:55 (5) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:48 (4) 16:46	15:55 (5) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:47 (4) 16:44	15:55 (5) 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	17:45 (4) 16:43	15:55 (5) 16:06
8	05:05 21:56	05:50 21:11	20:06 (2) 20:01	07:39 18:48	17:44 (4) 16:41	15:55 (5) 16:06
9	05:06 21:55	05:52 21:09	20:04 (2) 19:59	07:41 18:45	17:44 (4) 16:39	15:55 (5) 16:05
10	05:07 21:55	05:54 21:07	20:02 (2) 19:56	07:42 18:43	17:43 (4) 16:37	15:56 (5) 16:05
11	05:08 21:54	05:56 21:05	20:01 (2) 19:54	07:44 18:40	17:43 (4) 16:35	15:57 (5) 16:05
12	05:09 21:53	05:57 21:03	20:00 (2) 19:51	07:46 18:38	17:43 (4) 16:34	15:58 (5) 16:05
13	05:10 21:52	05:59 21:01	19:58 (2) 19:49	07:48 18:36	17:43 (4) 16:32	16:01 (5) 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 19:47	07:50 18:33	17:43 (4) 16:31	16:05 16:04
15	05:13 21:50	06:03 20:57	19:57 (2) 19:44	07:52 18:31	17:44 (4) 16:29	16:04 16:05
16	05:14 21:49	06:04 20:55	19:56 (2) 19:42	07:54 18:29	17:44 (4) 16:27	16:04 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 19:39	07:55 18:26	17:45 (4) 16:26	16:05 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 19:37	07:57 18:24	17:46 (4) 16:24	16:06 16:05
19	05:18 21:45	06:10 20:48	19:55 (2) 19:34	07:59 18:22	17:48 (4) 16:23	16:07 16:05
20	05:20 21:44	06:12 20:46	19:56 (2) 19:32	08:01 18:20	17:52 (4) 16:22	16:06 16:06
21	05:21 21:42	06:13 20:44	19:56 (2) 19:29	08:03 18:17	17:52 (4) 16:20	16:07 16:06
22	05:23 21:41	06:15 20:42	19:56 (2) 19:27	18:38 (3) 18:49 (3)	16:19 16:19	16:08 16:06
23	05:24 21:39	06:17 20:39	19:57 (2) 19:24	18:36 (3) 18:51 (3)	16:18 16:18	16:07 16:07
24	05:26 21:38	06:19 20:37	19:58 (2) 19:22	18:35 (3) 18:52 (3)	16:17 16:17	16:08 16:08
25	05:27 21:36	06:20 20:35	19:58 (2) 20:06 (2)	18:33 (3) 18:51 (3)	16:16 16:16	16:09 16:08
26	05:29 21:35	06:22 20:32	20:00 (2) 20:04 (2)	18:32 (3) 18:48 (3)	16:15 16:14	16:08 16:09
27	05:30 21:33	06:24 20:30	19:57 (2) 19:14	18:32 (3) 18:46 (3)	16:14 16:13	16:09 16:10
28	05:32 21:32	06:26 20:28	19:56 (2) 19:12	18:31 (3) 18:44 (3)	16:13 16:12	16:10 16:11
29	05:34 21:30	06:27 20:25	19:55 (2) 19:09	18:32 (3) 18:41 (3)	16:12 16:12	16:11 16:11
30	05:35 21:28	06:29 20:23	19:54 (2) 19:07	18:31 (3) 18:38 (3)	16:11 16:08	16:10 16:12
31	05:37 21:26	06:31 20:21	19:53 (2) 19:06	18:30 (3) 18:37 (3)	16:10 16:07	16:11 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		348	120	416	161	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		77	26	82	28	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LY - H337

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	17:15 (4)	07:01	05:52
	16:15	17:06	18:02	19	17:34 (4)	20:00
2	08:44	08:12	07:14	17:14 (4)	06:59	05:50
	16:16	17:08	18:04	22	17:36 (4)	20:02
3	08:43	08:10	07:11	17:14 (4)	06:56	05:48
	16:17	17:10	18:06	24	17:38 (4)	20:04
4	08:43	08:08	07:09	17:14 (4)	06:54	05:46
	16:18	17:12	18:07	27	17:41 (4)	20:06
5	08:43	08:07	07:07	17:13 (4)	06:51	05:44
	16:19	17:14	18:09	29	17:42 (4)	20:07
6	08:42	08:05	07:04	17:13 (4)	06:49	05:42
	16:21	17:16	18:11	30	17:43 (4)	20:09
7	08:42	08:03	07:02	17:13 (4)	06:47	05:40
	16:22	17:18	18:13	29	17:42 (4)	20:11
8	08:42	08:01	07:00	17:14 (4)	06:44	05:38
	16:24	17:20	18:15	28	17:42 (4)	20:13
9	08:41	07:59	06:57	17:14 (4)	06:42	05:36
	16:25	17:22	18:17	26	17:40 (4)	20:15
10	08:40	07:57	06:55	17:15 (4)	06:39	05:34
	16:26	17:24	18:19	24	17:39 (4)	20:17
11	08:40	07:55	06:52	17:17 (4)	06:37	05:33
	16:28	17:26	18:21	21	17:38 (4)	20:19
12	08:39	07:53	06:50	17:18 (4)	06:35	05:31
	16:30	17:28	18:23	18	17:36 (4)	20:20
13	08:38	07:51	06:48	17:21 (4)	06:32	05:29
	16:31	17:30	18:25	15	17:58 (3)	20:22
14	08:37	07:49	06:45	17:53 (3)	06:30	05:27
	16:33	17:32	18:27	7	18:00 (3)	20:24
15	08:36	07:47	06:43	17:53 (3)	06:28	05:26
	16:34	17:34	18:28	9	18:02 (3)	20:26
16	08:35	07:45	06:40	17:52 (3)	06:25	05:24
	16:36	17:36	18:30	12	18:04 (3)	20:28
17	08:34	07:43	06:38	17:52 (3)	06:23	05:22
	16:38	17:38	18:32	14	18:06 (3)	20:30
18	08:33	07:41	06:35	17:51 (3)	06:21	05:21
	16:40	17:40	18:34	16	18:07 (3)	20:31
19	08:32	07:39	06:33	17:52 (3)	06:18	05:19
	16:41	17:42	18:36	18	18:10 (3)	20:33
20	08:31	07:36	06:31	17:52 (3)	06:16	05:18
	16:43	17:44	18:38	17	18:09 (3)	20:35
21	08:30	07:34	06:28	17:54 (3)	06:14	05:16
	16:45	17:46	18:40	13	18:07 (3)	20:37
22	08:28	07:32	06:26	17:55 (3)	06:12	05:15
	16:47	17:48	18:41	9	18:04 (3)	20:39
23	08:27	07:30	06:23	06:09	05:13	04:55
	16:49	17:50	18:43	22	20:12 (2)	21:33
24	08:26	07:28	17:22 (4)	06:07	05:12	04:55
	16:50	17:52	2	20:42	24	20:14 (2)
25	08:24	07:25	17:19 (4)	06:05	05:11	04:55
	16:52	17:54	7	20:44	25	20:15 (2)
26	08:23	07:23	17:18 (4)	06:03	05:09	04:56
	16:54	17:56	10	20:46	25	20:15 (2)
27	08:22	07:21	17:17 (4)	06:00	05:08	04:56
	16:56	17:58	14	20:48	25	20:15 (2)
28	08:20	07:18	17:15 (4)	05:58	05:07	04:57
	16:58	18:00	17	20:50	23	20:14 (2)
29	08:18		07:08	05:56	05:06	04:57
	17:00		19:54	20:52	23	20:14 (2)
30	08:17		07:06	05:54	05:05	04:58
	17:02		19:56	20:53	21	20:13 (2)
31	08:15		07:04		05:04	22:00
	17:04		19:58		21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case		50	427	262	55	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.68	0.68	0.65	0.65	
Total reduction		0.16	0.18	0.23	0.25	
Total, real		8	78	60	14	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LY - H337

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:58 (4) 18:36 (3)	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:55 (4) 18:15 (4)	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:54 (4) 18:17 (4)	07:28 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:52 (4) 18:18 (4)	07:30 16:48
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:51 (4) 18:18 (4)	07:32 16:46
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:50 (4) 18:19 (4)	07:34 16:44
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	17:49 (4) 18:18 (4)	07:36 16:43
8	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	17:48 (4) 18:18 (4)	07:38 16:41
9	05:06 21:55	05:52 21:09	20:06 (2) 20:16 (2)	06:47 19:59	17:48 (4) 18:16 (4)	07:40 16:39
10	05:07 21:55	05:54 21:07	20:03 (2) 20:17 (2)	06:49 19:56	17:48 (4) 18:14 (4)	07:42 16:37
11	05:08 21:54	05:56 21:05	20:02 (2) 20:19 (2)	06:50 19:54	17:48 (4) 18:11 (4)	07:44 16:35
12	05:09 21:53	05:57 21:03	20:01 (2) 20:20 (2)	06:52 19:51	17:48 (4) 18:09 (4)	07:45 16:34
13	05:10 21:52	05:59 21:01	19:59 (2) 20:20 (2)	06:54 19:49	17:48 (4) 18:07 (4)	07:47 16:32
14	05:12 21:51	06:01 20:59	19:58 (2) 20:21 (2)	06:56 19:47	17:49 (4) 18:04 (4)	07:49 16:31
15	05:13 21:50	06:03 20:57	19:58 (2) 20:22 (2)	06:57 19:44	17:50 (4) 18:02 (4)	07:51 16:29
16	05:14 21:49	06:04 20:55	19:57 (2) 20:22 (2)	06:59 19:42	17:51 (4) 17:59 (4)	07:53 16:27
17	05:16 21:47	06:06 20:53	19:57 (2) 20:22 (2)	07:01 19:39	17:52 (4) 17:57 (4)	07:55 16:26
18	05:17 21:46	06:08 20:50	19:57 (2) 20:22 (2)	07:03 19:37	17:54 (4) 17:55 (4)	07:57 16:24
19	05:18 21:45	06:10 20:48	19:56 (2) 20:19 (2)	07:05 19:34	07:59 18:22	08:40 16:23
20	05:20 21:44	06:12 20:46	19:56 (2) 20:17 (2)	07:06 19:32	08:01 18:20	08:41 16:22
21	05:21 21:42	06:13 20:44	19:56 (2) 20:15 (2)	07:08 19:29	08:03 18:42 (3)	08:02 16:20
22	05:23 21:41	06:15 20:42	19:56 (2) 20:12 (2)	07:10 19:27	18:17 18:39 (3)	08:04 16:19
23	05:24 21:39	06:17 20:39	19:57 (2) 20:10 (2)	07:12 19:24	18:15 18:37 (3)	08:06 16:18
24	05:26 21:38	06:19 20:37	19:58 (2) 20:09 (2)	07:13 19:22	18:13 18:36 (3)	08:08 16:17
25	05:27 21:36	06:20 20:35	19:58 (2) 20:06 (2)	07:15 19:19	18:11 18:54 (3)	08:09 16:16
26	05:29 21:35	06:22 20:32	19:59 (2) 20:04 (2)	07:17 19:17	17:09 18:34 (3)	08:11 16:15
27	05:30 21:33	06:24 20:30	07:19 19:14	17:14 18:46 (3)	17:06 18:34 (3)	08:13 16:13
28	05:32 21:32	06:26 20:28	07:21 19:12	17:16 18:44 (3)	17:04 18:34 (3)	08:14 16:12
29	05:34 21:30	06:27 20:25	07:22 19:09	17:18 18:41 (3)	17:02 18:34 (3)	08:16 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	17:20 18:01 (4)	17:00 18:38 (3)	16:12 16:11
31	05:37 21:26	06:31 20:21		16:58 16:56		16:12 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		319	128	360		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.67	0.68		
Total reduction		0.22	0.22	0.20		
Total, real		71	28	71		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LZ - H338
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:57 (2) 20:17 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:58 (2) 20:16 (2)
3	08:43 16:17	08:10 17:10	07:11 18:05	17:36 (4) 17:38 (4)	06:56 20:04	19:59 (2) 20:15 (2)
4	08:43 16:18	08:08 17:12	07:09 18:07	17:34 (4) 17:41 (4)	06:54 20:06	20:00 (2) 20:13 (2)
5	08:43 16:19	08:07 17:14	07:07 18:09	17:32 (4) 17:42 (4)	06:51 20:07	20:02 (2) 20:10 (2)
6	08:42 16:21	08:05 17:16	07:04 18:11	17:31 (4) 17:45 (4)	06:49 20:09	20:10 (2) 21:04
7	08:42 16:22	08:03 17:18	07:02 18:13	17:30 (4) 17:46 (4)	06:47 20:11	21:06 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	17:29 (4) 17:48 (4)	06:44 20:13	21:08 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	17:28 (4) 17:50 (4)	06:42 20:15	21:10 21:54
10	08:40 16:26	07:57 17:24	06:55 18:19	17:28 (4) 17:52 (4)	06:39 20:17	21:11 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	17:28 (4) 17:55 (4)	06:37 20:18	21:13 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	17:28 (4) 17:55 (4)	06:35 20:20	21:15 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	17:28 (4) 17:55 (4)	06:32 20:22	21:17 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	17:28 (4) 17:54 (4)	06:30 20:24	21:18 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	17:29 (4) 17:53 (4)	06:28 20:26	21:20 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	17:30 (4) 17:51 (4)	06:25 20:28	21:22 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	17:31 (4) 17:50 (4)	06:23 20:30	21:23 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	17:33 (4) 17:47 (4)	06:21 20:31	21:25 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	17:36 (4) 17:44 (4)	06:18 20:33	20:03 (2) 20:05 (2)
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	2 6	20:01 (2) 20:07 (2)
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	9	19:59 (2) 20:08 (2)
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	12	19:58 (2) 20:10 (2)
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	15	19:57 (2) 20:12 (2)
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	18	19:56 (2) 20:14 (2)
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19	19:56 (2) 20:15 (2)
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	21	19:56 (2) 20:17 (2)
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	23	19:56 (2) 20:19 (2)
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	23	19:56 (2) 20:19 (2)
29	08:18 17:00		07:08 19:54	05:56 20:52	23	19:56 (2) 20:19 (2)
30	08:17 17:02		07:06 19:56	05:54 20:53	22	19:56 (2) 20:18 (2)
31	08:15 17:04		07:04 19:58			05:04 21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case			307	193	75	
Sun reduction			0.27	0.35	0.38	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.68	0.65	0.65	
Total reduction			0.18	0.23	0.25	
Total, real			56	44	19	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: LZ - H338

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:07 (4) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:06 (4) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:06 (4) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:06 (4) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:06 (4) 16:46	08:25 16:07
6	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	18:07 (4) 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	18:06 (4) 16:43	08:28 16:06
8	05:05 21:56	05:50 21:11	20:11 (2) 20:01	07:39 18:48	18:07 (4) 16:41	08:29 16:06
9	05:06 21:55	05:52 21:09	20:09 (2) 20:23 (2)	07:41 18:45	18:08 (4) 16:39	08:30 16:05
10	05:07 21:55	05:54 21:07	20:07 (2) 20:24 (2)	07:42 18:43	18:16 (4) 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	20:06 (2) 20:25 (2)	07:44 18:40	18:14 (4) 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	20:05 (2) 20:26 (2)	07:46 18:38	18:16 (4) 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	20:04 (2) 20:26 (2)	07:48 18:36	18:18 (4) 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	20:03 (2) 20:26 (2)	07:50 18:33	18:20 (4) 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	20:03 (2) 20:27 (2)	07:52 18:31	18:22 (4) 16:29	08:37 16:04
16	05:14 21:49	06:04 20:55	20:02 (2) 20:25 (2)	07:54 18:29	18:24 (4) 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	20:02 (2) 20:23 (2)	07:55 18:26	18:26 (4) 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:03 (2) 20:22 (2)	07:57 18:24	18:28 (4) 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	20:02 (2) 20:19 (2)	07:59 18:22	18:30 (4) 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	20:03 (2) 20:17 (2)	08:01 18:20	18:32 (4) 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	20:03 (2) 20:15 (2)	08:03 18:17	18:34 (4) 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	20:04 (2) 20:12 (2)	08:05 18:15	18:36 (4) 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	20:05 (2) 20:10 (2)	08:07 18:13	18:38 (4) 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	20:07 (2) 20:09 (2)	08:09 18:11	18:40 (4) 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	07:15 19:19	18:16 (4) 18:29 (4)	18:42 (4) 17:09	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	18:14 (4) 18:31 (4)	18:44 (4) 17:06	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	18:12 (4) 18:33 (4)	18:46 (4) 17:04	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	18:10 (4) 18:34 (4)	18:48 (4) 17:02	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	18:09 (4) 18:34 (4)	18:50 (4) 17:00	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	18:07 (4) 18:34 (4)	18:52 (4) 16:58	08:44 16:12
31	05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		271	130	178		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.68	0.68		
Total reduction		0.22	0.22	0.20		
Total, real		60	28	35		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MA - H339

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	19:53 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:55	20:18 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10			
2	08:44	08:12	07:14	06:59	05:50	19:53 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	20:17 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09			
3	08:43	08:10	07:11	06:56	05:48	19:53 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	20:16 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08			
4	08:43	08:08	07:09	06:54	05:46	19:54 (5)	05:00	05:01	05:44	20:10 (5)	06:38	07:31	08:24			
	16:18	17:12	18:07	20:06	21:01	20:15 (5)	21:49	21:59	21:19	9	20:19 (5)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44	19:54 (5)	04:59	05:02	05:45	20:07 (5)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:03	20:14 (5)	21:50	21:58	21:17	14	20:21 (5)	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42	19:55 (5)	04:59	05:03	05:47	20:06 (5)	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	20:13 (5)	21:51	21:57	21:15	16	20:22 (5)	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40	19:57 (5)	04:58	05:04	05:49	20:05 (5)	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	20:12 (5)	21:52	21:57	21:13	19	20:24 (5)	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38	19:59 (5)	04:57	05:05	05:51	20:03 (5)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	20:10 (5)	21:53	21:56	21:11	21	20:24 (5)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36	20:01 (5)	04:57	05:06	05:52	20:03 (5)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	20:07 (5)	21:54	21:55	21:09	22	20:25 (5)	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	20:01 (5)	06:49	07:42	07:42	08:31		
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	24	20:25 (5)	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:01 (5)	06:50	07:44	07:43	08:33		
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	25	20:26 (5)	19:54	18:40	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:58	20:01 (5)	06:52	07:46	07:45	08:34		
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	25	20:26 (5)	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	20:00 (5)	06:54	07:48	07:47	08:35		
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	26	20:26 (5)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	20:00 (5)	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	26	20:26 (5)	19:47	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	20:00 (5)	06:58	07:52	07:51	08:37		
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	26	20:26 (5)	19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	20:00 (5)	06:59	07:54	07:53	08:38		
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	25	20:25 (5)	19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06	20:00 (5)	07:01	07:55	07:55	08:38		
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	23	20:23 (5)	19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21		04:54	05:17	06:08	20:01 (5)	07:03	07:57	07:57	08:39		
	16:40	17:40	18:34	20:31	21:25		21:59	21:46	20:50	21	20:22 (5)	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:18	05:19		04:54	05:18	06:10	20:01 (5)	07:05	07:59	07:59	08:40		
	16:41	17:42	18:36	20:33	21:27		22:00	21:45	20:48	18	20:19 (5)	19:34	18:22	16:23	16:05	
20	08:31	07:36	06:31	06:16	20:02 (5)	05:18	04:54	05:20	06:12	20:02 (5)	07:06	08:01	08:00	08:41		
	16:43	17:44	18:38	20:35	5	20:07 (5)	21:28	22:00	21:43	20:46	15	20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:59 (5)	05:16	04:54	05:21	06:13	20:03 (5)	07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	9	20:08 (5)	21:30	22:00	21:42	20:44	12	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:57 (5)	05:15	04:55	05:23	06:15	20:04 (5)	07:10	08:05	08:04	08:42		
	16:47	17:48	18:41	20:39	13	20:10 (5)	21:31	22:01	21:41	20:42	8	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:56 (5)	05:13	04:55	05:24	06:17	20:06 (5)	07:12	08:07	08:06	08:42		
	16:49	17:50	18:43	20:41	16	20:12 (5)	21:33	22:01	21:39	20:39	4	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:55 (5)	05:12	04:55	05:26	06:19	07:13	08:09	08:07	08:43			
	16:51	17:52	18:45	20:42	18	20:13 (5)	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:08		
25	08:24	07:25	06:18	06:05	19:54 (5)	05:11	04:56	05:27	06:20	07:15	07:11	08:09	08:43			
	16:52	17:54	18:47	20:44	21	20:15 (5)	21:36	22:01	21:36	20:35	19:19	17:09	16:16	16:08		
26	08:23	07:23	06:16	06:03	19:53 (5)	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43			
	16:54	17:56	18:49	20:46	24	20:17 (5)	21:37	22:01	21:35	20:32	19:17	17:06	16:15	16:09		
27	08:21	07:21	06:13	06:01	19:53 (5)	05:08	04:56	05:30	06:24	07:19	07:14	08:13	08:44			
	16:56	17:58	18:51	20:48	25	20:18 (5)	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:10		
28	08:20	07:18	06:11	05:58	19:53 (5)	05:07	04:57	05:32	06:26	07:21	07:16	08:14	08:44			
	16:58	18:00	18:53	20:50	25	20:18 (5)	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16:11		
29	08:18		07:08	05:56	19:53 (5)	05:06	04:58	05:34	06:28	07:22	07:18	08:16	08:44			
	17:00		19:54	20:52	25	20:18 (5)	21:41	22:00	21:30	20:25	19:09	17:00	16:12	16:11		
30	08:17		07:06	05:54	19:53 (5)	05:05	04:58	05:35	06:29	07:24	07:20	08:17	08:44			
	17:02		19:56	20:53	25	20:18 (5)	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:12		
31	08:15		07:04		05:04		05:37	06:31			07:22		08:44			
	17:04		19:58		21:44		21:26	20:21			16:56		16:13			
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233		
Total, worst case				206	163				379							
Sun reduction				0.35	0.38				0.34							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.65	0.65				0.65							
Total reduction				0.23	0.25				0.22							
Total, real				47	40				84							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MB - H340

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	19:52 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	20:16 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	19:52 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	20:15 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48	19:53 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	20:14 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	19:54 (5)	05:00	05:01	05:44	06:38	07:31	07:30	08:23
	16:18	17:12	18:07	20:06	21:01	20:13 (5)	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	19:54 (5)	04:59	05:02	05:45	20:10 (5)	06:40	07:33	08:25
	16:20	17:14	18:09	20:07	21:03	20:12 (5)	21:50	21:58	21:17	6	20:16 (5)	20:09	18:55
6	08:42	08:05	07:04	06:49	05:42	19:56 (5)	04:59	05:03	05:47	20:07 (5)	06:42	07:35	08:26
	16:21	17:16	18:11	20:09	21:04	20:10 (5)	21:51	21:57	21:15	12	20:19 (5)	20:06	18:52
7	08:42	08:03	07:02	06:47	05:40	19:58 (5)	04:58	05:04	05:49	20:06 (5)	06:43	07:37	08:28
	16:22	17:18	18:13	20:11	21:06	20:09 (5)	21:52	21:57	21:13	15	20:21 (5)	20:04	18:50
8	08:41	08:01	07:00	06:44	05:38		04:57	05:05	05:51	20:03 (5)	06:45	07:39	08:29
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:11	18	20:21 (5)	20:01	18:48
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	20:03 (5)	06:47	07:41	08:30
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	20	20:23 (5)	19:59	18:45
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	20:01 (5)	06:49	07:42	08:31
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	22	20:23 (5)	19:56	16:37
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:01 (5)	06:50	07:44	08:33
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	23	20:24 (5)	19:54	18:40
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:58	20:00 (5)	06:52	07:46	08:34
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	24	20:24 (5)	19:51	18:38
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:59 (5)	06:54	07:48	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	25	20:24 (5)	19:49	18:36
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:59 (5)	06:56	07:50	08:36
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	25	20:24 (5)	19:47	18:33
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	19:59 (5)	06:58	07:52	08:37
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	25	20:24 (5)	19:44	18:31
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	19:58 (5)	06:59	07:54	08:38
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	26	20:24 (5)	19:42	18:29
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06	19:59 (5)	07:01	07:55	08:38
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	24	20:23 (5)	19:39	18:26
18	08:33	07:41	06:35	06:21	05:21		04:54	05:17	06:08	19:59 (5)	07:03	07:57	08:39
	16:40	17:40	18:34	20:31	21:25		21:59	21:46	20:50	23	20:22 (5)	19:37	18:24
19	08:32	07:39	06:33	06:18	20:02 (5)	05:19	04:54	05:18	06:10	19:59 (5)	07:05	07:59	08:40
	16:41	17:42	18:36	20:33	3	20:05 (5)	21:27	22:00	21:45	20:48	20	20:19 (5)	19:34
20	08:31	07:36	06:31	06:16	19:59 (5)	05:18	04:54	05:20	06:12	20:00 (5)	07:06	08:01	08:41
	16:43	17:44	18:38	20:35	8	20:07 (5)	21:28	22:00	21:43	20:46	17	20:17 (5)	19:32
21	08:30	07:34	06:28	06:14	19:56 (5)	05:16	04:54	05:21	06:13	20:01 (5)	07:08	08:03	08:41
	16:45	17:46	18:40	20:37	12	20:08 (5)	21:30	22:00	21:42	20:44	14	20:15 (5)	19:29
22	08:28	07:32	06:26	06:12	19:55 (5)	05:15	04:55	05:23	06:15	20:01 (5)	07:10	08:05	08:42
	16:47	17:48	18:41	20:39	15	20:10 (5)	21:31	22:01	21:41	20:42	11	20:12 (5)	19:27
23	08:27	07:30	06:23	06:09	19:54 (5)	05:13	04:55	05:24	06:17	20:03 (5)	07:12	08:07	08:42
	16:49	17:50	18:43	20:41	18	20:12 (5)	21:33	22:01	21:39	20:39	7	20:10 (5)	19:24
24	08:26	07:28	06:21	06:07	19:53 (5)	05:12	04:55	05:26	06:19	20:06 (5)	07:13	08:09	08:43
	16:51	17:52	18:45	20:42	20	20:13 (5)	21:34	22:01	21:38	20:37	3	20:09 (5)	19:22
25	08:24	07:25	06:18	06:05	19:53 (5)	05:11	04:56	05:27	06:20	20:07 (5)	07:15	07:11	08:09
	16:52	17:54	18:47	20:44	22	20:15 (5)	21:36	22:01	21:36	20:35	19:19	17:09	16:16
26	08:23	07:23	06:16	06:03	19:52 (5)	05:09	04:56	05:29	06:22	20:07 (5)	07:17	07:13	08:11
	16:54	17:56	18:49	20:46	25	20:17 (5)	21:37	22:01	21:35	20:32	19:17	17:06	16:15
27	08:21	07:21	06:13	06:01	19:52 (5)	05:08	04:56	05:30	06:24	20:07 (5)	07:19	07:14	08:13
	16:56	17:58	18:51	20:48	25	20:17 (5)	21:39	22:01	21:33	20:30	19:14	17:04	16:13
28	08:20	07:18	06:11	05:58	19:52 (5)	05:07	04:57	05:32	06:26	20:07 (5)	07:21	07:16	08:14
	16:58	18:00	18:53	20:50	25	20:17 (5)	21:40	22:01	21:32	20:28	19:12	17:02	16:13
29	08:18		07:08	05:56	19:52 (5)	05:06	04:58	05:34	06:28	20:07 (5)	07:22	07:18	08:16
	17:00		19:54	20:52	25	20:17 (5)	21:41	22:00	21:30	20:25	19:09	17:00	16:12
30	08:17		07:06	05:54	19:52 (5)	05:05	04:58	05:35	06:29	20:07 (5)	07:24	07:20	08:17
	17:02		19:56	20:53	24	20:16 (5)	21:43	22:00	21:28	20:23	19:07	16:58	16:11
31	08:15		07:04		05:04			05:37	06:31			07:22	08:44
	17:04		19:58		21:44			21:26	20:21			16:56	16:13
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259
Total, worst case				222	130				360				233
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.65	0.65				0.65				
Total reduction				0.23	0.25				0.22				
Total, real				51	32				80				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MC - H341

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	05:03	21:07 (4)	04:59	21:11 (4)	05:39	06:33	07:26	07:24	08:19		
2	16:15	17:06	18:02	20:00	20:55	21:45	3	21:10 (4)	22:00	13	21:24 (4)	21:25	20:18	19:05	16:54	16:10
	08:44	08:12	07:14	06:59	05:50	05:02		21:08 (4)	05:00		21:12 (4)	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:46	4	21:12 (4)	21:59	12	21:24 (4)	21:23	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48	05:01		21:07 (4)	05:00		21:11 (4)	05:42	06:36	07:30	07:28	08:22
	16:17	17:10	18:05	20:04	20:59	21:48	6	21:13 (4)	21:59	12	21:23 (4)	21:21	20:13	19:00	16:50	16:08
	08:43	08:08	07:09	06:54	05:46	05:00		21:07 (4)	05:01		21:12 (4)	05:44	06:38	07:31	07:30	08:23
4	16:18	17:12	18:07	20:06	21:01	21:49	7	21:14 (4)	21:59	11	21:23 (4)	21:19	20:11	18:57	16:48	16:08
	08:43	08:07	07:07	06:51	05:44	04:59		21:07 (4)	05:02		21:12 (4)	05:45	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07	21:02	21:50	8	21:15 (4)	21:58	11	21:23 (4)	21:17	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	04:59		21:07 (4)	05:03		21:13 (4)	05:47	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	21:51	9	21:16 (4)	21:57	9	21:22 (4)	21:15	20:06	18:52	16:44	16:07
	08:42	08:03	07:02	06:47	05:40	04:58		21:06 (4)	05:04		21:13 (4)	05:49	06:43	07:37	07:36	08:28
7	16:22	17:18	18:13	20:11	21:06	21:52	10	21:16 (4)	21:57	9	21:22 (4)	21:13	20:04	18:50	16:43	16:06
	08:41	08:01	07:00	06:44	05:38	04:57		21:07 (4)	05:05		21:14 (4)	05:51	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	10	21:17 (4)	21:56	7	21:21 (4)	21:11	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	04:57		21:06 (4)	05:06		21:14 (4)	05:52	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	12	21:18 (4)	21:55	7	21:21 (4)	21:09	19:59	18:45	16:39	16:05
	08:40	07:57	06:55	06:39	05:34	04:56		21:06 (4)	05:07		21:15 (4)	05:54	06:49	07:42	07:42	08:31
10	16:27	17:24	18:19	20:17	21:11	21:54	13	21:19 (4)	21:54	5	21:20 (4)	21:07	19:56	18:43	16:37	16:05
	08:40	07:55	06:52	06:37	05:33	04:56		21:07 (4)	05:08		21:16 (4)	05:56	06:50	07:44	07:43	08:32
	16:28	17:26	18:21	20:18	21:13	21:55	13	21:20 (4)	21:54	3	21:19 (4)	21:05	19:54	18:40	16:35	16:05
12	08:39	07:53	06:50	06:35	05:31	04:55		21:06 (4)	05:09		21:16 (4)	05:57	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15	21:56	14	21:20 (4)	21:53	2	21:18 (4)	21:03	19:51	18:38	16:34	16:05
	08:38	07:51	06:48	06:32	05:29	04:55		21:07 (4)	05:11			05:59	06:54	07:48	07:47	08:35
13	16:31	17:30	18:25	20:22	21:17	21:57	14	21:21 (4)	21:52		21:01	19:49	18:36	16:32	16:05	
	08:37	07:49	06:45	06:30	05:27	04:55		21:07 (4)	05:12		06:01	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18	21:57	15	21:22 (4)	21:51		20:59	19:46	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26	04:55		21:07 (4)	05:13		06:03	06:57	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20	21:58	15	21:22 (4)	21:50		20:57	19:44	18:31	16:29	16:05	
	08:35	07:45	06:40	06:25	05:24	04:54		21:07 (4)	05:14		06:04	06:59	07:54	07:53	08:37	
16	16:36	17:36	18:30	20:28	21:22	21:59	16	21:23 (4)	21:48		20:55	19:42	18:29	16:27	16:05	
	08:34	07:43	06:38	06:23	05:22	04:54		21:08 (4)	05:16		06:06	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23	21:59	15	21:23 (4)	21:47		20:53	19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21	04:54		21:08 (4)	05:17		06:08	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	21:25	21:59	16	21:24 (4)	21:46		20:50	19:37	18:24	16:25	16:05	
	08:32	07:39	06:33	06:18	05:19	04:54		21:08 (4)	05:18		06:10	07:05	07:59	07:59	08:40	
19	16:41	17:42	18:36	20:33	21:26	22:00	16	21:24 (4)	21:45		20:48	19:34	18:22	16:23	16:05	
	08:31	07:36	06:31	06:16	05:18	04:54		21:08 (4)	05:20		06:12	07:06	08:01	08:00	08:40	
	16:43	17:44	18:38	20:35	21:28	22:00	16	21:24 (4)	21:43		20:46	19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16	04:54		21:08 (4)	05:21		06:13	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30	22:00	16	21:24 (4)	21:42		20:44	19:29	18:17	16:20	16:06	
	08:28	07:32	06:26	06:12	05:15	04:55		21:09 (4)	05:23		06:15	07:10	08:05	08:04	08:42	
22	16:47	17:48	18:41	20:39	21:31	22:01	16	21:25 (4)	21:41		20:41	19:27	18:15	16:19	16:06	
	08:27	07:30	06:23	06:09	05:13	04:55		21:09 (4)	05:24		06:17	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	21:33	22:01	16	21:25 (4)	21:39		20:39	19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12	04:55		21:09 (4)	05:26		06:19	07:13	08:09	08:07	08:43	
	16:50	17:52	18:45	20:42	21:34	22:01	16	21:25 (4)	21:38		20:37	19:22	18:11	16:17	16:08	
	08:24	07:25	06:18	06:05	05:11	04:56		21:10 (4)	05:27		06:20	07:15	07:11	08:09	08:43	
25	16:52	17:54	18:47	20:44	21:36	22:01	15	21:25 (4)	21:36		20:35	19:19	17:09	16:16	16:08	
	08:23	07:23	06:16	06:03	05:09	04:56		21:09 (4)	05:29		06:22	07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	21:37	22:01	16	21:25 (4)	21:35		20:32	19:17	17:06	16:15	16:09	
27	08:21	07:21	06:13	06:01	05:08	04:56		21:09 (4)	05:30		06:24	07:19	07:14	08:13	08:43	
	16:56	17:58	18:51	20:48	21:39	22:01	15	21:24 (4)	21:33		20:30	19:14	17:04	16:13	16:10	
	08:20	07:18	06:11	05:58	05:07	04:57		21:10 (4)	05:32		06:26	07:21	07:16	08:14	08:44	
28	16:58	18:00	18:53	20:50	21:40	22:01	15	21:25 (4)	21:32		20:28	19:12	17:02	16:12	16:11	
	08:18		07:08	05:56	05:06	04:57		21:11 (4)	05:34		06:27	07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	21:41	22:00	14	21:25 (4)	21:30		20:25	19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	05:05	04:58		21:10 (4)	05:35		06:29	07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	21:43	22:00	14	21:24 (4)	21:28		20:23	19:07	16:58	16:11	16:12	
	08:15		07:04		05:04				05:37		06:31		07:22		08:44	
31	17:04		19:58		21:44	1	21:08 (4)		21:26		20:21		16:56		16:13	
	Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233			
Total, worst case						1	385	101								
Sun reduction						0.38	0.32	0.32								
Oper. time red.						1.00	1.00	1.00								
Wind dir. red.						0.61	0.61	0.61								
Total reduction						0.23	0.19	0.20								
Total, real						0	75	20								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MD - H342

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: ME - H343

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MF - H344

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MG - H345

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MH - H346

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MI - H347

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MJ - H348

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MK - H349

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: ML - H350

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	18:44 (4)	05:52
	16:15	17:06	18:02	20:00	47	19:33 (3)
2	08:44	08:12	07:14	06:59	18:45 (4)	05:50
	16:16	17:08	18:04	20:02	44	19:32 (3)
3	08:43	08:10	07:11	06:56	18:47 (4)	05:48
	16:17	17:10	18:06	20:04	39	19:32 (3)
4	08:43	08:08	07:09	06:54	18:49 (4)	05:46
	16:18	17:12	18:07	20:06	33	19:31 (3)
5	08:43	08:07	07:07	06:51	18:53 (4)	05:44
	16:19	17:14	18:09	20:07	20	19:28 (3)
6	08:42	08:05	07:04	06:49	19:18 (3)	05:42
	16:21	17:16	18:11	20:09	8	19:26 (3)
7	08:42	08:03	07:02	06:47		05:40
	16:22	17:18	18:13	20:11		21:06
8	08:42	08:01	07:00	06:44		05:38
	16:24	17:20	18:15	20:13		21:08
9	08:41	07:59	06:57	06:42		05:36
	16:25	17:22	18:17	20:15		21:10
10	08:40	07:57	16:50 (5)	06:55		05:34
	16:26	17:24	4	16:54 (5)		20:17
11	08:40	07:55	16:49 (5)	06:52		05:33
	16:28	17:26	7	16:56 (5)		20:19
12	08:39	07:53	16:47 (5)	06:50		05:31
	16:30	17:28	11	16:58 (5)		21:15
13	08:38	07:51	16:46 (5)	06:48		05:29
	16:31	17:30	14	17:00 (5)		21:17
14	08:37	07:49	16:46 (5)	06:45		05:27
	16:33	17:32	16	17:02 (5)		21:18
15	08:36	07:47	16:45 (5)	06:43		05:26
	16:34	17:34	20	17:05 (5)		21:20
16	08:35	07:45	16:45 (5)	06:40		05:24
	16:36	17:36	22	17:07 (5)		21:22
17	08:34	07:43	16:45 (5)	06:38		05:22
	16:38	17:38	23	17:08 (5)		21:23
18	08:33	07:41	16:45 (5)	06:35		05:21
	16:40	17:40	22	17:07 (5)		21:25
19	08:32	07:39	16:45 (5)	06:33		05:19
	16:41	17:42	22	17:07 (5)		21:27
20	08:31	07:36	16:46 (5)	06:31		05:18
	16:43	17:44	20	17:06 (5)		21:28
21	08:30	07:34	16:47 (5)	06:28		05:16
	16:45	17:46	19	17:06 (5)		21:30
22	08:28	07:32	16:48 (5)	06:26		05:15
	16:47	17:48	16	17:04 (5)		21:31
23	08:27	07:30	16:50 (5)	06:23		05:13
	16:49	17:50	12	17:02 (5)		21:33
24	08:26	07:28	16:53 (5)	06:21		05:12
	16:50	17:52	6	16:59 (5)		21:34
25	08:24	07:25		06:18		05:11
	16:52	17:54		18:12 (3)		21:36
26	08:23	07:23		06:16		05:09
	16:54	17:56		18:14 (3)		21:37
27	08:22	07:21		06:13		05:08
	16:56	17:58		18:15 (3)		21:39
28	08:20	07:18		06:11		05:07
	16:58	18:00		18:16 (3)		21:40
29	08:18			07:08		05:06
	17:00			19:54		21:41
30	08:17			07:06		05:05
	17:02			19:56		21:43
31	08:15			07:04		05:04
	17:04			19:58		21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case		234	538	191	500	174
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.67	0.67	0.63	0.63
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		36	98	45	121	35

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: ML - H350

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July			August			September			October			November			December	
1	04:59		20:44 (2)	05:39		20:40 (2)	06:33			07:26			07:24		16:20 (5)	08:19	
	22:00	7	20:51 (2)	21:25	13	20:53 (2)	20:18			19:05			16:54	3	16:23 (5)	16:10	
2	04:59		20:44 (2)	05:40		20:42 (2)	06:35			07:28			07:26			08:21	
	22:00	9	20:53 (2)	21:23	10	20:52 (2)	20:16			19:02			16:52			16:09	
3	05:00		20:42 (2)	05:42		20:42 (2)	06:36			07:30			07:28			08:22	
	21:59	11	20:53 (2)	21:21	8	20:50 (2)	20:13			19:00			16:50			16:08	
4	05:01		20:42 (2)	05:44		20:44 (2)	06:38			07:31			07:30			08:24	
	21:59	12	20:54 (2)	21:19	4	20:48 (2)	20:11			18:57			16:48			16:08	
5	05:02		20:42 (2)	05:45			06:40			07:33			07:32			08:25	
	21:58	13	20:55 (2)	21:17			20:09			18:55			16:46			16:07	
6	05:03		20:41 (2)	05:47			06:42		19:14 (3)	07:35			07:34			08:26	
	21:58	15	20:56 (2)	21:15			20:06	8		18:52			16:44			16:07	
7	05:04		20:41 (2)	05:49			06:43		18:48 (4)	07:37			07:36			08:28	
	21:57	16	20:57 (2)	21:13			20:04	19	19:23 (3)	18:50			16:43			16:06	
8	05:05		20:41 (2)	05:51			06:45		18:44 (4)	07:39			07:38			08:29	
	21:56	17	20:58 (2)	21:11			20:01	31	19:25 (3)	18:48			16:41			16:06	
9	05:06		20:40 (2)	05:52			06:47		18:41 (4)	07:41			07:40			08:30	
	21:55	19	20:59 (2)	21:09			19:59	38	19:26 (3)	18:45			16:39			16:05	
10	05:07		20:40 (2)	05:54			06:49		18:38 (4)	07:42			07:42			08:31	
	21:55	19	20:59 (2)	21:07			19:56	44	19:26 (3)	18:43			16:37			16:05	
11	05:08		20:39 (2)	05:56			06:50		18:36 (4)	07:44			07:44			08:33	
	21:54	21	21:00 (2)	21:05			19:54	48	19:26 (3)	18:40			16:35			16:05	
12	05:09		20:39 (2)	05:57			06:52		18:35 (4)	07:46			07:45			08:34	
	21:53	21	21:00 (2)	21:03			19:51	48	19:24 (3)	18:38			16:34			16:05	
13	05:10		20:38 (2)	05:59			06:54		18:34 (4)	07:48			07:47			08:35	
	21:52	23	21:01 (2)	21:01			19:49	48	19:22 (3)	18:36			16:32			16:05	
14	05:12		20:38 (2)	06:01			06:56		18:32 (4)	07:50			07:49			08:36	
	21:51	23	21:01 (2)	20:59			19:47	46	19:18 (3)	18:33			16:31			16:04	
15	05:13		20:38 (2)	06:03			06:58		18:32 (4)	07:52			07:51			08:37	
	21:50	24	21:02 (2)	20:57			19:44	44	19:16 (3)	18:31			16:29			16:05	
16	05:14		20:37 (2)	06:04			06:59		18:31 (4)	07:54			07:53			08:38	
	21:49	25	21:02 (2)	20:55			19:42	43	19:14 (3)	18:29			16:27			16:05	
17	05:16		20:38 (2)	06:06			07:01		18:30 (4)	07:55			07:55			08:38	
	21:47	25	21:03 (2)	20:53			19:39	40	19:11 (3)	18:26			16:26			16:05	
18	05:17		20:37 (2)	06:08			07:03		18:29 (4)	07:57		17:23 (5)	07:57			08:39	
	21:46	26	21:03 (2)	20:50			19:37	37	19:08 (3)	18:24	9	17:32 (5)	16:24			16:05	
19	05:18		20:37 (2)	06:10			07:05		18:29 (4)	07:59		17:20 (5)	07:59			08:40	
	21:45	26	21:03 (2)	20:48			19:34	35	19:04 (4)	18:22	14	17:34 (5)	16:23			16:05	
20	05:20		20:37 (2)	06:12			07:06		18:29 (4)	08:01		17:19 (5)	08:00			08:41	
	21:44	27	21:04 (2)	20:46			19:32	35	19:04 (4)	18:20	16	17:35 (5)	16:22			16:06	
21	05:21		20:37 (2)	06:13			07:08		18:29 (4)	08:03		17:17 (5)	08:02			08:41	
	21:42	27	21:04 (2)	20:44			19:29	32	19:01 (4)	18:17	19	17:36 (5)	16:20			16:06	
22	05:23		20:37 (2)	06:15			07:10		18:29 (4)	08:05		17:16 (5)	08:04			08:42	
	21:41	27	21:04 (2)	20:42			19:27	29	18:58 (4)	18:15	21	17:37 (5)	16:19			16:06	
23	05:24		20:37 (2)	06:17			07:12		18:29 (4)	08:07		17:16 (5)	08:06			08:42	
	21:39	27	21:04 (2)	20:39			19:24	27	18:56 (4)	18:13	21	17:37 (5)	16:18			16:07	
24	05:26		20:37 (2)	06:19			07:13		18:30 (4)	08:09		17:15 (5)	08:08			08:43	
	21:38	27	21:04 (2)	20:37			19:22	24	18:54 (4)	18:11	22	17:37 (5)	16:17			16:08	
25	05:27		20:38 (2)	06:20			07:15		18:30 (4)	07:11		16:15 (5)	08:09			08:43	
	21:36	26	21:04 (2)	20:35			19:19	21	18:51 (4)	17:09	22	16:37 (5)	16:16			16:08	
26	05:29		20:37 (2)	06:22			07:17		18:31 (4)	07:13		16:15 (5)	08:11			08:43	
	21:35	25	21:02 (2)	20:32			19:17	17	18:48 (4)	17:06	21	16:36 (5)	16:14			16:09	
27	05:30		20:37 (2)	06:24			07:19		18:33 (4)	07:14		16:15 (5)	08:13			08:44	
	21:33	23	21:00 (2)	20:30			19:14	13	18:46 (4)	17:04	19	16:34 (5)	16:13			16:10	
28	05:32		20:38 (2)	06:26			07:21		18:35 (4)	07:16		16:15 (5)	08:14			08:44	
	21:32	21	20:59 (2)	20:28			19:12	9	18:44 (4)	17:02	16	16:31 (5)	16:12			16:11	
29	05:34		20:38 (2)	06:27			07:22		18:38 (4)	07:18		16:16 (5)	08:16			08:44	
	21:30	19	20:57 (2)	20:25			19:09	3	18:41 (4)	17:00	13	16:29 (5)	16:12			16:11	
30	05:35		20:39 (2)	06:29			07:24			07:20		16:16 (5)	08:18			08:44	
	21:28	17	20:56 (2)	20:23			19:07			16:58	11	16:27 (5)	16:11			16:12	
31	05:37		20:40 (2)	06:31						07:22		16:18 (5)				08:44	
	21:26	15	20:55 (2)	20:21						16:56	7	16:25 (5)				16:13	
Potential sun hours	512			460			382			328			259			233	
Total, worst case		633			35		739			231				3			
Sun reduction		0.32			0.34		0.32			0.29				0.27			
Oper. time red.		1.00			1.00		1.00			1.00				1.00			
Wind dir. red.		0.63			0.63		0.67			0.66				0.66			
Total reduction		0.20			0.22		0.22			0.19				0.18			
Total, real		130			8		160			45				1			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MM - H351

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MN - H352

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MO - H353

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MP - H354

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:26 17:54	06:18 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58	05:04 21:44			05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MQ - H355

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MR - H356

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:04 (5)	07:16	16:43 (4)	07:01		05:52		19:48 (2)	05:03					
	16:15			17:06	16	16:20 (5)	18:02	31	17:14 (4)	20:00	20:55	32	20:20 (2)	21:45				
2	08:44			08:12		16:06 (5)	07:14		16:43 (4)	06:59	05:50		19:48 (2)	05:02				
	16:16			17:08	13	16:19 (5)	18:04	29	17:12 (4)	20:02	20:57	32	20:20 (2)	21:46				
3	08:44			08:10		16:08 (5)	07:12		16:45 (4)	06:56	05:48		19:48 (2)	05:01				
	16:17			17:10	8	16:16 (5)	18:06	25	17:10 (4)	20:04	20:59	31	20:19 (2)	21:48				
4	08:43			08:08			07:09		16:48 (4)	06:54	05:46		19:48 (2)	05:00				
	16:18			17:12			18:07	21	17:09 (4)	20:06	21:01	31	20:19 (2)	21:49				
5	08:43			08:07			07:07		16:50 (4)	06:51	05:44		19:49 (2)	04:59				
	16:19			17:14			18:09	15	17:05 (4)	20:07	21:03	29	20:18 (2)	21:50				
6	08:42			08:05			07:04		16:56 (4)	06:49	05:42		19:49 (2)	04:59				
	16:21			17:16			18:11	3	16:59 (4)	20:09	21:04	28	20:17 (2)	21:51				
7	08:42			08:03			07:02		17:43 (3)	06:47	05:40		19:51 (2)	04:58				
	16:22			17:18			18:13	3	17:46 (3)	20:11	21:06	26	20:17 (2)	21:52				
8	08:42			08:01			07:00		17:42 (3)	06:44	05:38		19:51 (2)	04:57				
	16:24			17:20			18:15	6	17:48 (3)	20:13	21:08	25	20:16 (2)	21:53				
9	08:41			07:59		16:51 (4)	06:57		17:40 (3)	06:42	05:36		19:52 (2)	04:57				
	16:25			17:22	1	16:52 (4)	18:17	10	17:50 (3)	20:15	21:10	22	20:14 (2)	21:54				
10	08:40			07:57		16:49 (4)	06:55		17:40 (3)	06:39	05:34		19:53 (2)	04:56				
	16:26			17:24	5	16:54 (4)	18:19	12	17:52 (3)	20:17	21:11	20	20:13 (2)	21:55				
11	08:40			07:55		16:47 (4)	06:52		17:40 (3)	06:37	05:33		19:56 (2)	04:56				
	16:28			17:26	9	16:56 (4)	18:21	15	17:55 (3)	20:19	21:13	16	20:12 (2)	21:55				
12	08:39			07:53		16:45 (4)	06:50		17:39 (3)	06:35	05:31		19:57 (2)	04:55				
	16:30			17:28	13	16:58 (4)	18:23	17	17:56 (3)	20:20	21:15	12	20:09 (2)	21:56				
13	08:38			07:51		16:44 (4)	06:48		17:39 (3)	06:32	05:29		20:02 (2)	04:55				
	16:31			17:30	16	17:00 (4)	18:25	19	17:58 (3)	20:22	21:17	2	20:04 (2)	21:57				
14	08:37			07:49		16:43 (4)	06:45		17:39 (3)	06:30	05:27			04:55				
	16:33			17:32	19	17:02 (4)	18:27	21	18:00 (3)	20:24	21:18			21:58				
15	08:36			07:47		16:42 (4)	06:43		17:39 (3)	06:28	05:26			04:54				
	16:34			17:34	23	17:05 (4)	18:28	22	18:01 (3)	20:26	21:20			21:58				
16	08:35		15:59 (5)	07:45		16:42 (4)	06:40		17:39 (3)	06:25	05:24			04:54				
	16:36	1	16:00 (5)	17:36	25	17:07 (4)	18:30	20	17:59 (3)	20:28	21:22			21:59				
17	08:34		15:59 (5)	07:43		16:41 (4)	06:38		17:41 (3)	06:23	05:22			04:54				
	16:38	4	16:03 (5)	17:38	28	17:09 (4)	18:32	17	17:58 (3)	20:30	21:23			21:59				
18	08:33		15:59 (5)	07:41		16:40 (4)	06:35		17:42 (3)	06:21	20:00 (2)	05:21		04:54				
	16:40	6	16:05 (5)	17:40	31	17:11 (4)	18:34	14	17:56 (3)	20:31	3	20:03 (2)	21:25	22:00				
19	08:32		15:59 (5)	07:39		16:40 (4)	06:33		17:45 (3)	06:18	19:57 (2)	05:19		04:54				
	16:41	8	16:07 (5)	17:42	33	17:13 (4)	18:36	8	17:53 (3)	20:33	8	20:05 (2)	21:27	22:00				
20	08:31		15:58 (5)	07:36		16:40 (4)	06:31			06:16	19:55 (2)	05:18		04:54				
	16:43	10	16:08 (5)	17:44	36	17:16 (4)	18:38			20:35	12	20:07 (2)	21:28	22:00				
21	08:30		15:59 (5)	07:34		16:40 (4)	06:28			06:14	19:53 (2)	05:16		04:54				
	16:45	12	16:11 (5)	17:46	38	17:18 (4)	18:40			20:37	15	20:08 (2)	21:30	22:01				
22	08:29		15:58 (5)	07:32		16:39 (4)	06:26			06:12	19:52 (2)	05:15		04:55				
	16:47	14	16:12 (5)	17:48	39	17:18 (4)	18:42			20:39	18	20:10 (2)	21:31	22:01				
23	08:27		15:59 (5)	07:30		16:40 (4)	06:23			06:09	19:51 (2)	05:13		04:55				
	16:49	16	16:15 (5)	17:50	38	17:18 (4)	18:43			20:41	21	20:12 (2)	21:33	22:01				
24	08:26		15:58 (5)	07:28		16:40 (4)	06:21			06:07	19:50 (2)	05:12		04:55				
	16:50	19	16:17 (5)	17:52	38	17:18 (4)	18:45			20:43	24	20:14 (2)	21:34	22:01				
25	08:24		15:59 (5)	07:25		16:40 (4)	06:18			06:05	19:50 (2)	05:11		04:55				
	16:52	20	16:19 (5)	17:54	37	17:17 (4)	18:47			20:44	25	20:15 (2)	21:36	22:01				
26	08:23		15:59 (5)	07:23		16:41 (4)	06:16			06:03	19:49 (2)	05:09		04:56				
	16:54	22	16:21 (5)	17:56	36	17:17 (4)	18:49			20:46	28	20:17 (2)	21:37	22:01				
27	08:22		15:59 (5)	07:21		16:41 (4)	06:13			06:01	19:49 (2)	05:08		04:56				
	16:56	22	16:21 (5)	17:58	35	17:16 (4)	18:51			20:48	30	20:19 (2)	21:39	22:01				
28	08:20		16:00 (5)	07:18		16:41 (4)	06:11			05:58	19:48 (2)	05:07		04:57				
	16:58	22	16:22 (5)	18:00	33	17:14 (4)	18:53			20:50	33	20:21 (2)	21:40	22:01				
29	08:18		16:01 (5)				07:08			05:56	19:48 (2)	05:06		04:57				
	17:00	20	16:21 (5)				19:54			20:52	33	20:21 (2)	21:41	22:01				
30	08:17		16:01 (5)				07:06			05:54	19:48 (2)	05:05		04:58				
	17:02	20	16:21 (5)				19:56			20:54	33	20:21 (2)	21:43	22:00				
31	08:15		16:02 (5)				07:04					05:04						
	17:04	18	16:20 (5)				19:58					21:44						
Potential sun hours	250			273			367		420		494			510				
Total, worst case		234		570			308		283		306							
Sun reduction		0.24		0.23			0.27		0.35		0.38							
Oper. time red.		1.00		1.00			1.00		1.00		1.00							
Wind dir. red.		0.66		0.67			0.67		0.65		0.65							
Total reduction		0.16		0.16			0.18		0.23		0.25							
Total, real		38		88			56		65		76							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MR - H356

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December			
1	04:59		05:39		20:07 (2)	06:33		07:26	18:18 (3)	07:24	16:19 (4)	08:19		
	22:00		21:25	13	20:20 (2)	20:18		19:05	18	18:36 (3)	4	16:23 (4)	16:10	
2	04:59		05:40		20:05 (2)	06:35		07:28		18:18 (3)		08:21		
	22:00		21:23	18	20:23 (2)	20:16		19:02	15	18:33 (3)		16:09		
3	05:00		05:42		20:03 (2)	06:36		07:30		18:18 (3)		08:22		
	21:59		21:21	21	20:24 (2)	20:13		19:00	13	18:31 (3)		16:08		
4	05:01		05:44		20:02 (2)	06:38		07:31		18:18 (3)		08:24		
	21:59		21:19	23	20:25 (2)	20:11		18:57	11	18:29 (3)		16:08		
5	05:02		05:45		20:00 (2)	06:40		07:33		18:19 (3)		08:25		
	21:58		21:17	25	20:25 (2)	20:09		18:55	7	18:26 (3)		16:07		
6	05:03		05:47		20:00 (2)	06:42		07:35		18:19 (3)		08:26		
	21:58		21:15	27	20:27 (2)	20:06		18:52	5	18:24 (3)		16:07		
7	05:04		05:49		19:59 (2)	06:43		07:37		18:20 (3)		08:28		
	21:57		21:13	29	20:28 (2)	20:04		18:50	1	18:21 (3)		16:06		
8	05:05		05:51		19:58 (2)	06:45		07:39		17:27 (4)		08:29		
	21:56		21:12	30	20:28 (2)	20:01		18:48	11	17:38 (4)	8	15:46 (5)	16:06	
9	05:06		05:52		19:58 (2)	06:47		07:41		17:23 (4)		15:35 (5)	08:30	
	21:55		21:10	30	20:28 (2)	19:59		18:45	18	17:41 (4)	14	15:49 (5)	16:05	
10	05:07		05:54		19:57 (2)	06:49		07:42		17:20 (4)		15:35 (5)	08:31	
	21:55		21:07	31	20:28 (2)	19:56		18:43	24	17:44 (4)	16	15:51 (5)	16:05	
11	05:08		05:56		19:56 (2)	06:50		07:44		17:18 (4)		15:34 (5)	08:33	
	21:54		21:05	33	20:29 (2)	19:54		18:40	27	17:45 (4)	18	15:52 (5)	16:05	
12	05:09		05:57		19:56 (2)	06:52		07:46		17:17 (4)		15:33 (5)	08:34	
	21:53		21:03	33	20:29 (2)	19:51		18:38	29	17:46 (4)	20	15:53 (5)	16:05	
13	05:10		05:59		19:56 (2)	06:54		07:48		17:15 (4)		15:33 (5)	08:35	
	21:52		21:01	32	20:28 (2)	19:49		18:36	32	17:47 (4)	20	15:53 (5)	16:05	
14	05:12		06:01		19:56 (2)	06:56		07:50		17:14 (4)		15:32 (5)	08:36	
	21:51		20:59	32	20:28 (2)	19:47		18:33	34	17:48 (4)	22	15:54 (5)	16:04	
15	05:13		06:03		19:56 (2)	06:58		07:52		17:13 (4)		15:32 (5)	08:37	
	21:50		20:57	32	20:28 (2)	19:44		18:31	35	17:48 (4)	22	15:54 (5)	16:05	
16	05:14		06:04		19:55 (2)	06:59		07:54		17:12 (4)		15:32 (5)	08:38	
	21:49		20:55	30	20:25 (2)	19:42		18:29	37	17:49 (4)	22	15:54 (5)	16:05	
17	05:16		06:06		19:56 (2)	07:01		07:55		17:12 (4)		15:32 (5)	08:38	
	21:47		20:53	27	20:23 (2)	19:39		18:26	37	17:49 (4)	20	15:52 (5)	16:05	
18	05:17		06:08		19:56 (2)	07:03		07:57		17:11 (4)		15:32 (5)	08:39	
	21:46		20:51	26	20:22 (2)	19:37		18:24	38	17:49 (4)	19	15:51 (5)	16:05	
19	05:18		06:10		19:56 (2)	07:05		07:59		17:11 (4)		15:33 (5)	08:40	
	21:45		20:48	23	20:19 (2)	19:34		18:22	38	17:49 (4)	16	15:49 (5)	16:05	
20	05:20		06:12		19:57 (2)	07:06		08:01		17:11 (4)		15:33 (5)	08:41	
	21:44		20:46	20	20:17 (2)	19:32		18:20	38	17:49 (4)	14	15:47 (5)	16:06	
21	05:21		06:13		19:58 (2)	07:08		08:03		17:10 (4)		15:34 (5)	08:41	
	21:42		20:44	17	20:15 (2)	19:29		18:17	38	17:48 (4)	12	15:46 (5)	16:06	
22	05:23		06:15		19:58 (2)	07:10		08:05		17:10 (4)		15:34 (5)	08:42	
	21:41		20:42	14	20:12 (2)	19:27		18:15	35	17:45 (4)	10	15:44 (5)	16:06	
23	05:24		06:17		19:59 (2)	07:12		08:07		17:10 (4)		15:35 (5)	08:42	
	21:39		20:39	11	20:10 (2)	19:24		18:13	33	17:43 (4)	8	15:43 (5)	16:07	
24	05:26		06:19		20:01 (2)	07:13	18:30 (3)	08:09		17:11 (4)		15:36 (5)	08:43	
	21:38		20:37	8	20:09 (2)	19:22	5	18:35 (3)	18:11	30	17:41 (4)	6	15:42 (5)	16:08
25	05:27		06:20		20:03 (2)	07:15		18:25 (3)	07:11		16:11 (4)		15:37 (5)	08:43
	21:36		20:35	3	20:06 (2)	19:19	13	18:38 (3)	17:09	27	16:38 (4)	4	15:41 (5)	16:08
26	05:29		06:22			07:17		18:23 (3)	07:13		16:11 (4)		15:38 (5)	08:43
	21:35		20:32			19:17	17	18:40 (3)	17:06	25	16:36 (4)	2	15:40 (5)	16:09
27	05:30		06:24			07:19		18:22 (3)	07:15		16:12 (4)		08:13	08:44
	21:33		20:30			19:14	19	18:41 (3)	17:04	22	16:34 (4)		16:13	16:10
28	05:32		06:26			07:21		18:20 (3)	07:16		16:13 (4)		08:14	08:44
	21:32		20:28			19:12	22	18:42 (3)	17:02	18	16:31 (4)		16:12	16:11
29	05:34		06:27			07:22		18:20 (3)	07:18		16:14 (4)		08:16	08:44
	21:30		20:25			19:09	21	18:41 (3)	17:00	15	16:29 (4)		16:12	16:11
30	05:35		06:29			07:24		18:18 (3)	07:20		16:15 (4)		08:18	08:44
	21:28		20:23			19:07	20	18:38 (3)	16:58	12	16:27 (4)		16:11	16:12
31	05:37	20:10 (2)	06:31					07:22			16:16 (4)		08:44	08:44
	21:26	8	20:18 (2)	20:21				16:56	9	16:25 (4)			16:13	16:13
Potential sun hours	512		460			382		328		259			233	
Total, worst case	8		588			117		732		277				
Sun reduction	0.32		0.34			0.32		0.29		0.27				
Oper. time red.	1.00		1.00			1.00		1.00		1.00				
Wind dir. red.	0.65		0.65			0.67		0.67		0.66				
Total reduction	0.21		0.22			0.22		0.20		0.18				
Total, real	2		130			25		143		49				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: MS - H357

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:16 (4) 21:25	05:39 20:18	06:33 19:05	07:26 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:16 (4) 21:23	05:40 20:16	06:35 19:02	07:28 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	21:16 (4) 21:21	05:42 20:13	06:36 19:00	07:30 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:12 (4) 21:59	05:01 21:23 (4)	05:44 21:19	06:38 20:11	07:31 18:57	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	21:12 (4) 21:58	05:02 21:17 (4)	05:45 21:17	06:40 20:09	07:33 18:55	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:12 (4) 21:57	05:03 21:11 (4)	05:47 21:15	06:42 20:06	07:35 18:52	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:11 (4) 21:57	05:04 21:11 (4)	05:49 21:13	06:43 20:04	07:37 18:50	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:11 (4) 21:56	05:05 21:17 (4)	05:51 21:11	06:45 20:01	07:39 18:48	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:11 (4) 21:55	05:06 21:21 (4)	05:52 21:09	06:47 19:59	07:41 18:45	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:11 (4) 21:54	05:07 21:19 (4)	05:54 21:07	06:49 19:56	07:42 18:43	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:11 (4) 21:54	05:08 21:11 (4)	05:56 21:05	06:50 19:54	07:44 18:40	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:11 (4) 21:53	05:09 21:20 (4)	05:57 21:03	06:52 19:51	07:46 18:38	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:11 (4) 21:52	05:11 21:21 (4)	05:59 21:01	06:54 19:49	07:48 18:36	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:11 (4) 21:51	05:12 21:22 (4)	06:01 20:59	06:56 19:46	07:50 18:33	08:36 16:31
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:12 (4) 21:50	05:13 21:22 (4)	06:03 20:57	06:57 19:44	07:52 18:31	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:12 (4) 21:48	05:14 21:23 (4)	06:04 20:55	06:59 19:42	07:54 18:29	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:12 (4) 21:47	05:16 21:23 (4)	06:06 20:53	07:01 19:39	07:55 18:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:12 (4) 21:46	05:17 21:24 (4)	06:08 20:50	07:03 19:37	07:57 18:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:12 (4) 21:45	05:18 21:24 (4)	06:10 20:48	07:05 19:34	07:59 18:22	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:12 (4) 21:43	05:20 21:24 (4)	06:12 20:46	07:06 19:32	08:01 18:20	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:12 (4) 21:42	05:21 21:24 (4)	06:13 20:44	07:08 19:29	08:03 18:17	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:13 (4) 21:41	05:23 21:25 (4)	06:15 20:41	07:10 19:27	08:05 18:15	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:13 (4) 21:39	05:24 21:25 (4)	06:17 20:39	07:12 19:24	08:07 18:13	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:13 (4) 21:38	05:26 21:25 (4)	06:19 20:37	07:13 19:22	08:09 18:11	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:14 (4) 21:36	05:27 21:25 (4)	06:20 20:35	19:22 19:19	18:11 17:09	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:14 (4) 21:35	05:29 21:25 (4)	06:22 20:32	07:17 19:17	18:13 17:06	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:14 (4) 21:33	05:30 21:24 (4)	06:24 20:30	07:19 19:14	18:13 17:04	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:14 (4) 21:31	05:32 21:25 (4)	06:26 20:28	07:21 19:12	18:14 17:02	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:58 22:00	21:15 (4) 21:30	05:34 21:25 (4)	06:27 20:25	07:22 19:09	18:16 17:00	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	21:15 (4) 21:28	05:35 21:28	06:29 20:23	07:24 19:07	18:17 16:58	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26		06:31 20:21		18:18 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case						252						
Sun reduction						0.32						
Oper. time red.						1.00						
Wind dir. red.						0.61						
Total reduction						0.19						
Total, real						49						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MT - H358

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:36 (5)	08:14	16:13 (4)	07:16	17:28 (3)	07:01	05:52	19:33 (2)	05:03	
	16:15	1	15:37 (5)	17:06	22	16:35 (4)	18:02	20:55	32	20:05 (2)	21:45
2	08:44	15:37 (5)	08:12	16:12 (4)	07:14	17:26 (3)	06:59	05:50		19:34 (2)	05:02
	16:16	2	15:39 (5)	17:08	25	16:37 (4)	18:04	20:57	30	20:04 (2)	21:46
3	08:44	15:36 (5)	08:10	16:12 (4)	07:12	17:26 (3)	06:56	05:48		19:35 (2)	05:01
	16:17	3	15:39 (5)	17:10	27	16:39 (4)	18:06	20:59	27	20:02 (2)	21:48
4	08:43	15:36 (5)	08:08	16:11 (4)	07:09	17:25 (3)	06:54	05:46		19:36 (2)	05:00
	16:18	5	15:41 (5)	17:12	30	16:41 (4)	18:07	21:01	25	20:01 (2)	21:49
5	08:43	15:36 (5)	08:07	16:11 (4)	07:07	17:24 (3)	06:51	05:44		19:37 (2)	04:59
	16:19	6	15:42 (5)	17:14	32	16:43 (4)	18:09	21:03	23	20:00 (2)	21:50
6	08:43	15:37 (5)	08:05	16:10 (4)	07:04	17:24 (3)	06:49	05:42		19:38 (2)	04:59
	16:21	7	15:44 (5)	17:16	35	16:45 (4)	18:11	21:04	20	19:58 (2)	21:51
7	08:42	15:36 (5)	08:03	16:10 (4)	07:02	17:24 (3)	06:47	05:40		19:41 (2)	04:58
	16:22	9	15:45 (5)	17:18	37	16:47 (4)	18:13	21:06	16	19:57 (2)	21:52
8	08:42	15:36 (5)	08:01	16:10 (4)	07:00	17:24 (3)	06:44	05:38		19:44 (2)	04:57
	16:24	10	15:46 (5)	17:20	40	16:50 (4)	18:15	21:08	9	19:53 (2)	21:53
9	08:41	15:37 (5)	07:59	16:10 (4)	06:57	17:24 (3)	06:42	05:36			04:57
	16:25	12	15:49 (5)	17:22	40	16:50 (4)	18:17	21:10			21:54
10	08:40	15:37 (5)	07:57	16:10 (4)	06:55	17:25 (3)	06:39	05:34			04:56
	16:26	13	15:50 (5)	17:24	40	16:50 (4)	18:19	21:11			21:55
11	08:40	15:37 (5)	07:55	16:10 (4)	06:52	17:26 (3)	06:37	05:33			04:56
	16:28	15	15:52 (5)	17:26	40	16:50 (4)	18:21	21:13			21:55
12	08:39	15:37 (5)	07:53	16:09 (4)	06:50	17:27 (3)	06:35	05:31			04:55
	16:30	17	15:54 (5)	17:28	40	16:49 (4)	18:23	19:48 (2)	5	19:53 (2)	21:15
13	08:38	15:38 (5)	07:51	16:10 (4)	06:48	17:29 (3)	06:32	05:29			04:55
	16:31	17	15:55 (5)	17:30	39	16:49 (4)	18:25	19:43 (2)			21:57
14	08:37	15:38 (5)	07:49	16:10 (4)	06:45	17:41 (3)	06:30	05:27	11	19:54 (2)	21:17
	16:33	19	15:57 (5)	17:32	39	16:49 (4)	18:27	19:41 (2)			04:55
15	08:36	15:38 (5)	07:47	16:11 (4)	06:43	17:34 (3)	06:28	05:26			21:58
	16:34	21	15:59 (5)	17:34	38	16:49 (4)	18:28	19:56 (2)	15	19:56 (2)	21:18
16	08:35	15:38 (5)	07:45	16:12 (4)	06:40	20:26	18	05:26			04:54
	16:36	22	16:00 (5)	17:36	37	16:49 (4)	18:30	19:40 (2)			21:58
17	08:34	15:38 (5)	07:43	16:12 (4)	06:38	06:25	22	20:00 (2)	22	20:00 (2)	21:22
	16:38	23	16:01 (5)	17:38	36	16:48 (4)	18:32	20:28			04:54
18	08:33	15:39 (5)	07:41	16:13 (4)	06:35	06:23	25	19:36 (2)			21:59
	16:40	23	16:02 (5)	17:40	34	16:47 (4)	18:34	20:01 (2)	25	20:01 (2)	21:23
19	08:32	15:40 (5)	07:39	16:14 (4)	06:33	06:21	28	19:35 (2)			04:54
	16:41	22	16:02 (5)	17:42	32	16:46 (4)	18:36	20:03 (2)	28	20:03 (2)	21:25
20	08:31	15:40 (5)	07:36	16:15 (4)	06:31	06:18	30	05:19			04:54
	16:43	22	16:02 (5)	17:44	30	16:45 (4)	18:38	20:05 (2)	30	20:05 (2)	21:27
21	08:30	15:41 (5)	07:34	16:17 (4)	06:28	06:16	33	05:18			04:54
	16:45	21	16:02 (5)	17:46	27	16:44 (4)	18:40	20:07 (2)	33	20:07 (2)	21:28
22	08:29	15:41 (5)	07:32	16:18 (4)	06:26	06:14	35	05:16			04:54
	16:47	20	16:01 (5)	17:48	23	16:41 (4)	18:42	20:07 (2)	35	20:07 (2)	21:30
23	08:27	15:43 (5)	07:30	16:21 (4)	06:23	06:12	36	05:15			22:01
	16:49	18	16:01 (5)	17:50	18	16:39 (4)	18:43	20:08 (2)	36	20:08 (2)	21:33
24	08:26	15:43 (5)	07:28	16:25 (4)	06:21	06:09	36	05:13			04:55
	16:50	18	16:01 (5)	17:52	10	16:35 (4)	18:45	20:08 (2)	36	20:08 (2)	21:34
25	08:24	15:45 (5)	07:25		06:18	06:07		05:12			22:01
	16:52	15	16:00 (5)	17:54		06:05		20:43	36	20:08 (2)	21:36
26	08:23	15:47 (5)	07:23		06:16	06:03		05:11			04:55
	16:54	13	16:21 (4)	17:56		20:46	35	20:08 (2)			22:01
27	08:22	15:49 (5)	07:21		06:13	06:01		05:10			04:56
	16:56	13	16:23 (4)	17:58		20:48	35	20:07 (2)			22:01
28	08:20	16:17 (4)	07:18	17:29 (3)	06:11	05:58		05:07			04:57
	16:58	9	16:26 (4)	18:00	3	17:32 (3)		19:32 (2)	35	20:07 (2)	21:40
29	08:18	16:16 (4)			07:08	20:50		20:07 (2)			22:01
	17:00	12	16:28 (4)		19:54	05:56		19:32 (2)			04:57
30	08:17	16:14 (4)			07:06	20:52	34	05:06			22:01
	17:02	16	16:30 (4)		19:56	05:54		20:06 (2)			04:58
31	08:15	16:13 (4)			07:04	20:54	32	05:05			22:00
	17:04	18	16:31 (4)		19:58			20:05 (2)			
Potential sun hours	250		273		367		420		494		510
Total, worst case		442		774		221		537		182	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.66		0.68		0.65		0.65	
Total reduction		0.16		0.15		0.18		0.23		0.25	
Total, real		71		118		41		123		45	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: MT - H358

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September		October		November		December						
1	04:59	05:39	06:33		07:26		18:06 (3)	07:24	15:40 (4)	08:19	15:19 (5)				
	22:00	21:25	20:18		19:05		15	18:21 (3)	16:54	40	16:20 (4)	16:10	15	15:34 (5)	
2	04:59	05:40	06:35		07:28		18:05 (3)		07:26	15:40 (4)		08:21	15:19 (5)		
	22:00	21:23	20:16		19:02		18	18:23 (3)	16:52	40	16:20 (4)	16:09	14	15:33 (5)	
3	05:00	05:42	06:36		07:30		18:03 (3)		07:28	15:40 (4)		08:22	15:20 (5)		
	21:59	21:21	20:13		19:00		21	18:24 (3)	16:50	39	16:19 (4)	16:08	12	15:32 (5)	
4	05:01	05:44	06:38		07:31		18:02 (3)		07:30	15:40 (4)		08:24	15:21 (5)		
	21:59	21:19	20:11		18:57		23	18:25 (3)	16:48	37	16:17 (4)	16:08	11	15:32 (5)	
5	05:02	05:45	19:52 (2)	06:40	07:33		18:01 (3)		07:32	15:40 (4)		08:25	15:22 (5)		
	21:58	21:17	12	20:04 (2)	20:09	18:55		24	18:25 (3)	16:46	35	16:15 (4)	16:07	8	15:30 (5)
6	05:03	05:47	19:50 (2)		06:42	07:35		18:01 (3)		07:34	15:41 (4)		08:26	15:23 (5)	
	21:58	21:15	17	20:07 (2)	20:06	18:52		23	18:24 (3)	16:44	31	16:12 (4)	16:07	7	15:30 (5)
7	05:04	05:49	19:48 (2)		06:43	07:37		17:59 (3)		07:36	15:41 (4)		08:28	15:23 (5)	
	21:57	21:13	21	20:09 (2)	20:04	18:50		22	18:21 (3)	16:43	29	16:10 (4)	16:06	6	15:29 (5)
8	05:05	05:51	19:46 (2)		06:45	07:39		17:59 (3)		07:38	15:42 (4)		08:29	15:24 (5)	
	21:56	21:12	24	20:10 (2)	20:01	18:48		19	18:18 (3)	16:41	26	16:08 (4)	16:06	4	15:28 (5)
9	05:06	05:52	19:45 (2)		06:47	07:41		17:59 (3)		07:40	15:42 (4)		08:30	15:25 (5)	
	21:55	21:10	26	20:11 (2)	19:59	18:45		17	18:16 (3)	16:39	24	16:06 (4)	16:05	3	15:28 (5)
10	05:07	05:54	19:43 (2)		06:49	07:42		18:00 (3)		07:42	15:44 (4)		08:31	15:26 (5)	
	21:55	21:07	28	20:11 (2)	19:56	18:43		14	18:14 (3)	16:37	21	16:05 (4)	16:05	2	15:28 (5)
11	05:08	05:56	19:42 (2)		06:50	07:44		18:00 (3)		07:44	15:45 (4)		08:33	15:26 (5)	
	21:54	21:05	30	20:12 (2)	19:54	18:40		11	18:11 (3)	16:35	18	16:03 (4)	16:05	1	15:27 (5)
12	05:09	05:57	19:42 (2)		06:52	07:46		18:01 (3)		07:45	15:46 (4)		08:34		
	21:53	21:03	31	20:13 (2)	19:51	18:38		8	18:09 (3)	16:34	15	16:01 (4)	16:05		
13	05:10	05:59	19:40 (2)		06:54	07:48		18:02 (3)		07:47	15:47 (4)		08:35		
	21:52	21:01	33	20:13 (2)	19:49	18:36		5	18:07 (3)	16:32	12	15:59 (4)	16:05		
14	05:12	06:01	19:40 (2)		06:56	07:50		18:03 (3)		07:49	15:49 (4)		08:36		
	21:51	20:59	34	20:14 (2)	19:47	18:33		1	18:04 (3)	16:31	9	15:58 (4)	16:04		
15	05:13	06:03	19:40 (2)		06:58	07:52				07:51	15:22 (5)		08:37		
	21:50	20:57	34	20:14 (2)	19:44	18:31				16:29	13	15:56 (4)	16:05		
16	05:14	06:04	19:38 (2)		06:59	07:54				07:53	15:20 (5)		08:38		
	21:49	20:55	36	20:14 (2)	19:42	18:29				16:27	13	15:54 (4)	16:05		
17	05:16	06:06	19:38 (2)		07:01	07:55				07:55	15:18 (5)		08:38		
	21:47	20:53	36	20:14 (2)	19:39	18:26				16:26	15	15:33 (5)	16:05		
18	05:17	06:08	19:38 (2)		07:03	07:57		16:55 (4)		07:57	15:17 (5)		08:39		
	21:46	20:51	36	20:14 (2)	19:37	18:24		13	17:08 (4)	16:24	18	15:35 (5)	16:05		
19	05:18	06:10	19:37 (2)		07:05	07:59		16:51 (4)		07:59	15:17 (5)		08:40		
	21:45	20:48	36	20:13 (2)	19:34	18:22		20	17:11 (4)	16:23	18	15:35 (5)	16:05		
20	05:20	06:12	19:38 (2)		07:06	08:01		16:49 (4)		08:00	15:16 (5)		08:41		
	21:44	20:46	35	20:13 (2)	19:32	18:20		24	17:13 (4)	16:22	20	15:36 (5)	16:06		
21	05:21	06:13	19:38 (2)		07:08	08:03		16:47 (4)		08:02	15:16 (5)		08:41		
	21:42	20:44	35	20:13 (2)	19:29	18:17		27	17:14 (4)	16:20	21	15:37 (5)	16:06		
22	05:23	06:15	19:37 (2)		07:10	08:05		16:45 (4)		08:04	15:16 (5)		08:42		
	21:41	20:42	35	20:12 (2)	19:27	18:15		31	17:16 (4)	16:19	22	15:38 (5)	16:06		
23	05:24	06:17	19:38 (2)		07:12	08:07		16:44 (4)		08:06	15:16 (5)		08:42		
	21:39	20:39	32	20:10 (2)	19:24	18:13		33	17:17 (4)	16:18	22	15:38 (5)	16:07		
24	05:26	06:19	19:38 (2)		07:13	08:09		16:43 (4)		08:08	15:16 (5)		08:43		
	21:38	20:37	31	20:09 (2)	19:22	18:11		34	17:17 (4)	16:17	23	15:39 (5)	16:08		
25	05:27	06:20	19:38 (2)		07:15	07:11		15:42 (4)		08:09	15:17 (5)		08:43		
	21:36	20:35	28	20:06 (2)	19:19	17:09		36	16:18 (4)	16:16	22	15:39 (5)	16:08		
26	05:29	06:22	19:39 (2)		07:17	07:13		15:41 (4)		08:11	15:17 (5)		08:43		
	21:35	20:32	25	20:04 (2)	19:17	17:06		37	16:18 (4)	16:14	23	15:40 (5)	16:09		
27	05:30	06:24	19:40 (2)		07:19	07:15		15:40 (4)		08:13	15:17 (5)		08:44		
	21:33	20:30	22	20:02 (2)	19:14	17:04		39	16:19 (4)	16:13	21	15:38 (5)	16:10		
28	05:32	06:26	19:40 (2)		07:21	07:16		15:40 (4)		08:14	15:18 (5)		08:44		
	21:32	20:28	19	19:59 (2)	19:12	17:02		39	16:19 (4)	16:12	19	15:37 (5)	16:11		
29	05:34	06:27	19:42 (2)		07:22	07:18		15:39 (4)		08:16	15:18 (5)		08:44		
	21:30	20:25	15	19:57 (2)	19:09	17:00		40	16:19 (4)	16:12	18	15:36 (5)	16:11		
30	05:35	06:29	19:44 (2)		07:24	18:09 (3)	07:20	15:39 (4)		08:18	15:18 (5)		08:44		
	21:28	20:23	11	19:55 (2)	19:07	10	18:19 (3)	16:58	40	16:19 (4)	16:11	17	15:35 (5)	16:12	
31	05:37	06:31	19:47 (2)					07:22	15:39 (4)				08:44		
	21:27	20:21	5	19:52 (2)				16:56	40	16:19 (4)			16:13		
Potential sun hours	512	460			382			328		259			233		
Total, worst case			727		10			674		681			83		
Sun reduction			0.34		0.32			0.29		0.27			0.21		
Oper. time red.			1.00		1.00			1.00		1.00			1.00		
Wind dir. red.			0.65		0.68			0.66		0.66			0.66		
Total reduction			0.22		0.22			0.19		0.17			0.14		
Total, real			161		2			131		119			11		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MU - H359

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MV - H360

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MW - H361

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MX - H362

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: MY - H363

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case **Shadow receptor:** MZ - H364

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26	18:24 (4)	07:24	08:19	
	16:15	17:06	18:02		20:00	20:55	21:45	22:00	21:25	20:18		19:05	12	18:36 (4)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	04:59	05:40	06:35		07:28		18:24 (4)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:46	22:00	21:23	20:16		19:02	9	18:33 (4)	16:52	16:09
3	08:43	08:10	07:11		06:56	05:48	05:01	05:00	05:42	06:36		07:30		18:25 (4)	07:28	08:22
	16:17	17:10	18:05		20:04	20:59	21:48	21:59	21:21	20:13		19:00	6	18:31 (4)	16:50	16:08
4	08:43	08:08	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:31		18:26 (4)	07:30	08:24
	16:18	17:12	18:07		20:06	21:01	21:49	21:59	21:19	20:11		18:57	3	18:29 (4)	16:48	16:08
5	08:43	08:07	07:07		06:51	05:44	04:59	05:02	05:45	06:40		07:33			07:32	08:25
	16:19	17:14	18:09		20:07	21:03	21:50	21:58	21:17	20:09		18:55			16:46	16:07
6	08:42	08:05	07:04		06:49	05:42	04:58	05:03	05:47	06:42		07:35			07:34	08:26
	16:21	17:16	18:11		20:09	21:04	21:51	21:57	21:15	20:06		18:52			16:44	16:07
7	08:42	08:03	07:02		06:47	05:40	04:58	05:04	05:49	06:43		07:37			07:36	08:28
	16:22	17:18	18:13		20:11	21:06	21:52	21:57	21:13	20:04		18:50			16:43	16:06
8	08:41	08:01	07:00		06:44	05:38	04:57	05:05	05:50	06:45		07:39			07:38	08:29
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:11	20:01		18:48			16:41	16:06
9	08:41	07:59	06:57		17:49 (4)	06:42	05:36	04:57	05:06	05:52		07:41			07:40	08:30
	16:25	17:22	18:17	1	17:50 (4)	20:15	21:10	21:54	21:55	21:09		18:45			16:39	16:05
10	08:40	07:57	06:55		17:48 (4)	06:39	05:34	04:56	05:07	05:54		07:42			07:42	08:31
	16:26	17:24	18:19	4	17:52 (4)	20:17	21:11	21:55	21:07	19:56		18:43			16:37	16:05
11	08:40	07:55	06:52		17:46 (4)	06:37	05:32	04:56	05:08	05:56		07:44			07:43	08:33
	16:28	17:26	18:21	8	17:54 (4)	20:18	21:13	21:55	21:04	19:54		18:40			16:35	16:05
12	08:39	07:53	06:50		17:45 (4)	06:35	05:31	04:55	05:09	05:57		07:46			07:45	08:34
	16:30	17:28	18:23	11	17:56 (4)	20:20	21:15	21:56	21:53	21:03		18:38			16:34	16:05
13	08:38	07:51	06:48		17:45 (4)	06:32	05:29	04:55	05:10	06:54		07:48			07:47	08:35
	16:31	17:30	18:25	13	17:58 (4)	20:22	21:17	21:57	21:52	21:01		18:36			16:32	16:04
14	08:37	07:49	06:45		17:44 (4)	06:30	05:27	04:55	05:12	06:01		07:50			07:49	08:36
	16:33	17:32	18:26	16	18:00 (4)	20:24	21:18	21:57	21:51	20:59		18:33			16:30	16:04
15	08:36	07:47	06:43		17:44 (4)	06:28	05:25	04:54	05:13	06:03		07:52			07:51	08:37
	16:34	17:34	18:28	18	18:02 (4)	20:26	21:20	21:58	21:50	20:57		18:31			16:29	16:04
16	08:35	07:45	06:40		17:44 (4)	06:25	05:24	04:54	05:14	06:04		07:54			07:53	08:38
	16:36	17:36	18:30	20	18:04 (4)	20:28	21:22	21:59	21:48	20:55		18:29			16:27	16:05
17	08:34	07:43	06:38		17:44 (4)	06:23	05:22	04:54	05:16	06:06		07:55			07:55	08:38
	16:38	17:38	18:32	20	18:04 (4)	20:30	21:23	21:59	21:47	20:53		18:26			16:26	16:05
18	08:33	07:41	06:35		17:44 (4)	06:21	05:21	04:54	05:17	06:08		07:57			07:57	08:39
	16:40	17:40	18:34	19	18:03 (4)	20:31	21:25	22:00	21:46	20:50		18:24			16:24	16:05
19	08:32	07:39	06:33		17:46 (4)	06:18	05:19	04:54	05:18	06:10		07:59			07:59	08:40
	16:41	17:42	18:36	16	18:02 (4)	20:33	21:27	22:00	21:45	20:48		18:22			16:23	16:05
20	08:31	07:36	06:31		17:47 (4)	06:16	05:18	04:54	05:20	06:12		08:01			08:00	08:41
	16:43	17:44	18:38	12	17:59 (4)	20:35	21:28	22:00	21:44	20:46		18:20			16:22	16:06
21	08:30	07:34	06:28		17:50 (4)	06:14	05:16	04:54	05:21	06:13		08:03			08:02	08:41
	16:45	17:46	18:40	6	17:56 (4)	20:37	21:30	22:00	21:42	20:44		18:17			16:20	16:06
22	08:28	07:32	06:26		06:11	05:15	04:55	05:23	06:15	07:10		08:05			08:04	08:42
	16:47	17:48	18:41		20:39	21:31	22:01	21:41	20:42	19:27	2	18:39 (4)			16:19	16:06
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12		18:32 (4)			08:06	08:42
	16:49	17:50	18:43		20:41	21:33	22:01	21:39	20:39	19:24	11	18:43 (4)			16:18	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:13		18:30 (4)			08:07	08:43
	16:50	17:52	18:45		20:42	21:34	22:01	21:38	20:37	19:22	15	18:45 (4)			16:17	16:08
25	08:24	07:25	06:18		06:05	05:11	04:55	05:27	06:20	07:15		18:27 (4)			08:09	08:43
	16:52	17:54	18:47		20:44	21:36	22:01	21:36	20:35	19:19	18	18:45 (4)			16:16	16:08
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17		18:26 (4)			08:11	08:43
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:32	19:17	20	18:46 (4)			16:14	16:09
27	08:21	07:21	06:13		06:00	05:08	04:56	05:30	06:24	07:19		18:26 (4)			08:13	08:44
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:14	20	18:46 (4)			16:13	16:10
28	08:20	07:18	06:11		05:58	05:07	04:57	05:32	06:26	07:21		18:25 (4)			08:14	08:44
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	19	18:44 (4)			16:12	16:10
29	08:18		07:08		05:56	05:06	04:57	05:34	06:27	07:22		18:25 (4)			08:16	08:44
	17:00		19:54		20:52	21:41	22:01	21:30	20:25	19:09	16	18:41 (4)			16:11	16:11
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		18:24 (4)			08:17	08:44
	17:02		19:56		20:53	21:43	22:00	21:28	20:23	19:07	14	18:38 (4)			16:11	16:12
31	08:15		07:04			05:04		05:37	06:31			07:22				08:44
	17:04		19:58			21:44		21:26	20:21			16:56				16:13
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case				164						135		30				
Sun reduction				0.27						0.32		0.29				
Oper. time red.				1.00						1.00		1.00				
Wind dir. red.				0.67						0.67		0.67				
Total reduction				0.18						0.22		0.20				
Total, real				30						29		6				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: NA - H365

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:12 (4) 21:24 (4)	05:39 21:25	06:33 20:18	19:47 (5) 19:50 (5)	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	21:10 (4) 21:12 (4)	05:00 21:59	06:35 21:23	20:16 21:23		07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	21:09 (4) 21:13 (4)	05:00 21:59	06:36 21:21	20:13 21:21		07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:08 (4) 21:14 (4)	05:01 21:59	06:38 21:19	20:11 21:19		07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	21:09 (4) 21:15 (4)	05:02 21:58	06:40 21:17	20:09 21:23		07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:08 (4) 21:16 (4)	05:03 21:57	06:42 21:15	20:06 21:22		07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:08 (4) 21:16 (4)	05:04 21:57	06:43 21:13	20:06 21:22		07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:08 (4) 21:17 (4)	05:05 21:56	06:45 21:11	20:01 21:16		07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:07 (4) 21:18 (4)	05:06 21:55	06:47 21:09	20:01 21:21		07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:08 (4) 21:19 (4)	05:07 21:54	06:49 21:07	20:09 21:20		07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 19:48 (5) 19:51 (5)	04:56 21:13	21:08 (4) 21:20 (4)	05:08 21:54	06:50 21:05	20:04 21:19		07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 19:53 (5)	04:55 21:15	21:08 (4) 21:20 (4)	05:09 21:53	06:52 21:03	20:05 21:13		07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:28	06:32 20:32	05:29 19:54 (5)	04:55 21:17	21:08 (4) 21:21 (4)	05:11 21:57	06:54 21:01	20:06 21:22		07:51 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 19:56 (5)	04:55 21:18	21:08 (4) 21:22 (4)	05:12 21:51	06:56 20:59	20:07 21:23		07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 19:42 (5) 19:58 (5)	04:55 21:20	21:08 (4) 21:22 (4)	05:13 21:50	06:57 20:57	20:03 21:24		07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 19:41 (5) 19:59 (5)	04:54 21:22	21:09 (4) 21:23 (4)	05:14 21:48	06:58 20:55	20:04 21:25		07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 20:00 (5) 19:41 (5)	04:54 21:23	21:09 (4) 21:23 (4)	05:16 21:47	06:59 20:53	20:05 21:39		07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 20:00 (5) 21:00 (5)	04:54 21:25	21:09 (4) 21:24 (4)	05:17 21:46	07:00 20:50	20:06 21:37		07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 20:01 (5) 19:42 (5)	04:54 21:26	21:09 (4) 21:24 (4)	05:18 21:45	07:01 20:48	20:07 21:56 (5)		07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 19:59 (5) 21:28	04:54 22:00	21:09 (4) 21:24 (4)	05:18 21:43	07:02 20:46	21:50 (5) 20:00 (5) 19:32		08:00 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 19:57 (5) 21:30	04:54 22:00	21:09 (4) 21:24 (4)	05:21 21:42	07:03 20:44	19:48 (5) 20:02 (5) 19:29		08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 19:43 (5) 21:31	04:55 22:01	21:10 (4) 21:25 (4)	05:23 21:41	07:04 20:41	19:46 (5) 20:02 (5) 19:27		08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 19:45 (5) 21:33	04:55 22:01	21:10 (4) 21:25 (4)	05:24 21:39	07:05 20:39	19:45 (5) 20:03 (5) 19:24		08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:10 (4) 21:25 (4)	05:26 21:38	07:06 20:37	19:43 (5) 20:04 (5) 19:22		08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:11 (4) 21:25 (4)	05:27 21:36	07:07 20:35	19:44 (5) 20:03 (5) 19:19		08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:11 (4) 21:25 (4)	05:29 21:35	07:08 20:32	19:44 (5) 20:03 (5) 19:17		08:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:11 (4) 21:24 (4)	05:28 21:33	07:09 20:30	19:19 (5) 20:02 (5) 19:14		08:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:11 (4) 21:25 (4)	05:32 21:32	07:10 20:28	19:43 (5) 19:59 (5) 19:12		08:15 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:58 22:00	21:12 (4) 21:25 (4)	05:34 21:30	07:11 20:25	19:44 (5) 19:57 (5) 19:09		08:16 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	21:12 (4) 21:24 (4)	05:35 21:28	07:12 20:23	19:44 (5) 19:55 (5) 19:07		08:17 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44			05:37 21:26	07:13 20:21	19:45 (5) 19:52 (5)		08:18 16:56	08:18 16:11	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case				178			343	81	182	3				
Sun reduction				0.35			0.32	0.32	0.34	0.34				
Oper. time red.				1.00			1.00	1.00	1.00	1.00				
Wind dir. red.				0.65			0.61	0.61	0.65	0.65				
Total reduction				0.23			0.19	0.20	0.22	0.21				
Total, real				41			67	16	41	1				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NB - H366

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	05:03 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NC - H367

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		15:41 (2)	07:16	07:01		05:52	05:03	04:59	05:39	06:33	07:26	07:24			08:19				15:24 (2)		
	16:15		17:06	27	16:08 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54				16:10	10			15:34 (2)		
2	08:44		08:12		15:41 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26				08:21				15:26 (2)		
	16:16		17:08	26	16:07 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				16:09		6		15:32 (2)		
3	08:44		08:10		15:42 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28				08:22						
	16:17		17:10	24	16:06 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50				16:10						
4	08:43		08:08		15:43 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30				08:24						
	16:18		17:12	23	16:06 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48				15:19 (2)				15:31 (2)		
5	08:43		08:07		15:45 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32				15:16 (2)	12			15:28 (2)		
	16:19		17:14	19	16:04 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46				15:13 (2)	17			15:33 (2)		
6	08:43		08:05		15:47 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34				15:14 (2)				15:24 (2)		
	16:21		17:16	16	16:03 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44				15:10 (2)	20			15:34 (2)		
7	08:42		08:03		15:49 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				15:13 (2)				15:25 (2)		
	16:22		17:18	11	16:00 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				15:12 (2)	22			15:35 (2)		
8	08:42		08:01			07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38				15:12 (2)				15:26 (2)		
	16:24		17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	24			15:12 (2)	24			15:36 (2)		
9	08:41		07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				15:12 (2)				15:27 (2)		
	16:25		17:22			18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	26			15:12 (2)	26			15:38 (2)		
10	08:40		15:44 (2)	07:57		06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42				15:12 (2)				15:28 (2)		
	16:26	6	15:50 (2)	17:24		18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:42	16:37	27			15:12 (2)	27			15:39 (2)		
11	08:40		15:42 (2)	07:55		06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44				15:11 (2)				15:29 (2)		
	16:28	10	15:52 (2)	17:26		18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	28			15:11 (2)	28			15:39 (2)		
12	08:39		15:41 (2)	07:53		06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46				15:11 (2)				15:28 (2)		
	16:29	13	15:54 (2)	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	29			15:11 (2)	29			15:34 (2)		
13	08:38		15:40 (2)	07:51		06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47				15:11 (2)				15:27 (2)		
	16:31	15	15:55 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	29			15:10 (2)	29			15:40 (2)		
14	08:37		15:40 (2)	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				15:10 (2)				15:28 (2)		
	16:33	17	15:57 (2)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	30			15:10 (2)	30			15:40 (2)		
15	08:36		15:39 (2)	07:47		06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51				15:10 (2)				15:28 (2)		
	16:34	20	15:59 (2)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	30			15:10 (2)	30			15:40 (2)		
16	08:35		15:38 (2)	07:45		06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53				15:11 (2)				15:28 (2)		
	16:36	22	16:00 (2)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	29			15:11 (2)	29			15:40 (2)		
17	08:34		15:38 (2)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55				15:11 (2)				15:28 (2)		
	16:38	23	16:01 (2)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	29			15:11 (2)	29			15:40 (2)		
18	08:33		15:38 (2)	07:41		06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				15:11 (2)				15:28 (2)		
	16:40	25	16:03 (2)	17:40		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	29			15:11 (2)	29			15:40 (2)		
19	08:32		15:38 (2)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				15:12 (2)				15:28 (2)		
	16:41	26	16:04 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	28			15:12 (2)	28			15:40 (2)		
20	08:31		15:37 (2)	07:36		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00				15:12 (2)				15:28 (2)		
	16:43	27	16:04 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	28			15:12 (2)	28			15:40 (2)		
21	08:30		15:38 (2)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				15:13 (2)				15:28 (2)		
	16:45	27	16:05 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	27			15:13 (2)	27			15:40 (2)		
22	08:29		15:37 (2)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04				15:13 (2)				15:28 (2)		
	16:47	28	16:05 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	27			15:14 (2)	27			15:40 (2)		
23	08:27		15:38 (2)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				15:14 (2)				15:28 (2)		
	16:49	28	16:06 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	26			15:15 (2)	26			15:40 (2)		
24	08:26		15:37 (2)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08				15:15 (2)				15:28 (2)		
	16:50	29	16:06 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	25			15:16 (2)	25			15:40 (2)		
25	08:25		15:38 (2)	07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09				15:16 (2)				15:28 (2)		
	16:52	29	16:07 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	24			15:17 (2)	24			15:40 (2)		
26	08:23		15:38 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11				15:17 (2)				15:28 (2)		
	16:54	29	16:07 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	22			15:18 (2)	22			15:40 (2)		
27	08:22		15:37 (2)	07:21		06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13				15:18 (2)				15:28 (2)		
	16:56	30	16:07 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	20			15:19 (2)	20			15:40 (2)		
28	08:20		15:39 (2)	07:18		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14				15:20 (2)				15:28 (2)		
	16:58	29	16:08 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	17			15:21 (2)	17			15:40 (2)		
29	08:19		15:39 (2)			07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16				15:22 (2)				15:28 (2)		
	17:00	29	16:08 (2)			19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	15			15:23 (2)	15			15:40 (2)		
30	08:17		15:39 (2)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18				15:24 (2)				15:28 (2)		
	17:02	29	16:08 (2)			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	13									

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: ND - H368

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NE - H369

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:08 (5)	07:16	16:49 (4)	07:01	05:52	19:50 (2)	05:03		
	16:15	17:06	20 16:28 (5)	18:02	35 17:24 (4)	20:00	20:55	31 20:21 (2)	21:45		
2	08:44	08:12	16:09 (5)	07:14	16:49 (4)	06:59	05:50	19:50 (2)	05:02		
	16:16	17:08	18 16:27 (5)	18:04	33 17:22 (4)	20:02	20:57	31 20:21 (2)	21:46		
3	08:44	08:10	16:10 (5)	07:12	16:51 (4)	06:56	05:48	19:51 (2)	05:01		
	16:17	17:10	16 16:26 (5)	18:06	31 17:22 (4)	20:04	20:59	29 20:20 (2)	21:48		
4	08:43	08:08	16:11 (5)	07:09	16:52 (4)	06:54	05:46	19:51 (2)	05:00		
	16:18	17:12	14 16:25 (5)	18:07	29 17:21 (4)	20:06	21:01	28 20:19 (2)	21:49		
5	08:43	08:07	16:14 (5)	07:07	16:53 (4)	06:51	05:44	19:51 (2)	04:59		
	16:19	17:14	9 16:23 (5)	18:09	26 17:19 (4)	20:07	21:03	28 20:19 (2)	21:50		
6	08:42	08:05	07:04	16:55 (4)	06:49	05:42	05:42	19:52 (2)	04:59		
	16:21	17:16	18:11	22 17:17 (4)	20:09	21:04	26 20:18 (2)	21:51			
7	08:42	08:03	07:02	16:56 (4)	06:47	05:40	05:40	19:53 (2)	04:58		
	16:22	17:18	18:13	18 17:14 (4)	20:11	21:06	25 20:18 (2)	21:52			
8	08:42	08:01	07:00	17:00 (4)	06:44	05:38	05:38	19:54 (2)	04:57		
	16:24	17:20	18:15	11 17:11 (4)	20:13	21:08	22 20:16 (2)	21:53			
9	08:41	07:59	06:57	17:46 (3)	06:42	05:36	05:36	19:55 (2)	04:57		
	16:25	17:22	18:17	4 17:50 (3)	20:15	21:10	20 20:15 (2)	21:54			
10	08:40	07:57	06:55	17:45 (3)	06:39	05:34	05:34	19:56 (2)	04:56		
	16:26	17:24	18:19	7 17:52 (3)	20:17	21:11	17 20:13 (2)	21:55			
11	08:40	07:55	06:52	17:44 (3)	06:37	05:33	05:33	19:59 (2)	04:56		
	16:28	17:26	18:21	11 17:55 (3)	20:19	21:13	13 20:12 (2)	21:55			
12	08:39	07:53	06:50	17:43 (3)	06:35	05:31	05:31	20:02 (2)	04:55		
	16:30	17:28	18:23	13 17:56 (3)	20:20	21:15	6 20:08 (2)	21:56			
13	08:38	07:51	16:59 (4)	06:48	17:43 (3)	06:32	05:29		04:55		
	16:31	17:30	1 17:00 (4)	18:25	15 17:58 (3)	20:22	21:17		21:57		
14	08:37	07:49	16:57 (4)	06:45	17:42 (3)	06:30	05:27		04:55		
	16:33	17:32	5 17:02 (4)	18:27	18 18:00 (3)	20:24	21:18		21:58		
15	08:36	07:47	16:55 (4)	06:43	17:43 (3)	06:28	05:26		04:54		
	16:34	17:34	10 17:05 (4)	18:28	19 18:02 (3)	20:26	21:20		21:58		
16	08:35	07:45	16:54 (4)	06:40	17:43 (3)	06:25	05:24		04:54		
	16:36	17:36	13 17:07 (4)	18:30	21 18:04 (3)	20:28	21:22		21:59		
17	08:34	07:43	16:53 (4)	06:38	17:43 (3)	06:23	05:22		04:54		
	16:38	17:38	16 17:09 (4)	18:32	20 18:03 (3)	20:30	21:23		21:59		
18	08:33	07:41	16:51 (4)	06:35	17:44 (3)	06:21	05:21		04:54		
	16:40	17:40	20 17:11 (4)	18:34	17 18:01 (3)	20:31	21:25		22:00		
19	08:32	07:39	16:51 (4)	06:33	17:46 (3)	06:18	05:19		04:54		
	16:41	17:42	22 17:13 (4)	18:36	14 18:00 (3)	20:33	5 20:05 (2)	21:27	22:00		
20	08:31	16:06 (5)	07:36	16:50 (4)	06:31	17:47 (3)	06:16	19:58 (2)	05:18		
	16:43	2 16:08 (5)	17:44	26 17:16 (4)	18:38	10 17:57 (3)	20:35	9 20:07 (2)	21:28		
21	08:30	16:06 (5)	07:34	16:50 (4)	06:28	06:14	19:56 (2)	05:16	04:54		
	16:45	5 16:11 (5)	17:46	28 17:18 (4)	18:40	20:37	12 20:08 (2)	21:30	22:01		
22	08:29	16:06 (5)	07:32	16:49 (4)	06:26	06:12	19:54 (2)	05:15	04:55		
	16:47	6 16:12 (5)	17:48	30 17:19 (4)	18:42	20:39	16 20:10 (2)	21:31	22:01		
23	08:27	16:06 (5)	07:30	16:49 (4)	06:23	06:09	19:53 (2)	05:13	04:55		
	16:49	9 16:15 (5)	17:50	33 17:22 (4)	18:43	20:41	19 20:12 (2)	21:33	22:01		
24	08:26	16:05 (5)	07:28	16:49 (4)	06:21	06:07	19:53 (2)	05:12	04:55		
	16:50	12 16:17 (5)	17:52	35 17:24 (4)	18:45	20:42	21 20:14 (2)	21:34	22:01		
25	08:24	16:06 (5)	07:25	16:48 (4)	06:18	06:05	19:52 (2)	05:11	04:55		
	16:52	13 16:19 (5)	17:54	37 17:25 (4)	18:47	20:44	23 20:15 (2)	21:36	22:01		
26	08:23	16:05 (5)	07:23	16:49 (4)	06:16	06:03	19:51 (2)	05:09	04:56		
	16:54	16 16:21 (5)	17:56	36 17:25 (4)	18:49	20:46	26 20:17 (2)	21:37	22:01		
27	08:22	16:05 (5)	07:21	16:49 (4)	06:13	06:01	19:51 (2)	05:08	04:56		
	16:56	18 16:23 (5)	17:58	36 17:25 (4)	18:51	20:48	28 20:19 (2)	21:39	22:01		
28	08:20	16:06 (5)	07:18	16:49 (4)	06:11	05:58	19:51 (2)	05:07	04:57		
	16:58	20 16:26 (5)	18:00	35 17:24 (4)	18:53	20:50	30 20:21 (2)	21:40	22:01		
29	08:18	16:06 (5)		07:08	05:56	19:50 (2)	05:06		04:57		
	17:00	22 16:28 (5)		19:54	20:52	32 20:22 (2)	21:41		22:01		
30	08:17	16:06 (5)		07:06	05:54	19:50 (2)	05:05		04:58		
	17:02	22 16:28 (5)		19:56	20:53	32 20:22 (2)	21:43		22:00		
31	08:15	16:07 (5)		07:04			05:04				
	17:04	21 16:28 (5)		19:58			21:44				
Potential sun hours	250		273	367		420		494		510	
Total, worst case	166		460	374		253		276			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.67	0.67		0.65		0.65			
Total reduction	0.16		0.16	0.18		0.23		0.25			
Total, real	27		72	68		58		68			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case Shadow receptor: NE - H369

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September		October		November		December
1	04:59	05:39	20:11 (2)	06:33	07:26	18:22 (3)	07:24		08:19
	22:00	21:25	9 20:20 (2)	20:18	19:05	14 18:36 (3)	16:54		16:10
2	04:59	05:40	20:08 (2)	06:35	07:28	18:22 (3)	07:26		08:21
	22:00	21:23	15 20:23 (2)	20:16	19:02	11 18:33 (3)	16:52		16:09
3	05:00	05:42	20:06 (2)	06:36	07:30	18:23 (3)	07:28		08:22
	21:59	21:21	18 20:24 (2)	20:13	19:00	8 18:31 (3)	16:50		16:08
4	05:01	05:44	20:05 (2)	06:38	07:31	18:23 (3)	07:30		08:24
	21:59	21:19	21 20:26 (2)	20:11	18:57	6 18:29 (3)	16:48		16:08
5	05:02	05:45	20:03 (2)	06:40	07:33	17:41 (4)	07:32	15:48 (5)	08:25
	21:58	21:17	23 20:26 (2)	20:09	18:55	5 18:26 (3)	16:46	1 15:49 (5)	16:07
6	05:03	05:47	20:02 (2)	06:42	07:35	17:35 (4)	07:34	15:43 (5)	08:26
	21:58	21:15	25 20:27 (2)	20:06	18:52	15 17:50 (4)	16:44	10 15:53 (5)	16:07
7	05:04	05:49	20:02 (2)	06:43	07:37	17:31 (4)	07:36	15:41 (5)	08:28
	21:57	21:13	26 20:28 (2)	20:04	18:50	20 17:51 (4)	16:43	14 15:55 (5)	16:06
8	05:05	05:50	20:00 (2)	06:45	07:39	17:29 (4)	07:38	15:40 (5)	08:29
	21:56	21:12	28 20:28 (2)	20:01	18:48	24 17:53 (4)	16:41	16 15:56 (5)	16:06
9	05:06	05:52	20:00 (2)	06:47	07:41	17:27 (4)	07:40	15:39 (5)	08:30
	21:55	21:10	29 20:29 (2)	19:59	18:45	27 17:54 (4)	16:39	18 15:57 (5)	16:05
10	05:07	05:54	19:59 (2)	06:49	07:42	17:25 (4)	07:42	15:39 (5)	08:31
	21:55	21:07	30 20:29 (2)	19:56	18:43	30 17:55 (4)	16:37	20 15:59 (5)	16:05
11	05:08	05:56	19:59 (2)	06:50	07:44	17:24 (4)	07:44	15:38 (5)	08:33
	21:54	21:05	30 20:29 (2)	19:54	18:40	32 17:56 (4)	16:35	21 15:59 (5)	16:05
12	05:09	05:57	19:59 (2)	06:52	07:46	17:23 (4)	07:45	15:38 (5)	08:34
	21:53	21:03	31 20:30 (2)	19:51	18:38	34 17:57 (4)	16:34	22 16:00 (5)	16:05
13	05:10	05:59	19:58 (2)	06:54	07:48	17:22 (4)	07:47	15:38 (5)	08:35
	21:52	21:01	31 20:29 (2)	19:49	18:36	35 17:57 (4)	16:32	21 15:59 (5)	16:05
14	05:12	06:01	19:58 (2)	06:56	07:50	17:22 (4)	07:49	15:38 (5)	08:36
	21:51	20:59	31 20:29 (2)	19:47	18:33	35 17:57 (4)	16:31	20 15:58 (5)	16:04
15	05:13	06:03	19:58 (2)	06:58	07:52	17:21 (4)	07:51	15:38 (5)	08:37
	21:50	20:57	30 20:28 (2)	19:44	18:31	37 17:58 (4)	16:29	18 15:56 (5)	16:05
16	05:14	06:04	19:58 (2)	06:59	07:54	17:21 (4)	07:53	15:38 (5)	08:38
	21:49	20:55	27 20:25 (2)	19:42	18:29	37 17:58 (4)	16:27	16 15:54 (5)	16:05
17	05:16	06:06	19:58 (2)	07:01	07:55	17:20 (4)	07:55	15:39 (5)	08:38
	21:47	20:53	25 20:23 (2)	19:39	18:26	37 17:57 (4)	16:26	13 15:52 (5)	16:05
18	05:17	06:08	19:59 (2)	07:03	07:57	17:20 (4)	07:57	15:39 (5)	08:39
	21:46	20:51	23 20:22 (2)	19:37	18:24	35 17:55 (4)	16:24	12 15:51 (5)	16:05
19	05:18	06:10	19:58 (2)	07:05	07:59	17:20 (4)	07:59	15:40 (5)	08:40
	21:45	20:48	21 20:19 (2)	19:34	18:22	32 17:52 (4)	16:23	9 15:49 (5)	16:05
20	05:20	06:12	19:59 (2)	07:06	08:01	17:20 (4)	08:00	15:41 (5)	08:41
	21:44	20:46	18 20:17 (2)	19:32	18:20	30 17:50 (4)	16:22	6 15:47 (5)	16:06
21	05:21	06:13	20:00 (2)	07:08	08:03	17:20 (4)	08:02	15:41 (5)	08:41
	21:42	20:44	15 20:15 (2)	19:29	18:17	28 17:48 (4)	16:20	5 15:46 (5)	16:06
22	05:23	06:15	20:00 (2)	07:10	08:05	17:21 (4)	08:04	15:42 (5)	08:42
	21:41	20:42	12 20:12 (2)	19:27	18:15	24 17:45 (4)	16:19	2 15:44 (5)	16:06
23	05:24	06:17	20:02 (2)	07:12	18:33 (3)	08:07	17:21 (4)	08:06	08:42
	21:39	20:39	8 20:10 (2)	19:24	7 18:40 (3)	18:13	17:43 (4)	16:18	16:07
24	05:26	06:19	20:04 (2)	07:13	18:30 (3)	08:09	17:22 (4)	08:08	08:43
	21:38	20:37	5 20:09 (2)	19:22	13 18:43 (3)	18:11	19 17:41 (4)	16:17	16:08
25	05:27	06:20	07:15	18:27 (3)	07:11	16:23 (4)	08:09	08:43	
	21:36	20:35	19:19	17 18:44 (3)	17:09	15 16:38 (4)	16:16	16:08	
26	05:29	06:22	07:17	18:26 (3)	07:13	16:24 (4)	08:11	08:43	
	21:35	20:32	19:17	19 18:45 (3)	17:06	12 16:36 (4)	16:14	16:09	
27	05:30	06:24	07:19	18:25 (3)	07:15	16:25 (4)	08:13	08:44	
	21:33	20:30	19:14	21 18:46 (3)	17:04	9 16:34 (4)	16:13	16:10	
28	05:32	06:26	07:21	18:24 (3)	07:16	16:27 (4)	08:14	08:44	
	21:32	20:28	19:12	20 18:44 (3)	17:02	4 16:31 (4)	16:12	16:11	
29	05:34	06:27	07:22	18:23 (3)	07:18	08:16	16:12	08:44	
	21:30	20:25	19:09	18 18:41 (3)	17:00	16:12	16:11	16:11	
30	05:35	06:29	07:24	18:22 (3)	07:20	08:18	16:12	08:44	
	21:28	20:23	19:07	16 18:38 (3)	16:58	16:11	16:12	16:12	
31	05:37	06:31	07:22	16:56	07:22	16:11	16:12	08:44	
	21:26	20:21	16:56	07:22	16:56	16:11	16:12	16:13	
Potential sun hours	512	460	382	328	328	259	233	233	
Total, worst case		531	131	637	637	244			
Sun reduction		0.34	0.32	0.29	0.29	0.27			
Oper. time red.		1.00	1.00	1.00	1.00	1.00			
Wind dir. red.		0.65	0.67	0.67	0.67	0.66			
Total reduction		0.22	0.22	0.20	0.20	0.18			
Total, real		117	28	125	125	43			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NF - H370

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NG - H371

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NH - H372

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NI - H373

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NJ - SAINT PATRICK'S NATIONAL SCHOOL

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NK - H374

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	05:03	20:03 (5)	04:59	20:08 (5)	05:39	20:36 (5)	06:33	07:26	07:24	08:19
2	16:15	17:06	18:02	20:00	20:55	21:45	21:03 (5)	22:00	21:12 (5)	21:25	20:49 (5)	20:18	19:05	16:54	16:10
3	08:44	08:12	07:14	06:59	05:50	05:02	20:04 (5)	05:00	20:08 (5)	05:40		06:35	07:28	07:26	08:21
4	16:16	17:08	18:04	20:02	20:57	21:46	20:04 (5)	22:00	21:12 (5)	21:23		20:16	19:02	16:52	16:09
5	08:43	08:10	07:12	06:56	05:48	05:01	20:04 (5)	05:00	20:08 (5)	05:42		06:36	07:30	07:28	08:22
6	16:17	17:10	18:06	20:04	20:58	21:48	21:04 (5)	21:59	21:11 (5)	21:21		20:13	19:00	16:50	16:08
7	08:43	08:08	07:09	06:54	05:46	05:00	20:03 (5)	05:00	20:09 (5)	05:44		06:38	07:31	07:30	08:24
8	16:18	17:12	18:08	20:06	21:01	21:49	21:04 (5)	21:59	21:12 (5)	21:19		20:11	18:57	16:48	16:08
9	08:43	08:07	07:07	06:51	05:44	04:59	20:04 (5)	05:02	20:09 (5)	05:45		06:40	07:33	07:32	08:25
10	16:20	17:14	18:09	20:07	21:03	21:50	21:06 (5)	21:58	21:12 (5)	21:17		20:09	18:55	16:46	16:07
11	08:42	08:05	07:04	06:49	05:42	04:59	20:03 (5)	05:03	20:10 (5)	05:47		06:42	07:35	07:34	08:26
12	16:21	17:16	18:11	20:09	21:04	21:51	21:05 (5)	21:58	21:12 (5)	21:15		20:06	18:52	16:44	16:07
13	08:42	08:03	07:02	06:47	05:40	04:58	20:03 (5)	05:04	20:10 (5)	05:49		06:43	07:37	07:36	08:28
14	16:22	17:18	18:13	20:11	21:06	21:52	21:05 (5)	21:57	21:12 (5)	21:13		20:04	18:50	16:43	16:06
15	08:42	08:01	07:00	06:44	05:38	04:57	20:03 (5)	05:05	20:10 (5)	05:51		06:45	07:39	07:38	08:29
16	16:24	17:20	18:15	20:13	21:08	21:53	21:06 (5)	21:56	21:12 (5)	21:12		20:01	18:48	16:41	16:06
17	08:41	07:59	06:57	06:42	05:36	04:57	20:04 (5)	05:06	20:11 (5)	05:52		06:47	07:41	07:40	08:30
18	16:25	17:22	18:17	20:15	21:10	21:54	21:07 (5)	21:55	21:12 (5)	21:10		19:59	18:45	16:39	16:05
19	08:40	07:57	06:55	06:39	05:34	04:56	20:03 (5)	05:07	20:11 (5)	05:54		06:49	07:42	07:42	08:31
20	16:27	17:24	18:19	20:17	21:11	21:55	21:07 (5)	21:55	21:12 (5)	21:07		19:56	18:43	16:37	16:05
21	08:40	07:55	06:53	06:37	05:33	04:56	20:04 (5)	05:08	20:12 (5)	05:56		06:51	07:44	07:44	08:33
22	16:28	17:26	18:21	20:19	21:13	21:55	21:07 (5)	21:54	21:12 (5)	21:05		19:54	18:40	16:36	16:05
23	08:39	07:53	06:50	06:35	05:31	04:55	20:04 (5)	05:09	20:12 (5)	05:58		06:52	07:46	07:45	08:34
24	16:30	17:28	18:23	20:20	21:15	21:56	21:08 (5)	21:53	21:11 (5)	21:03		19:51	18:38	16:34	16:05
25	08:38	07:51	06:48	06:32	05:29	04:55	20:03 (5)	05:11	20:12 (5)	05:59		06:54	07:48	07:47	08:35
26	16:31	17:30	18:25	20:22	21:17	21:57	21:07 (5)	21:52	21:11 (5)	21:01		19:49	18:36	16:32	16:05
27	08:37	07:49	06:45	06:30	05:27	04:55	20:04 (5)	05:12	20:13 (5)	06:01		06:56	07:50	07:49	08:36
28	16:33	17:32	18:27	20:24	21:18	21:57	21:08 (5)	21:51	21:11 (5)	20:59		19:47	18:33	16:31	16:05
29	08:36	07:47	06:43	06:28	05:26	04:55	20:04 (5)	05:13	20:13 (5)	06:03		06:58	07:52	07:51	08:37
30	16:35	17:34	18:28	20:26	21:20	21:58	21:08 (5)	21:50	21:10 (5)	20:57		19:44	18:31	16:29	16:05
31	08:35	07:45	06:40	06:25	05:24	04:54	20:04 (5)	05:14	20:14 (5)	06:05		06:59	07:54	07:53	08:38
32	16:36	17:36	18:30	20:28	21:22	21:59	21:09 (5)	21:49	21:14 (5)	20:55		19:42	18:29	16:28	16:05
33	08:34	07:43	06:38	06:23	05:22	04:54	20:04 (5)	05:16	20:15 (5)	06:06		07:01	07:55	07:55	08:38
34	16:38	17:38	18:32	20:30	21:23	21:59	21:09 (5)	21:47	21:10 (5)	20:53		19:39	18:27	16:26	16:05
35	08:33	07:41	06:36	06:21	05:21	04:54	20:05 (5)	05:17	20:15 (5)	06:08		07:03	07:57	07:57	08:39
36	16:40	17:40	18:34	20:31	21:25	22:00	21:09 (5)	21:46	21:09 (5)	20:51		19:37	18:24	16:25	16:05
37	08:32	07:39	06:33	06:18	05:19	04:54	20:05 (5)	05:19	20:16 (5)	06:10		07:05	07:59	07:59	08:40
38	16:41	17:42	18:36	20:33	21:27	22:00	21:09 (5)	21:45	21:08 (5)	20:48		19:34	18:22	16:23	16:05
39	08:31	07:36	06:31	06:16	05:18	04:54	20:05 (5)	05:20	20:17 (5)	06:12		07:06	08:01	08:00	08:41
40	16:43	17:44	18:38	20:35	21:28	22:00	21:09 (5)	21:44	21:08 (5)	20:46		19:32	18:20	16:22	16:06
41	08:30	07:34	06:28	06:14	05:16	04:55	20:05 (5)	05:21	20:17 (5)	06:13		07:08	08:03	08:02	08:41
42	16:45	17:46	18:40	20:37	21:30	22:01	21:09 (5)	21:42	21:07 (5)	20:44		19:29	18:17	16:20	16:06
43	08:28	07:32	06:26	06:12	05:15	04:55	20:06 (5)	05:23	20:18 (5)	06:15		07:10	08:05	08:04	08:42
44	16:47	17:48	18:42	20:39	21:31	22:01	21:10 (5)	21:41	21:06 (5)	20:42		19:27	18:15	16:19	16:07
45	08:27	07:30	06:23	06:09	05:13	04:55	20:06 (5)	05:24	20:19 (5)	06:17		07:12	08:07	08:06	08:42
46	16:49	17:50	18:43	20:41	21:33	22:01	21:10 (5)	21:39	21:06 (5)	20:39		19:24	18:13	16:18	16:07
47	08:26	07:28	06:21	06:07	05:12	04:55	20:06 (5)	05:26	20:20 (5)	06:19		07:14	08:09	08:08	08:43
48	16:51	17:52	18:45	20:43	21:34	22:01	21:10 (5)	21:38	21:05 (5)	20:37		19:22	18:11	16:17	16:08
49	08:24	07:25	06:18	06:05	05:11	04:56	20:06 (5)	05:27	20:22 (5)	06:20		07:15	07:11	08:09	08:43
50	16:52	17:54	18:47	20:44	21:36	22:01	21:11 (5)	21:36	21:04 (5)	20:35		19:19	17:09	16:16	16:08
51	08:23	07:23	06:16	06:03	05:09	04:57	20:06 (5)	05:29	20:22 (5)	06:22		07:17	07:13	08:11	08:43
52	16:54	17:56	18:49	20:46	21:37	22:01	21:11 (5)	21:35	21:02 (5)	20:32		19:17	17:07	16:15	16:09
53	08:22	07:21	06:13	06:01	05:08	04:56	20:07 (5)	05:31	20:24 (5)	06:24		07:19	07:15	08:13	08:44
54	16:56	17:58	18:51	20:48	21:39	22:01	21:11 (5)	21:33	21:01 (5)	20:30		19:14	17:04	16:14	16:10
55	08:20	07:18	06:11	05:58	05:07	04:57	20:07 (5)	05:32	20:25 (5)	06:26		07:21	07:16	08:14	08:44
56	16:58	18:00	18:53	20:50	21:40	22:01	21:11 (5)	21:32	20:59 (5)	20:28		19:12	17:02	16:13	16:11
57	08:18	07:19	06:09	05:56	05:06	04:58	20:07 (5)	05:34	20:28 (5)	06:28		07:22	07:18	08:16	08:44
58	17:00	19:55	20:52	21:41	22:31	23:01	21:12 (5)	21:30	20:58 (5)	20:25		19:09	17:00	16:12	16:12
59	08:17	07:06	05:54	05:05	04:55	04:58	20:07 (5)	05:35	20:29 (5)	06:29		07:24	07:20	08:18	08:44
60	17:02	19:56	20:54	21:43	22:33	23:02	21:11 (5)	21:28	20:56 (5)	20:23		19:07	16:58	16:11	16:12
61	08:15	07:04	05:53	05:04	04:54	04:57	20:07 (5)	05:37	20:32 (5)	06:31		07:22	07:18	08:16	08:44
62	17:04	19:58	20:56	21:44	22:34	23:03	21:12 (5)	21:26	20:54 (5)	20:21		19:06	16:56	16:10	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233			
Total, worst case					897	1901	1609	13							
Sun reduction					0.38	0.32	0.32	0.34							
Oper. time red.					1.00	1.00	1.00	1.00							
Wind dir. red.					0.63	0.63	0.63	0.63							
Total reduction					0.24	0.20	0.20	0.21							
Total, real					215	382	327	3							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NL - Main Office

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44		14:56 (1)	08:14		09:04 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26					07:24	08:38 (2)	08:19		08:54 (2)			
	16:15	34	15:30 (1)	17:06	80	15:41 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05					16:54	38	09:16 (2)	16:10	61	15:19 (1)		
2	08:44		14:56 (1)	08:12		09:04 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28					07:26		08:37 (2)	08:21		08:56 (2)		
	16:16	35	15:31 (1)	17:08	78	15:40 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02					16:52	40	09:17 (2)	16:09	58	15:20 (1)		
3	08:44		14:56 (1)	08:10		09:05 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30					07:28		08:37 (2)	08:22		08:57 (2)		
	16:17	35	15:31 (1)	17:10	75	15:39 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00					16:50	50	14:59 (1)	16:08	55	15:19 (1)		
4	08:43		14:56 (1)	08:09		09:05 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32					07:30		08:36 (2)	08:24		08:59 (2)		
	16:18	36	15:32 (1)	17:12	73	15:38 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57					16:48	60	15:03 (1)	16:08	52	15:20 (1)		
5	08:43		14:56 (1)	08:07		09:05 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33					07:32		08:35 (2)	08:25		09:00 (2)		
	16:20	36	15:32 (1)	17:14	70	15:37 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55					16:46	65	15:05 (1)	16:07	48	15:19 (1)		
6	08:43		09:16 (2)	08:05		09:06 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35					07:34		08:35 (2)	08:27		09:02 (2)		
	16:21	44	15:34 (1)	17:16	64	15:35 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52					16:44	69	15:07 (1)	16:07	44	15:20 (1)		
7	08:42		09:15 (2)	08:03		09:06 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37					07:36		08:35 (2)	08:28		14:43 (1)		
	16:22	48	15:34 (1)	17:18	59	15:33 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50					16:43	73	15:08 (1)	16:06	37	15:20 (1)		
8	08:42		09:14 (2)	08:01		09:07 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39					07:38		08:34 (2)	08:29		14:44 (1)		
	16:24	52	15:35 (1)	17:20	47	15:28 (1)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48					16:41	76	15:09 (1)	16:06	36	15:20 (1)		
9	08:41		09:14 (2)	07:59		09:08 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41					07:40		08:35 (2)	08:30		14:45 (1)		
	16:25	55	15:36 (1)	17:22	39	09:47 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45					16:39	78	15:11 (1)	16:05	35	15:20 (1)		
10	08:40		09:13 (2)	07:57		09:09 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43					07:42		08:35 (2)	08:32		14:45 (1)		
	16:27	58	15:37 (1)	17:24	37	09:46 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43					16:37	80	15:12 (1)	16:05	35	15:20 (1)		
11	08:40		09:12 (2)	07:55		09:10 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44					07:44		08:35 (2)	08:33		14:46 (1)		
	16:28	60	15:37 (1)	17:26	35	09:45 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41					16:36	82	15:13 (1)	16:05	34	15:20 (1)		
12	08:39		09:11 (2)	07:53		09:11 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46					07:46		08:35 (2)	08:34		14:46 (1)		
	16:30	64	15:38 (1)	17:28	33	09:44 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38					16:34	84	15:14 (1)	16:05	34	15:20 (1)		
13	08:38		09:10 (2)	07:51		09:12 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48					07:47		08:35 (2)	08:35		14:48 (1)		
	16:31	66	15:38 (1)	17:30	30	09:42 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:35					16:32	84	15:14 (1)	16:05	33	15:21 (1)		
14	08:37		09:09 (2)	07:49		09:14 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50					07:49		08:36 (2)	08:36		14:48 (1)		
	16:33	69	15:39 (1)	17:32	26	09:40 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33					16:31	85	15:15 (1)	16:05	33	15:21 (1)		
15	08:36		09:08 (2)	07:47		09:16 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52					07:51		08:36 (2)	08:37		14:49 (1)		
	16:34	72	15:40 (1)	17:34	22	09:38 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31					16:29	85	15:15 (1)	16:05	33	15:22 (1)		
16	08:35		09:07 (2)	07:45		09:19 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54					07:53		08:36 (2)	08:38		14:49 (1)		
	16:36	74	15:40 (1)	17:36	16	09:35 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29					16:27	85	15:15 (1)	16:05	32	15:21 (1)		
17	08:34		09:05 (2)	07:43		09:25 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56					07:55		08:37 (2)	08:39		14:50 (1)		
	16:38	76	15:40 (1)	17:38	4	09:29 (2)	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27					16:26	84	15:16 (1)	16:05	31	15:21 (1)		
18	08:33		09:05 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57					07:57		08:37 (2)	08:39		14:50 (1)		
	16:40	79	15:41 (1)	17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24					16:25	84	15:16 (1)	16:05	32	15:22 (1)		
19	08:32		09:05 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59					07:59		08:38 (2)	08:40		14:51 (1)		
	16:41	80	15:42 (1)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22					16:23	84	15:17 (1)	16:05	32	15:23 (1)		
20	08:31		09:04 (2)	07:37			06:34	06:19	05:18	04:54	05:20	06:12	07:06	08:01					07:57		08:39 (2)	08:41		14:52 (1)		
	16:43	81	15:41 (1)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20					16:22	83	15:17 (1)	16:06	31	15:22 (1)		
21	08:30		09:04 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03					08:02		08:39 (2)	08:41		14:52 (1)		
	16:45	83	15:42 (1)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17					16:20	83	15:17 (1)	16:06	31	15:23 (1)		
22	08:29		09:04 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05					08:04		08:40 (2)	08:42		14:52 (1)		
	16:47	83	15:42 (1)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15					16:19	81	15:17 (1)	16:06	31	15:23 (1)		
23	08:27		09:04 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07					08:06		08:41 (2)	08:42		14:53 (1)		
	16:49	84	15:43 (1)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13					16:18	80	15:18 (1)	16:07	31	15:24 (1)		
24	08:26		09:03 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09					08:08		08:42 (2)	08:43		14:53 (1)		
	16:51	84	15:42 (1)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11					16:17	79	15:18 (1)	16:08	31	15:24 (1)		
25	08:25		09:04 (2)	07:25			06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11					08:09		08:43 (2)	08:43		14:53 (1)		
	16:52	85	15:43 (1)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09					9	08:52 (2)	16:16	77	15:18 (1)	16:08	32	15:25 (1)
26	08:23		09:03 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13					08:47 (2)		08:45 (2)	08:43		14:55 (1)		
	16:54	86	15:43 (1)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07					18	09:05 (2)	16:15	75	15:19 (1)	16:09	31	15:26 (1)
27	08:22		09:04 (2)	07:21			06:15	06:01	05:08	04:56	05:30	06:24	07:19	07:15					08:47 (2)		08:47 (2)	08:43		14:55 (1)		
	16:56	85	15:43 (1)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04					23	09:08 (2)	16:14	72	15:19 (1)	16:10	32	15:27 (1)
28	08:20		09:04 (2)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17					08:43 (2)		08:44 (2)	08:44		14:55 (1)		
	16:58	85	15:43 (1)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02					27	09:10 (2)	16:13	69	15:19 (1)	16:11	32	15:27 (1)
29	08:19		09:04 (2)				07:09	05:56	05:06	04:57	05:34	06:28	07:23	07:18					08:41 (2)		08:46 (2)	08:44		14:55 (1)		
	17:00	83	15:42 (1)				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00			</									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NM - Small Hut

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	09:18 (2) 08:14 15:32 (1) 17:06	09:19 (2) 07:16 15:43 (1) 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	08:57 (2) 08:19 09:24 (2) 16:10	08:58 (2) 15:22 (1)
2	08:44 16:16	09:18 (2) 08:12 15:33 (1) 17:08	09:19 (2) 07:14 15:42 (1) 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:55 (2) 08:21 09:26 (2) 16:09	08:59 (2) 15:22 (1)
3	08:44 16:17	09:17 (2) 08:10 15:33 (1) 17:10	09:20 (2) 07:12 15:41 (1) 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	08:54 (2) 08:22 09:27 (2) 16:08	08:59 (2) 15:22 (1)
4	08:43 16:18	09:17 (2) 08:09 15:34 (1) 17:12	09:20 (2) 07:09 15:40 (1) 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:53 (2) 08:24 15:03 (1) 16:08	09:00 (2) 15:22 (1)
5	08:43 16:20	09:16 (2) 08:07 15:35 (1) 17:14	09:21 (2) 07:07 15:38 (1) 18:09	06:52 20:08	05:44 21:03	05:02 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	08:52 (2) 08:25 15:06 (1) 16:07	09:01 (2) 15:22 (1)
6	08:43 16:21	09:16 (2) 08:05 15:36 (1) 17:16	09:22 (2) 07:05 15:36 (1) 18:11	06:49 20:09	05:42 21:04	05:03 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	08:51 (2) 08:27 15:08 (1) 16:07	09:02 (2) 15:22 (1)
7	08:42 16:22	09:16 (2) 08:03 15:36 (1) 17:18	09:23 (2) 07:02 15:33 (1) 18:13	06:47 20:11	05:40 21:06	05:04 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	08:50 (2) 08:28 15:10 (1) 16:06	09:03 (2) 15:22 (1)
8	08:42 16:24	09:15 (2) 08:01 15:37 (1) 17:20	09:24 (2) 07:00 15:37 (1) 18:15	06:44 20:13	05:38 21:08	05:05 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	08:49 (2) 08:29 15:11 (1) 16:06	09:05 (2) 15:23 (1)
9	08:41 16:25	09:16 (2) 07:59 15:38 (1) 17:22	09:26 (2) 06:57 15:36 (1) 18:17	06:42 20:15	05:36 21:10	05:06 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:50 (2) 08:30 15:13 (1) 16:05	09:06 (2) 15:22 (1)
10	08:40 16:27	09:16 (2) 07:57 15:39 (1) 17:24	09:27 (2) 06:55 15:39 (1) 18:19	06:39 20:17	05:34 21:12	05:07 21:55	05:07 21:58	05:54 21:08	06:49 19:56	07:43 18:43	08:49 (2) 08:32 15:14 (1) 16:05	09:07 (2) 15:22 (1)
11	08:40 16:28	09:16 (2) 07:55 15:40 (1) 17:26	09:30 (2) 06:53 15:40 (1) 18:21	06:37 20:19	05:33 21:13	05:08 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:49 (2) 08:33 15:15 (1) 16:05	09:08 (2) 15:22 (1)
12	08:39 16:30	09:16 (2) 07:53 15:40 (1) 17:28	09:32 (2) 06:50 15:40 (1) 18:23	06:35 20:20	05:31 21:15	05:09 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	08:49 (2) 08:34 15:16 (1) 16:05	09:09 (2) 15:22 (1)
13	08:38 16:31	09:15 (2) 07:51 15:41 (1) 17:30	09:37 (2) 06:48 15:41 (1) 18:25	06:32 20:22	05:29 21:17	05:11 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	08:51 (2) 08:35 15:17 (1) 16:05	09:11 (2) 15:23 (1)
14	08:37 16:33	09:15 (2) 07:49 15:41 (1) 17:32	09:43 (2) 06:45 15:41 (1) 18:27	06:30 20:24	05:27 21:18	05:12 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	08:49 (2) 08:36 15:17 (1) 16:05	09:12 (2) 15:23 (1)
15	08:36 16:34	09:16 (2) 07:47 15:42 (1) 17:34	09:44 (2) 06:43 15:42 (1) 18:29	06:28 20:26	05:26 21:20	05:13 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:49 (2) 08:37 15:17 (1) 16:05	09:13 (2) 15:24 (1)
16	08:35 16:36	09:16 (2) 07:45 15:43 (1) 17:36	09:45 (2) 06:40 15:43 (1) 18:30	06:25 20:28	05:24 21:22	05:14 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	08:49 (2) 08:38 15:18 (1) 16:05	09:14 (2) 15:23 (1)
17	08:34 16:38	09:15 (2) 07:43 15:43 (1) 17:38	09:46 (2) 06:38 15:43 (1) 18:32	06:23 20:30	05:22 21:23	05:14 21:59	05:16 21:48	06:06 20:53	06:59 19:39	07:56 18:27	08:49 (2) 08:39 15:18 (1) 16:05	09:15 (2) 15:23 (1)
18	08:33 16:40	09:15 (2) 07:41 15:43 (1) 17:40	09:47 (2) 06:36 15:43 (1) 18:34	06:21 20:32	05:21 21:25	05:17 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	08:49 (2) 08:39 15:19 (1) 16:05	09:16 (2) 15:24 (1)
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22	08:29 16:47	09:15 (2) 07:32 15:44 (1) 17:48	09:51 (2) 06:26 15:44 (1) 18:42	06:17 20:39	05:15 21:31	05:23 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:53 (2) 08:42 15:21 (1) 16:06	09:20 (2) 15:26 (1)
23	08:27 16:49	09:16 (2) 07:30 15:45 (1) 17:50	09:52 (2) 06:23 15:45 (1) 18:43	06:16 20:41	05:13 21:33	05:25 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:54 (2) 08:43 15:22 (1) 16:07	09:21 (2) 15:27 (1)
24	08:26 16:51	09:16 (2) 07:28 15:45 (1) 17:52	09:53 (2) 06:21 15:45 (1) 18:45	06:15 20:47	05:12 21:34	05:26 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:55 (2) 08:44 15:23 (1) 16:08	09:22 (2) 15:28 (1)
25	08:25 16:52	09:16 (2) 07:25 15:46 (1) 17:54	09:54 (2) 06:18 15:46 (1) 18:47	06:14 20:44	05:11 21:36	05:27 22:01	05:27 21:37	06:20 20:35	07:15 19:19	07:11 17:09	08:56 (2) 08:45 15:24 (1) 16:08	09:23 (2) 15:29 (1)
26	08:23 16:54	09:16 (2) 07:23 15:46 (1) 17:56	09:55 (2) 06:16 15:46 (1) 18:49	06:13 20:46	05:10 21:37	05:29 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:57 (2) 08:46 15:25 (1) 16:09	09:24 (2) 15:30 (1)
27	08:22 16:56	09:17 (2) 07:21 15:47 (1) 17:58	09:56 (2) 06:13 15:47 (1) 18:51	06:12 20:48	05:08 21:39	05:30 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:58 (2) 08:47 15:26 (1) 16:10	09:25 (2) 15:31 (1)
28	08:20 16:58	09:17 (2) 07:19 15:48 (1) 18:00	09:57 (2) 06:11 15:48 (1) 18:53	06:11 20:50	05:07 21:40	05:32 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:59 (2) 08:48 15:27 (1) 16:11	09:26 (2) 15:32 (1)
29	08:19 17:00	09:17 (2) 07:17 15:49 (1) 18:02	09:58 (2) 06:10 15:49 (1) 18:54	06:10 20:51	05:06 21:42	05:34 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	09:00 (2) 08:49 15:28 (1) 16:12	09:27 (2) 15:33 (1)
30	08:17 17:02	09:18 (2) 07:15 15:50 (1) 18:04	09:59 (2) 06:09 15:50 (1) 18:55	06:09 20:52	05:05 21:43	05:36 22:02	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	09:01 (2) 08:50 15:29 (1) 16:13	09:28 (2) 15:34 (1)
31	08:15 17:04	09:19 (2) 07:13 15:51 (1) 18:06	10:00 (2) 06:08 15:51 (1) 18:56	06:08 20:53	05:04 21:44	05:37 22:03	05:37 21:27	06:31 20:21	07:22 16:56	07:22 16:56	09:02 (2) 08:51 15:30 (1) 16:14	09:29 (2) 15:35 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	2372	577										1713
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.63	0.62										0.63
Total reduction	0.15	0.14										0.13
Total, real	361	83										224

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NN - Welfare Facilities

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 15:15 57	09:21 (2) 15:37 (1) 80	09:27 (2) 15:55 (1) 77	07:16 18:02 20:00	07:01 18:02 20:55	05:52 18:02 20:55	05:03 18:02 20:55	04:59 18:02 20:55	05:39 18:02 20:55	06:33 18:02 20:55	07:24 18:02 20:55	09:07 (2) 16:10 76
2	08:44 15:16 58	09:22 (2) 15:38 (1) 77	09:28 (2) 15:54 (1) 77	07:14 18:04 20:02	06:59 18:04 20:57	05:50 18:04 20:57	05:02 18:04 20:57	05:00 18:04 20:57	05:40 18:04 20:57	06:35 18:04 20:57	07:28 18:04 20:57	09:05 (2) 16:09 73
3	08:44 15:17 61	09:22 (2) 15:39 (1) 73	09:29 (2) 15:53 (1) 73	07:12 18:06 20:04	06:56 18:06 20:59	05:48 18:06 20:59	05:01 18:06 20:59	05:00 18:06 20:59	05:44 18:06 20:59	06:36 18:06 20:59	07:30 18:06 20:59	09:03 (2) 16:08 71
4	08:43 15:18 62	09:22 (2) 15:40 (1) 72	09:29 (2) 15:53 (1) 72	07:09 18:08 20:06	06:54 18:08 20:06	05:46 18:08 21:01	05:00 18:08 21:49	05:01 18:08 21:59	05:44 18:08 21:19	06:38 18:08 20:11	07:32 18:08 20:11	09:02 (2) 16:08 71
5	08:43 15:18 62	09:21 (2) 15:40 (1) 68	09:30 (2) 15:52 (1) 68	07:07 18:09 20:08	06:52 18:09 20:08	05:44 18:09 21:03	05:02 18:09 21:58	05:02 18:09 21:58	05:45 18:09 21:17	06:40 18:09 20:09	07:33 18:09 20:09	09:01 (2) 16:07 67
6	08:43 15:19 63	09:22 (2) 15:41 (1) 68	09:31 (2) 15:52 (1) 68	07:05 18:11 20:09	06:49 18:11 20:09	05:42 18:11 21:04	05:03 18:11 21:58	05:03 18:11 21:58	05:47 18:11 21:16	06:42 18:11 20:06	07:35 18:11 20:06	09:00 (2) 16:07 66
7	08:42 15:20 64	09:22 (2) 15:42 (1) 66	09:33 (2) 15:50 (1) 62	07:02 18:13 20:11	06:47 18:13 20:11	05:40 18:13 21:06	05:04 18:13 21:52	05:04 18:13 21:52	05:49 18:13 21:14	06:43 18:13 20:04	07:37 18:13 20:04	08:59 (2) 16:06 64
8	08:42 15:21 67	09:22 (2) 15:43 (1) 67	09:34 (2) 15:49 (1) 57	07:00 18:13 20:11	06:44 18:13 20:11	05:38 18:13 21:06	05:05 18:13 21:52	05:05 18:13 21:52	05:51 18:13 21:14	06:45 18:13 20:04	07:39 18:13 20:04	08:58 (2) 16:06 64
9	08:42 15:22 70	09:22 (2) 15:44 (1) 70	09:35 (2) 15:50 (1) 49	06:59 18:15 20:13	06:42 18:15 20:13	05:36 18:15 21:08	05:06 18:15 21:53	05:06 18:15 21:53	05:52 18:15 21:12	06:47 18:15 20:01	07:41 18:15 20:01	08:57 (2) 16:06 62
10	08:41 15:23 71	09:22 (2) 15:45 (1) 71	09:36 (2) 15:51 (1) 40	06:57 18:16 20:15	06:40 18:16 20:15	05:34 18:16 21:10	05:06 18:16 21:54	05:06 18:16 21:54	05:52 18:16 21:10	06:47 18:16 20:01	07:41 18:16 20:01	08:56 (2) 16:05 61
11	08:40 15:24 73	09:22 (2) 15:46 (1) 73	09:38 (2) 15:52 (1) 23	06:55 18:17 20:17	06:39 18:17 20:17	05:34 18:17 21:12	05:06 18:17 21:55	05:06 18:17 21:55	05:54 18:17 21:12	06:49 18:17 20:01	07:43 18:17 20:01	08:55 (2) 16:05 58
12	08:39 15:25 75	09:22 (2) 15:47 (1) 75	09:40 (2) 15:53 (1) 18	06:53 18:18 20:19	06:37 18:18 20:19	05:33 18:18 21:13	05:08 18:18 21:56	05:08 18:18 21:56	05:56 18:18 21:13	06:51 18:18 20:01	07:44 18:18 20:01	08:54 (2) 16:05 58
13	08:38 15:26 77	09:22 (2) 15:48 (1) 77	09:41 (2) 15:54 (1) 8	06:50 18:19 20:20	06:35 18:19 20:20	05:31 18:19 21:15	05:09 18:19 21:53	05:09 18:19 21:53	05:58 18:19 21:13	06:52 18:19 20:01	07:46 18:19 20:01	08:53 (2) 16:05 56
14	08:37 15:27 80	09:22 (2) 15:49 (1) 80	09:42 (2) 15:55 (1) 06:48	06:48 18:20 20:21	06:32 18:20 20:21	05:29 18:20 21:17	05:11 18:20 21:52	05:11 18:20 21:52	05:59 18:20 21:17	06:54 18:20 20:01	07:48 18:20 20:01	08:52 (2) 16:05 54
15	08:36 15:28 81	09:22 (2) 15:50 (1) 81	09:43 (2) 15:56 (1) 06:45	06:45 18:21 20:22	06:30 18:21 20:22	05:27 18:21 21:18	05:12 18:21 21:51	05:12 18:21 21:51	06:01 18:21 21:17	06:56 18:21 20:01	07:50 18:21 20:01	08:51 (2) 16:05 52
16	08:35 15:29 81	09:22 (2) 15:51 (1) 81	09:44 (2) 15:57 (1) 06:43	06:43 18:22 20:23	06:28 18:22 20:23	05:26 18:22 21:19	05:13 18:22 21:54	05:13 18:22 21:54	06:03 18:22 21:17	06:58 18:22 20:01	07:52 18:22 20:01	08:50 (2) 16:05 50
17	08:34 15:30 83	09:22 (2) 15:52 (1) 83	09:45 (2) 15:58 (1) 06:40	06:40 18:23 20:24	06:25 18:23 20:24	05:24 18:23 21:20	05:14 18:23 21:55	05:14 18:23 21:55	06:05 18:23 21:17	06:59 18:23 20:01	07:54 18:23 20:01	08:49 (2) 16:05 48
18	08:33 15:31 85	09:22 (2) 15:53 (1) 85	09:46 (2) 15:59 (1) 06:38	06:38 18:24 20:25	06:23 18:24 20:25	05:22 18:24 21:21	05:16 18:24 21:56	05:16 18:24 21:56	06:06 18:24 21:17	06:59 18:24 20:01	07:56 18:24 20:01	08:48 (2) 16:05 48
19	08:32 15:32 85	09:22 (2) 15:54 (1) 85	09:47 (2) 16:00 (1) 06:36	06:36 18:25 20:26	06:21 18:25 20:26	05:21 18:25 21:22	05:17 18:25 21:57	05:17 18:25 21:57	06:08 18:25 21:17	06:59 18:25 20:01	07:57 18:25 20:01	08:47 (2) 16:05 47
20	08:31 15:33 87	09:22 (2) 15:55 (1) 87	09:48 (2) 16:01 (1) 06:33	06:33 18:26 20:27	06:18 18:26 20:27	05:19 18:26 21:23	05:18 18:26 21:58	05:18 18:26 21:58	06:10 18:26 21:17	06:59 18:26 20:01	07:59 18:26 20:01	08:46 (2) 16:05 47
21	08:30 15:34 87	09:22 (2) 15:56 (1) 87	09:49 (2) 16:02 (1) 06:31	06:31 18:27 20:28	06:16 18:27 20:28	05:18 18:27 21:24	05:20 18:27 21:59	05:20 18:27 21:59	06:12 18:27 21:17	06:59 18:27 20:01	07:59 18:27 20:01	08:45 (2) 16:05 46
22	08:29 15:35 86	09:22 (2) 15:57 (1) 86	09:50 (2) 16:03 (1) 06:28	06:28 18:28 20:29	06:14 18:28 20:29	05:16 18:28 21:25	05:21 18:28 21:59	05:21 18:28 21:59	06:13 18:28 21:17	06:59 18:28 20:01	07:59 18:28 20:01	08:44 (2) 16:05 46
23	08:28 15:36 86	09:22 (2) 15:58 (1) 86	09:51 (2) 16:04 (1) 06:26	06:26 18:29 20:30	06:12 18:29 20:30	05:15 18:29 21:26	05:23 18:29 21:59	05:23 18:29 21:59	06:15 18:29 21:17	06:59 18:29 20:01	07:59 18:29 20:01	08:43 (2) 16:05 46
24	08:27 15:37 87	09:22 (2) 15:59 (1) 87	09:52 (2) 16:05 (1) 06:23	06:23 18:30 20:31	06:10 18:30 20:31	05:13 18:30 21:27	05:24 18:30 21:59	05:24 18:30 21:59	06:17 18:30 21:17	06:59 18:30 20:01	07:59 18:30 20:01	08:42 (2) 16:05 46
25	08:26 15:38 87	09:22 (2) 16:00 (1) 87	09:53 (2) 16:06 (1) 06:21	06:21 18:31 20:32	06:09 18:31 20:32	05:12 18:31 21:28	05:25 18:31 21:59	05:25 18:31 21:59	06:19 18:31 21:17	06:59 18:31 20:01	07:59 18:31 20:01	08:41 (2) 16:05 46
26	08:25 15:39 88	09:22 (2) 16:01 (1) 88	09:54 (2) 16:07 (1) 06:18	06:18 18:32 20:33	06:07 18:32 20:33	05:11 18:32 21:29	05:26 18:32 21:59	05:26 18:32 21:59	06:20 18:32 21:17	06:59 18:32 20:01	07:59 18:32 20:01	08:40 (2) 16:05 46
27	08:24 15:40 88	09:22 (2) 16:02 (1) 88	09:55 (2) 16:08 (1) 06:16	06:16 18:33 20:34	06:06 18:33 20:34	05:10 18:33 21:30	05:27 18:33 21:59	05:27 18:33 21:59	06:21 18:33 21:17	06:59 18:33 20:01	07:59 18:33 20:01	08:39 (2) 16:05 47
28	08:23 15:41 89	09:22 (2) 16:03 (1) 89	09:56 (2) 16:09 (1) 06:14	06:14 18:34 20:35	06:05 18:34 20:35	05:09 18:34 21:31	05:28 18:34 21:59	05:28 18:34 21:59	06:22 18:34 21:17	06:59 18:34 20:01	07:59 18:34 20:01	08:38 (2) 16:05 47
29	08:22 15:42 89	09:22 (2) 16:04 (1) 89	09:57 (2) 16:10 (1) 06:13	06:13 18:35 20:36	06:04 18:35 20:36	05:08 18:35 21:32	05:29 18:35 21:59	05:29 18:35 21:59	06:23 18:35 21:17	06:59 18:35 20:01	07:59 18:35 20:01	08:37 (2) 16:05 47
30	08:21 15:43 89	09:22 (2) 16:05 (1) 89	09:58 (2) 16:11 (1) 06:11	06:11 18:36 20:37	06:03 18:36 20:37	05:07 18:36 21:33	05:30 18:36 21:59	05:30 18:36 21:59	06:24 18:36 21:17	06:59 18:36 20:01	07:59 18:36 20:01	08:36 (2) 16:05 47
31	08:20 15:44 90	09:22 (2) 16:06 (1) 90	09:59 (2) 16:12 (1) 06:10	06:10 18:37 20:38	06:02 18:37 20:38	05:06 18:37 21:34	05:31 18:37 21:59	05:31 18:37 21:59	06:25 18:37 21:17	06:59 18:37 20:01	07:59 18:37 20:01	08:35 (2) 16:05 47
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	2403	627										1710
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.62	0.62										0.62
Total reduction	0.15	0.14										0.13
Total, real	364	91										220

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 11:16/4.0.552

SHADOW - Calendar

Calculation: Kellystown N149 Worst Case
Assumptions for shadow calculations

Shadow receptor: NO - Shipping Office

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

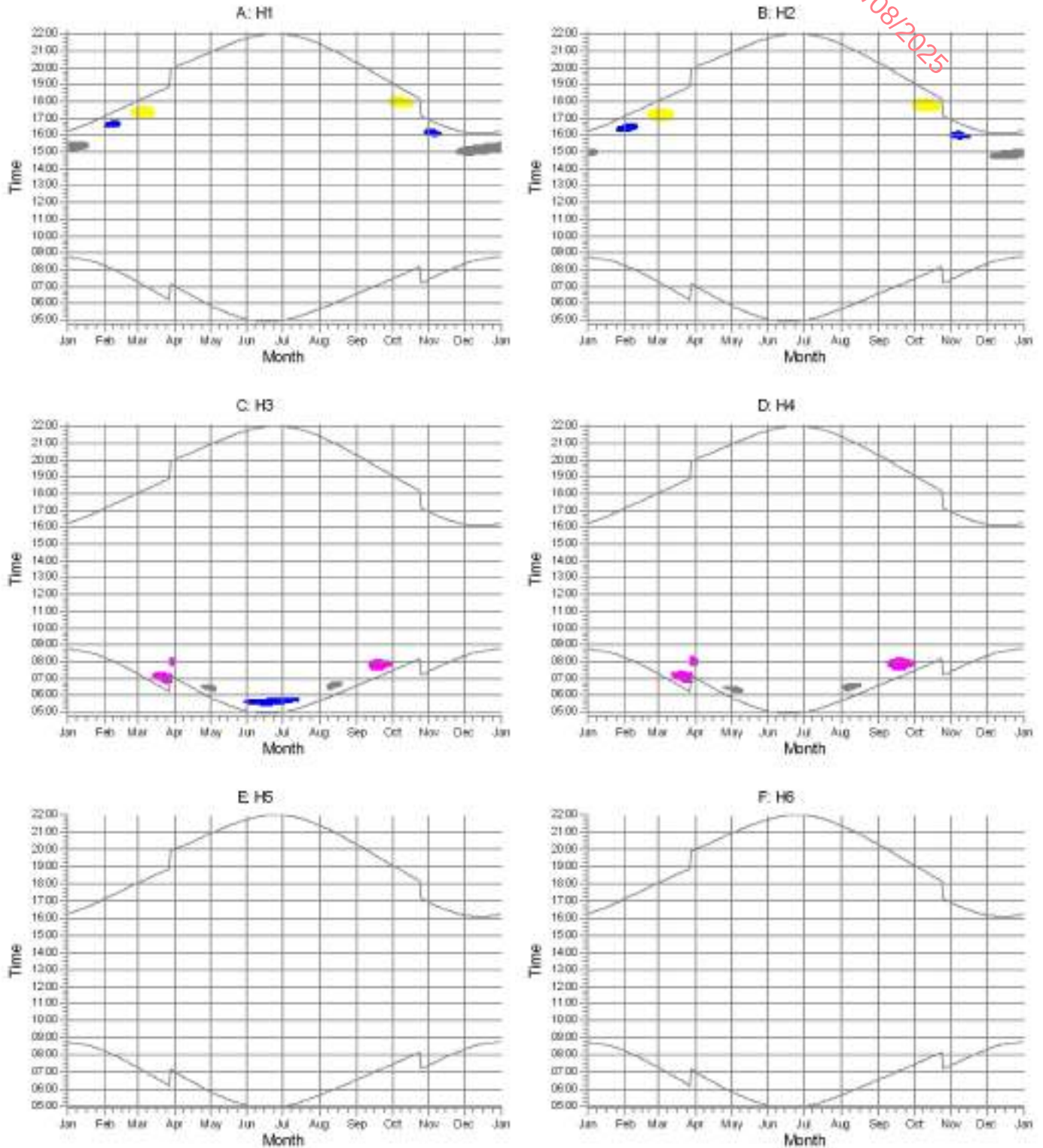
		January		February		March		April		May		June		July		August		September		October		November		December
1	08:44		09:19 (2)	08:14		09:24 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26				07:24		09:02 (2)	08:19		09:01 (2)	
	16:15	57	15:36 (1)	17:06	79	15:52 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05				16:54	27	09:29 (2)	16:10	75	15:27 (1)	
2	08:44		09:20 (2)	08:12		09:24 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28				07:26		09:01 (2)	08:21		09:03 (2)	
	16:16	58	15:37 (1)	17:08	78	15:51 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02				16:52	38	15:09 (1)	16:09	72	15:27 (1)	
3	08:44		09:19 (2)	08:10		09:25 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30				07:28		08:59 (2)	08:22		09:03 (2)	
	16:17	60	15:37 (1)	17:10	74	15:50 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00				16:50	49	15:13 (1)	16:08	72	15:27 (1)	
4	08:43		09:19 (2)	08:09		09:26 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32				07:30		08:58 (2)	08:24		09:04 (2)	
	16:18	63	15:39 (1)	17:12	69	15:49 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57				16:48	57	15:15 (1)	16:08	70	15:27 (1)	
5	08:43		09:19 (2)	08:07		09:26 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33				07:32		08:57 (2)	08:25		09:04 (2)	
	16:20	63	15:39 (1)	17:14	67	15:48 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55				16:46	63	15:17 (1)	16:07	68	15:26 (1)	
6	08:43		09:20 (2)	08:05		09:27 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35				07:34		08:56 (2)	08:27		09:06 (2)	
	16:21	66	15:41 (1)	17:16	62	15:47 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52				16:44	67	15:18 (1)	16:04	66	15:27 (1)	
7	08:42		09:19 (2)	08:03		09:28 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37				07:36		08:55 (2)	08:28		09:06 (2)	
	16:22	67	15:41 (1)	17:18	56	15:45 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50				16:43	71	15:19 (1)	16:06	64	15:26 (1)	
8	08:42		09:19 (2)	08:01		09:30 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39				07:38		08:55 (2)	08:29		09:07 (2)	
	16:24	70	15:42 (1)	17:20	47	15:43 (1)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48				16:41	74	15:20 (1)	16:06	63	15:27 (1)	
9	08:41		09:20 (2)	07:59		09:31 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41				07:40		08:55 (2)	08:30		09:08 (2)	
	16:25	71	15:43 (1)	17:22	35	15:38 (1)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45				16:39	77	15:22 (1)	16:05	60	15:26 (1)	
10	08:40		09:19 (2)	07:57		09:33 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43				07:42		08:55 (2)	08:32		09:09 (2)	
	16:27	73	15:44 (1)	17:24	26	09:59 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43				16:37	80	15:23 (1)	16:05	59	15:26 (1)	
11	08:40		09:19 (2)	07:55		09:36 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44				07:44		08:54 (2)	08:33		09:09 (2)	
	16:28	75	15:45 (1)	17:26	21	09:57 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41				16:36	81	15:23 (1)	16:05	57	15:26 (1)	
12	08:39		09:19 (2)	07:53		09:39 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46				07:46		08:54 (2)	08:34		09:10 (2)	
	16:30	77	15:46 (1)	17:28	15	09:54 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38				16:34	84	15:24 (1)	16:05	55	15:26 (1)	
13	08:38		09:19 (2)	07:51			06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48				07:47		08:54 (2)	08:35		09:12 (2)	
	16:31	77	15:46 (1)	17:30			15:46 (1)	20:22	21:17	21:57	21:54	21:01	19:49	18:33				16:32	84	15:24 (2)	16:04	54	15:27 (1)	
14	08:37		09:19 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50				07:49		08:54 (2)	08:36		09:12 (2)	
	16:33	79	15:47 (1)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33				16:31	85	15:25 (1)	16:05	53	15:27 (1)	
15	08:36		09:20 (2)	07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52				07:51		08:54 (2)	08:37		09:13 (2)	
	16:34	80	15:48 (1)	17:34			18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31				16:29	85	15:25 (1)	16:05	52	15:27 (1)	
16	08:35		09:20 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54				07:53		08:54 (2)	08:38		09:13 (2)	
	16:36	82	15:49 (1)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29				16:27	86	15:25 (1)	16:05	50	15:26 (1)	
17	08:34		09:19 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56				07:55		08:54 (2)	08:39		09:14 (2)	
	16:38	83	15:49 (1)	17:38			18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27				16:26	86	15:25 (1)	16:05	48	15:26 (1)	
18	08:33		09:19 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57				07:57		08:54 (2)	08:39		09:15 (2)	
	16:40	85	15:50 (1)	17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24				16:25	87	15:26 (1)	16:05	48	15:27 (1)	
19	08:32		09:20 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59				07:59		08:54 (2)	08:40		09:16 (2)	
	16:41	85	15:50 (1)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22				16:23	87	15:26 (1)	16:05	47	15:27 (1)	
20	08:31		09:20 (2)	07:37			06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01				08:07		08:54 (2)	08:42		09:17 (2)	
	16:43	85	15:50 (1)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20				16:22	87	15:26 (2)	16:06	46	15:27 (1)	
21	08:30		09:20 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03				08:02		08:55 (2)	08:41		09:17 (2)	
	16:45	86	15:51 (1)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17				16:20	86	15:26 (1)	16:06	46	15:28 (1)	
22	08:29		09:19 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05				08:04		08:55 (2)	08:42		09:17 (2)	
	16:47	87	15:51 (1)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15				16:19	85	15:26 (1)	16:06	46	15:28 (1)	
23	08:27		09:20 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07				08:06		08:56 (2)	08:42		09:18 (2)	
	16:49	87	15:52 (1)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13				16:18	86	15:27 (1)	16:07	46	15:29 (1)	
24	08:26		09:20 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09				08:08		08:56 (2)	08:43		09:18 (2)	
	16:51	87	15:52 (1)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11				16:17	85	15:27 (1)	16:08	46	15:29 (1)	
25	08:25		09:21 (2)	07:25			06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11				08:09		08:57 (2)	08:43		09:18 (2)	
	16:52	86	15:52 (1)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09				16:16	83	15:27 (1)	16:08	48	15:30 (1)	
26	08:23		09:21 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13				08:11		08:58 (2)	08:43		09:19 (2)	
	16:54	86	15:52 (1)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07				16:15	82	15:27 (1)	16:09	48	15:31 (1)	
27	08:22		09:22 (2)	07:21			06:13	06:01	05:08	04:56	05:28	06:24	07:19	07:15				08:13		08:59 (2)	08:44		09:19 (2)	
	16:56	86	15:53 (1)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04				16:13	80	15:27 (1)	16:10	50	15:32 (1)	
28	08:20		09:22 (2)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17				08:14		08:59 (2)	08:44		09:19 (2)	
	16:58	85	15:53 (1)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02				16:13	79	15:27 (1)	16:11	50	15:32 (1)	
29	08:19		09:22 (2)				07:09	05:56	05:06	04:57	05:34	06:28	07:22	07:18				08:16		08:59 (2)	08:44		09:19 (2)	
	17:00	84	15:52 (1)				19:55	20:52 (1)	21:42	22:01	21:30	20:25	19:10	17:00				16:12	78	15:27 (1)	16:11	52	15:33 (1)	
30	08:17		09:22 (2)				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20				08:18		09:00 (2)	08:44		09:19 (2)	
	17:02	83	15:52 (1)				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

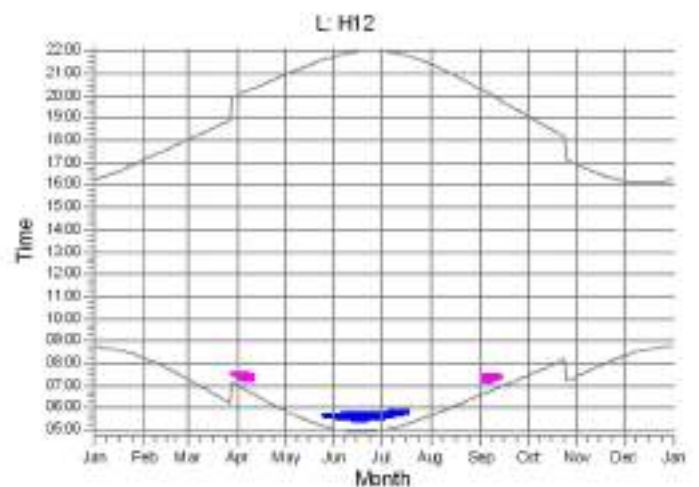
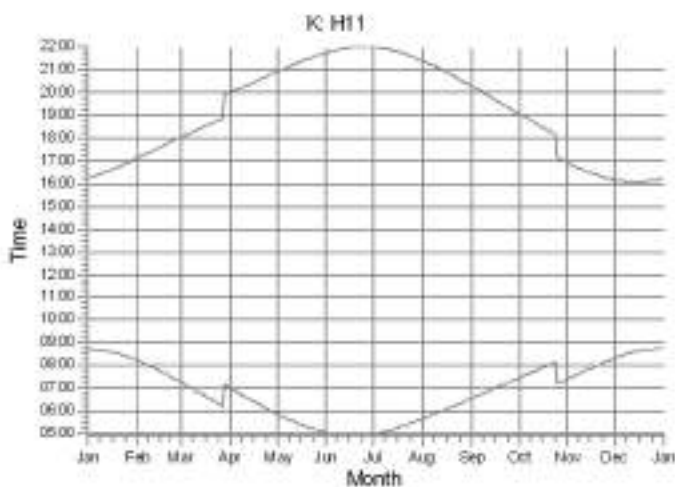
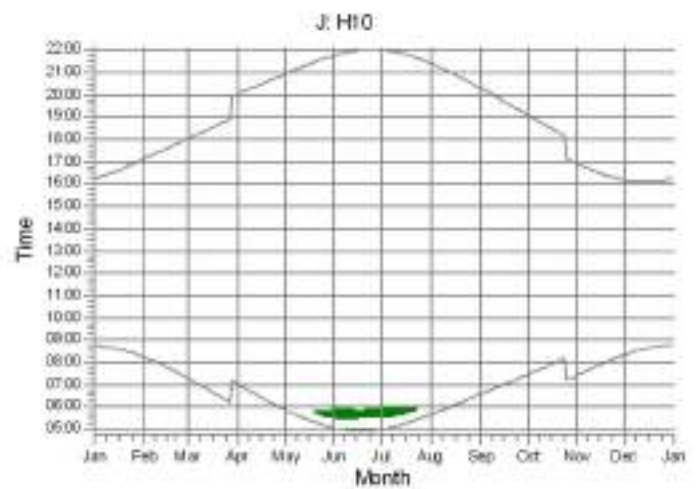
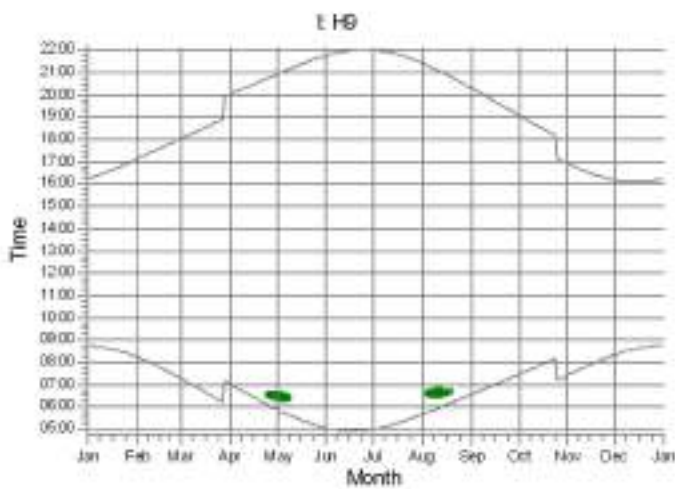
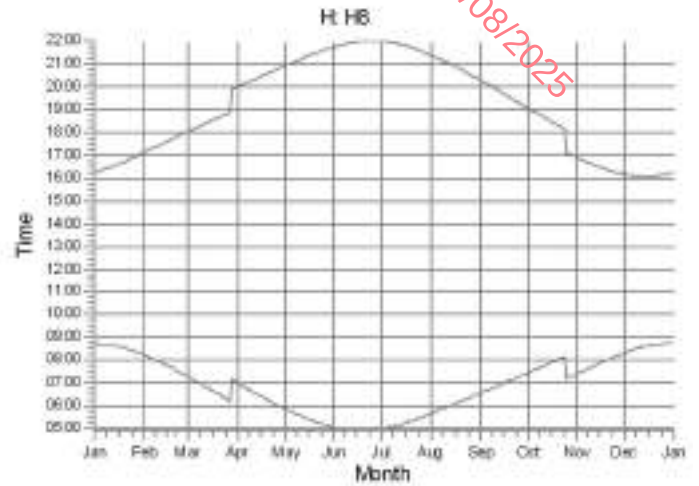
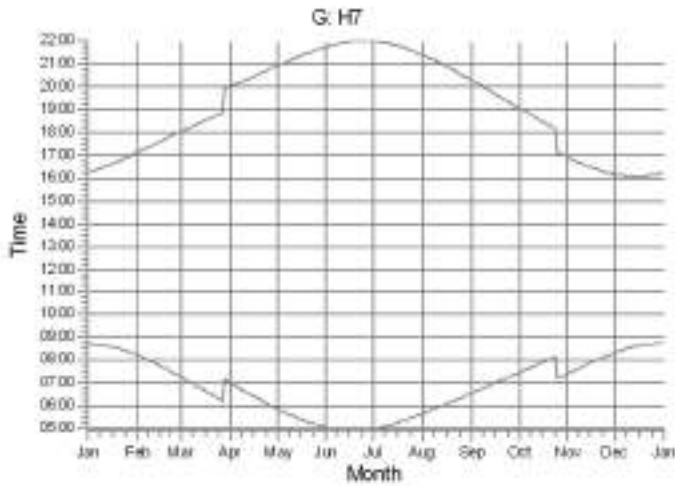


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

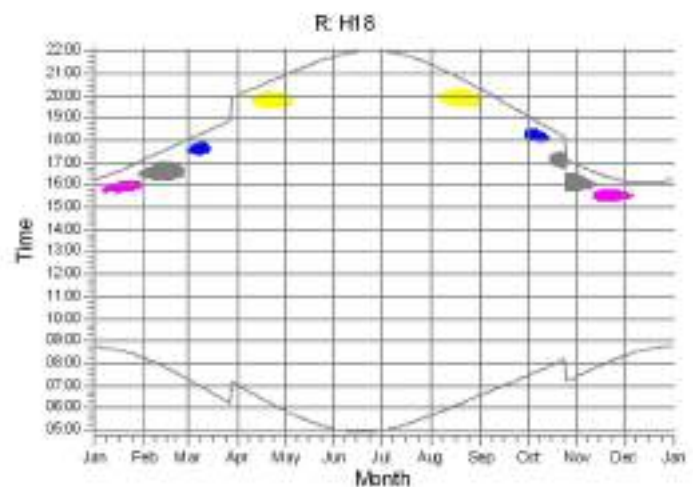
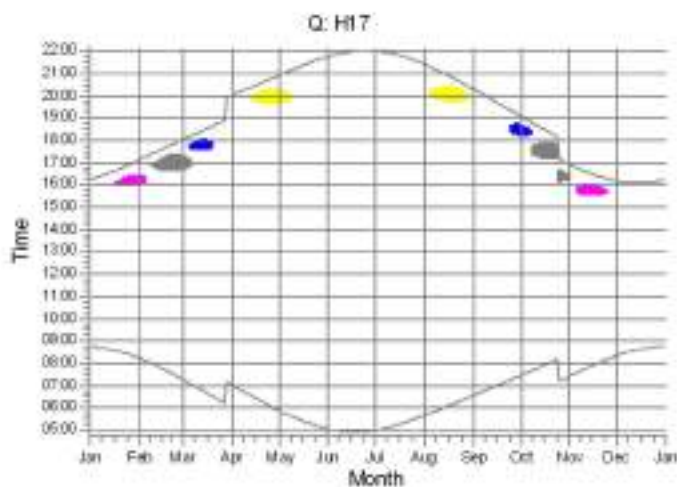
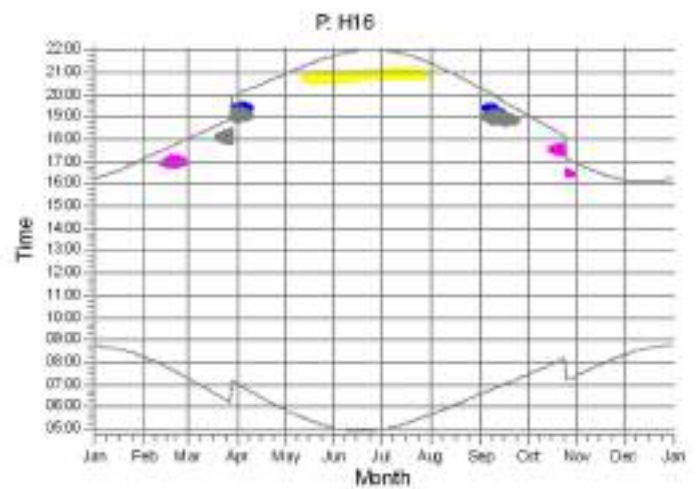
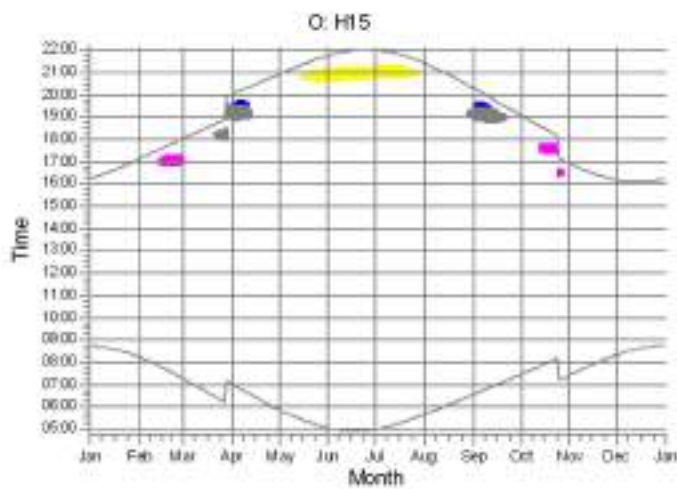
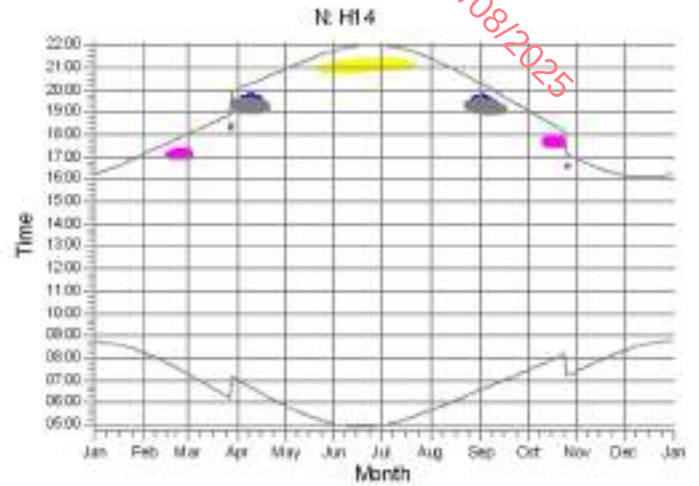
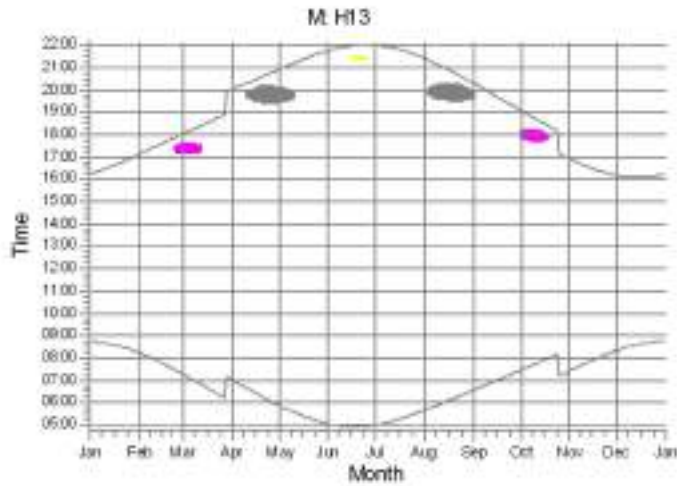


WTGs

1: T01 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

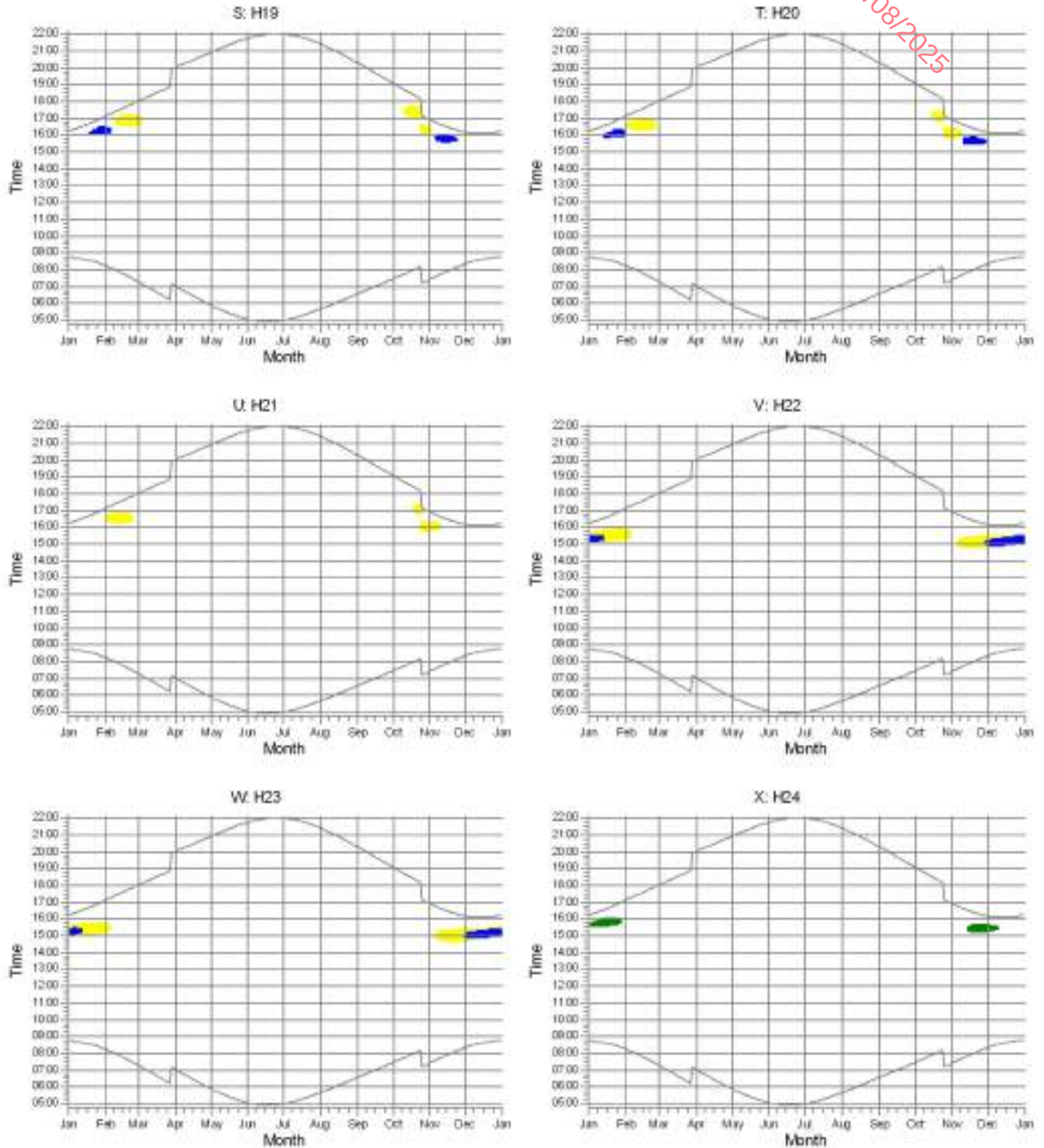


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

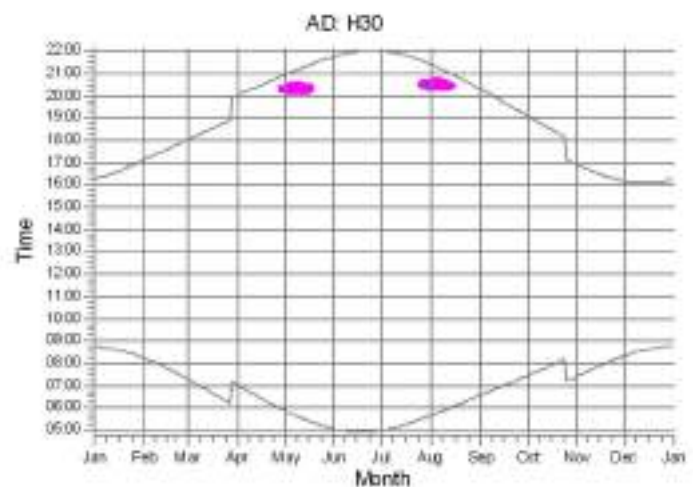
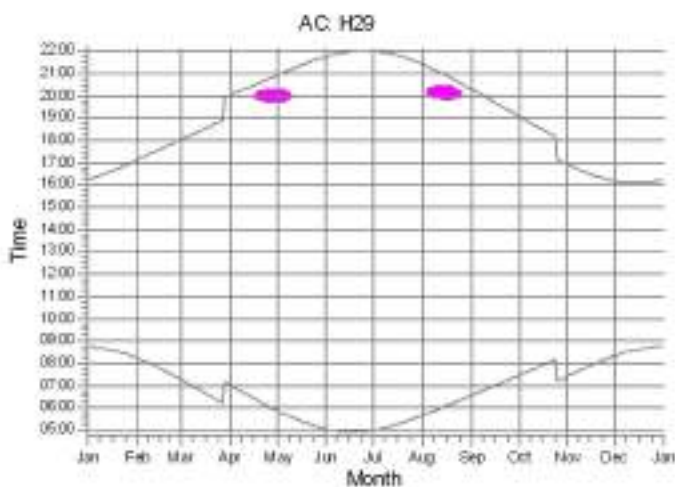
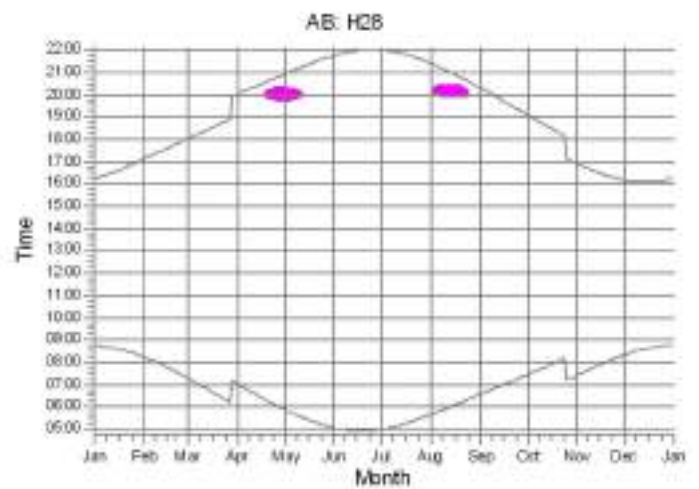
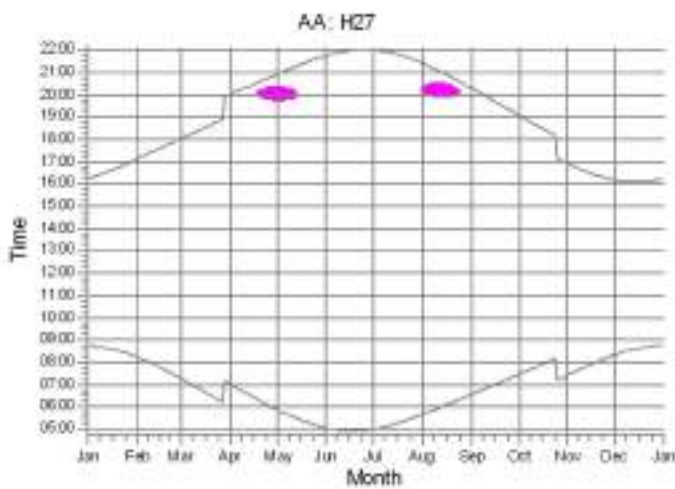
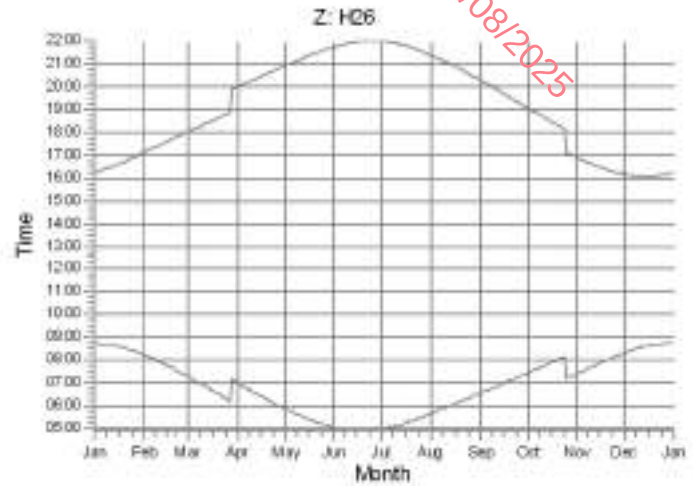
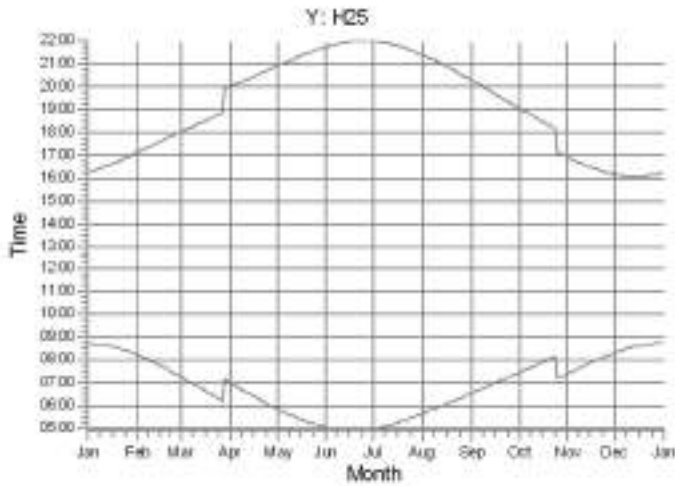


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

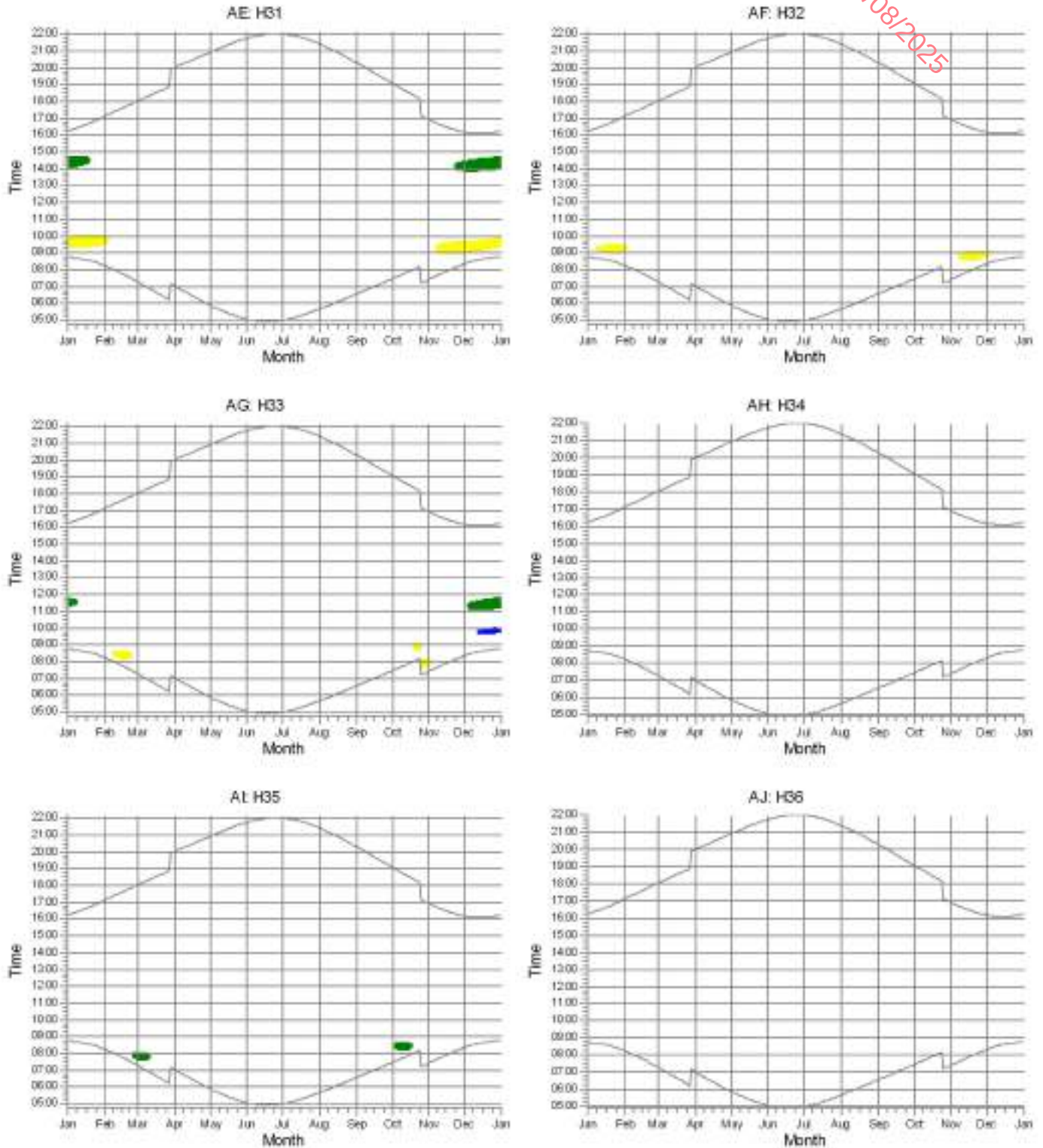


WTGs

5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

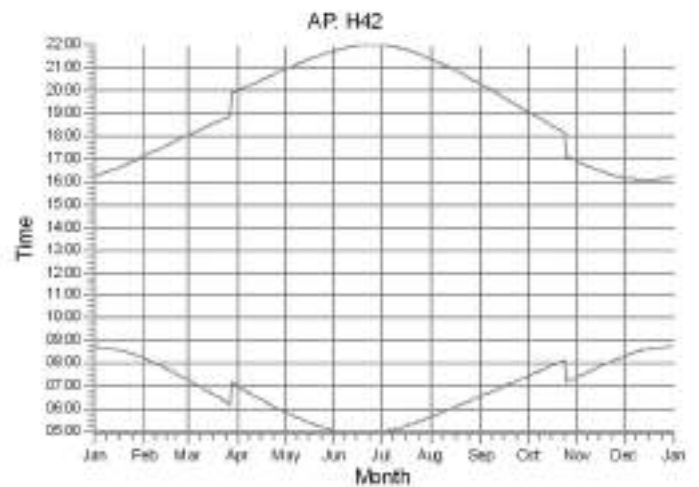
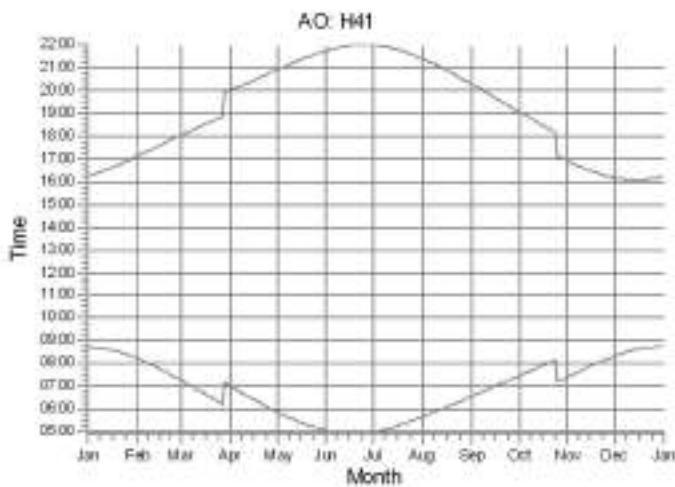
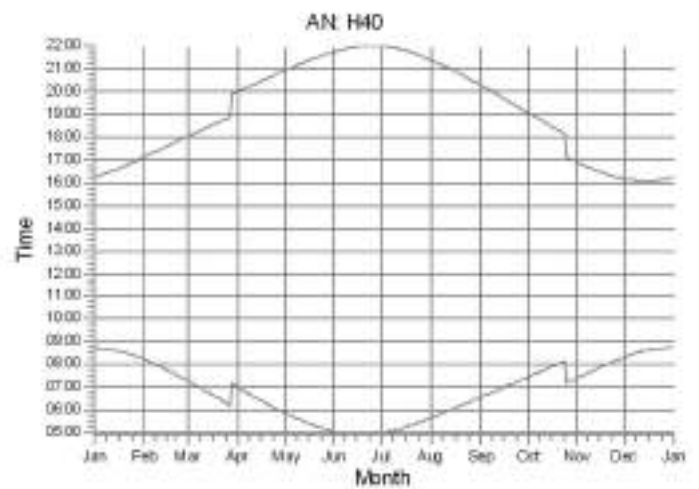
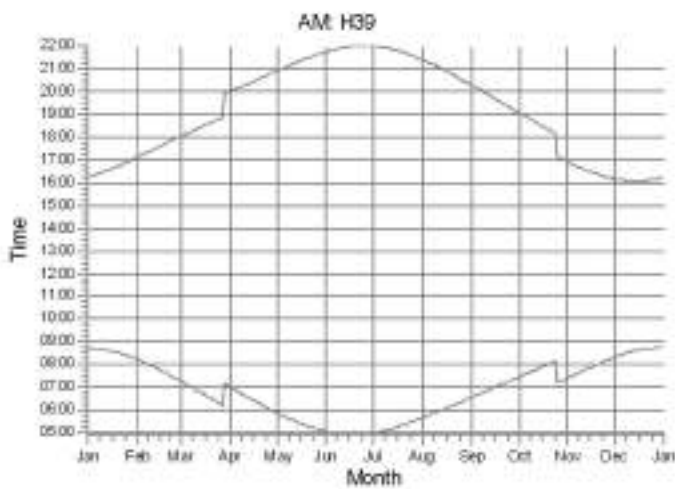
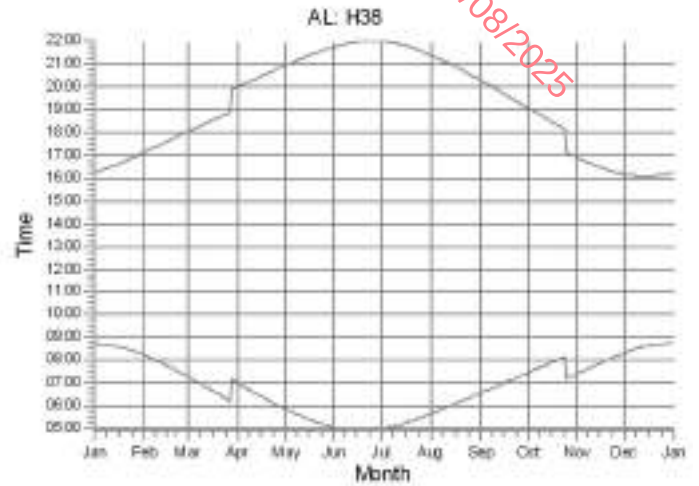
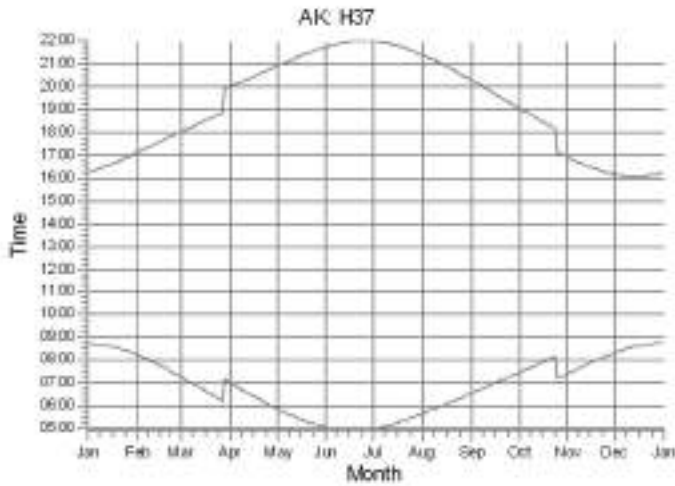


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

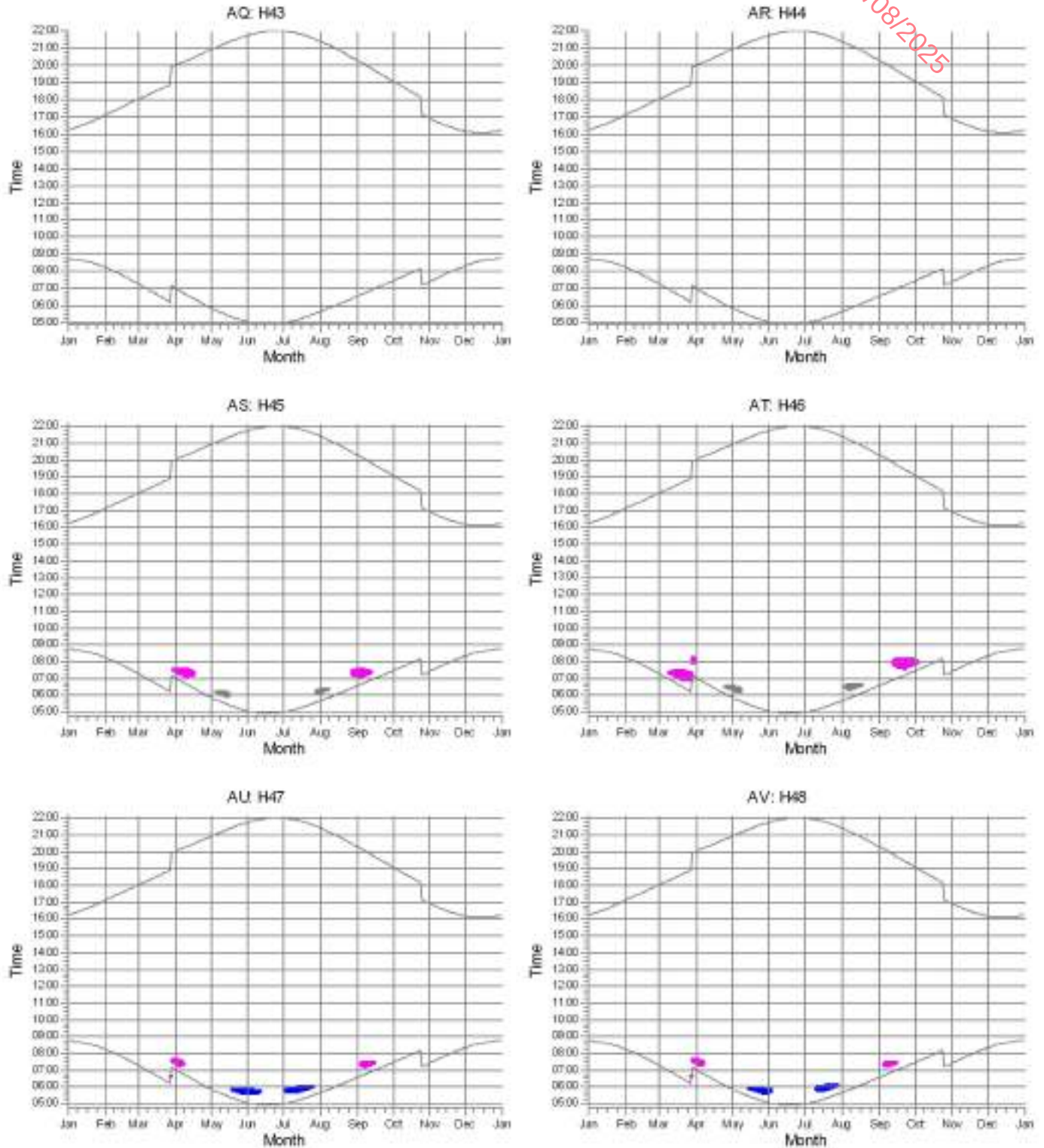
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

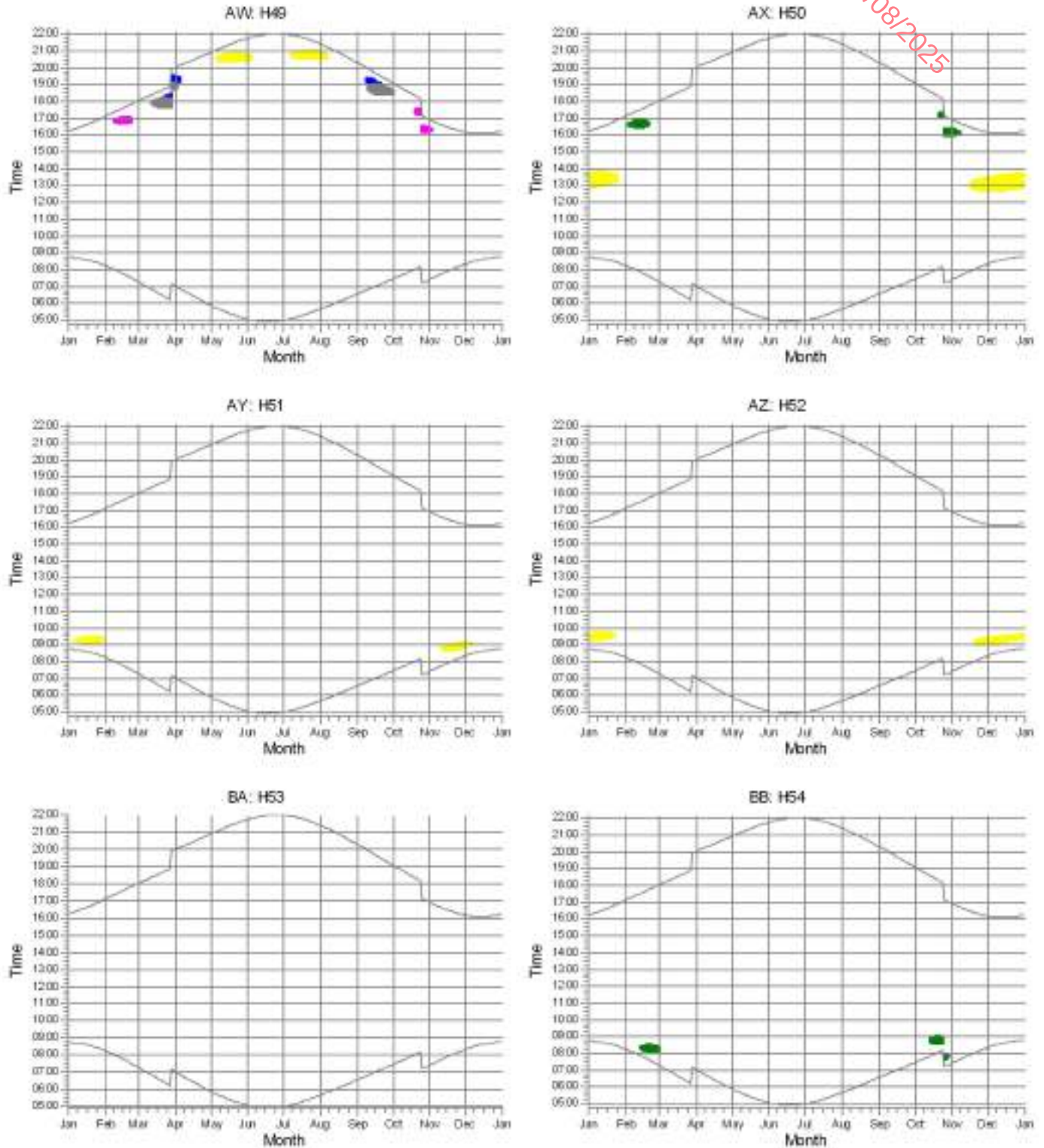


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

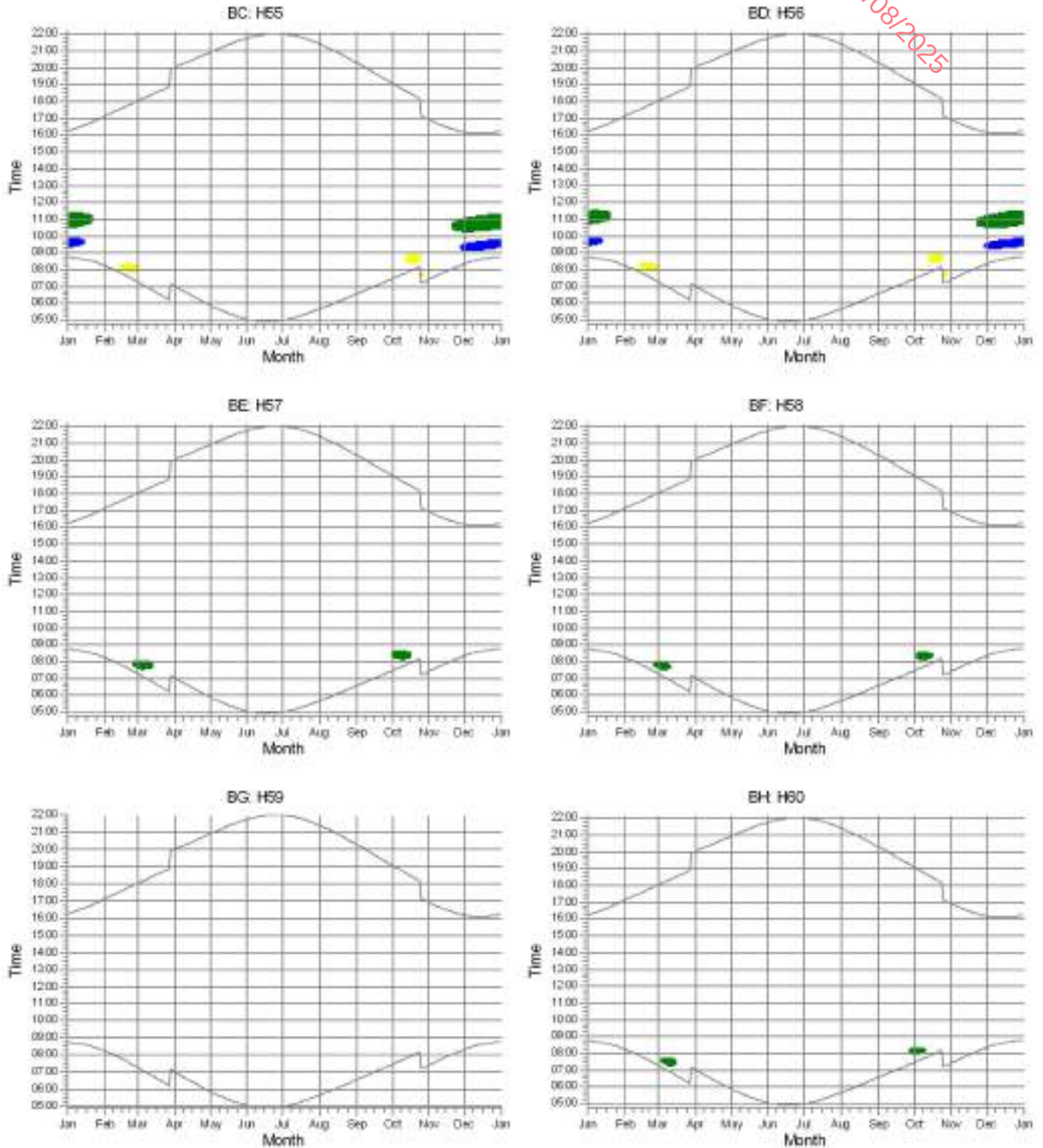


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

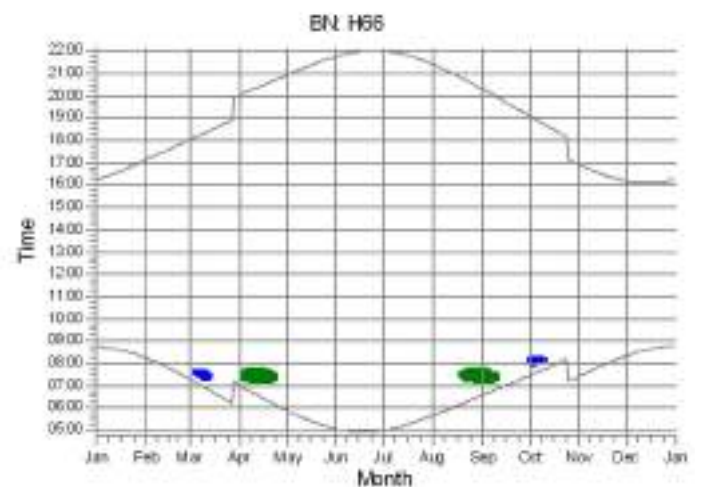
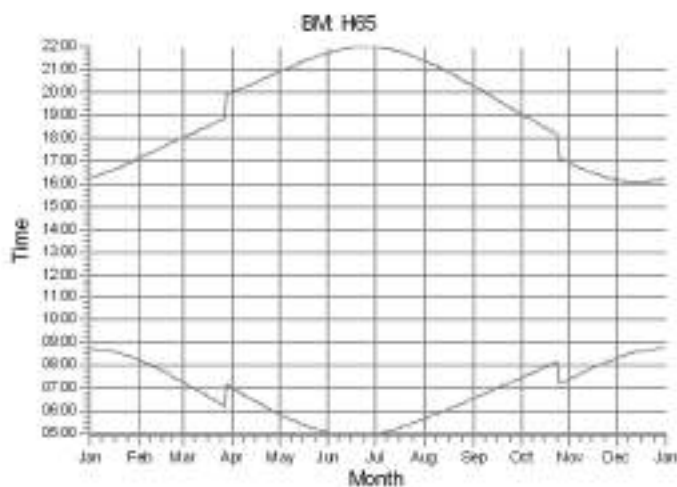
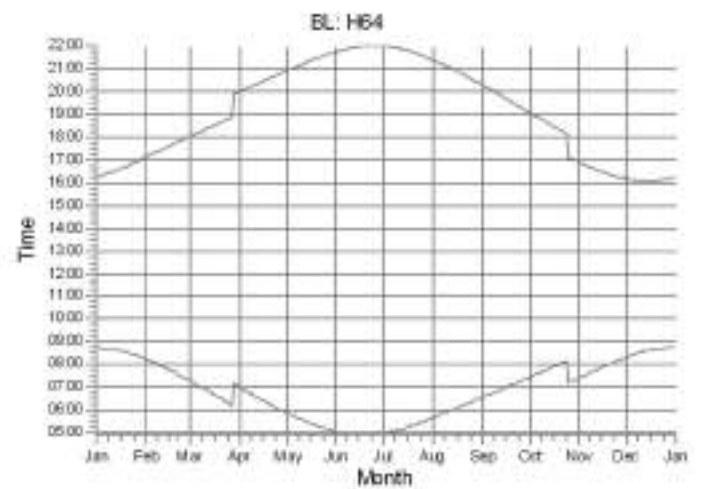
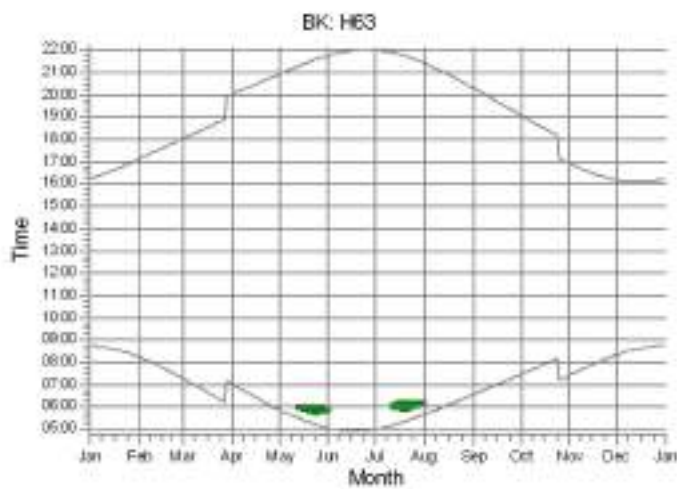
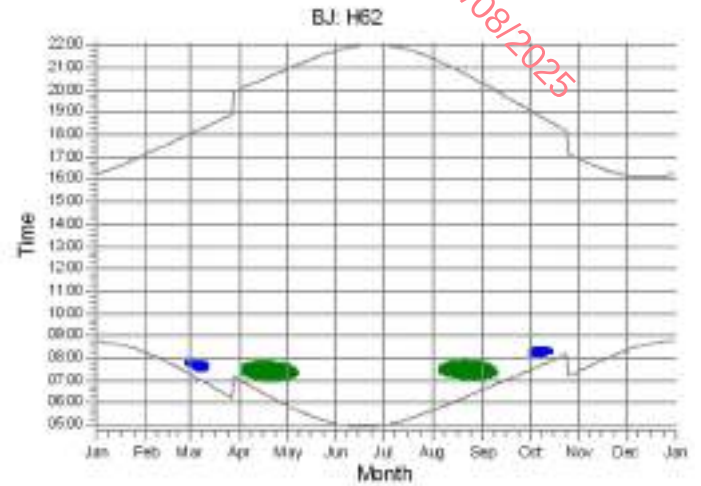
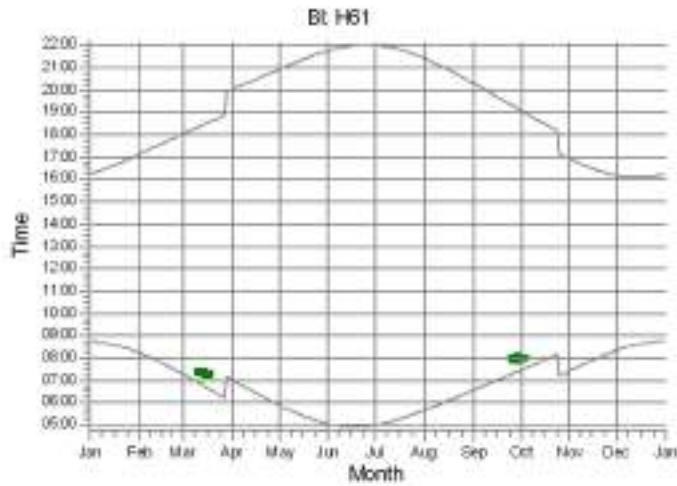


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

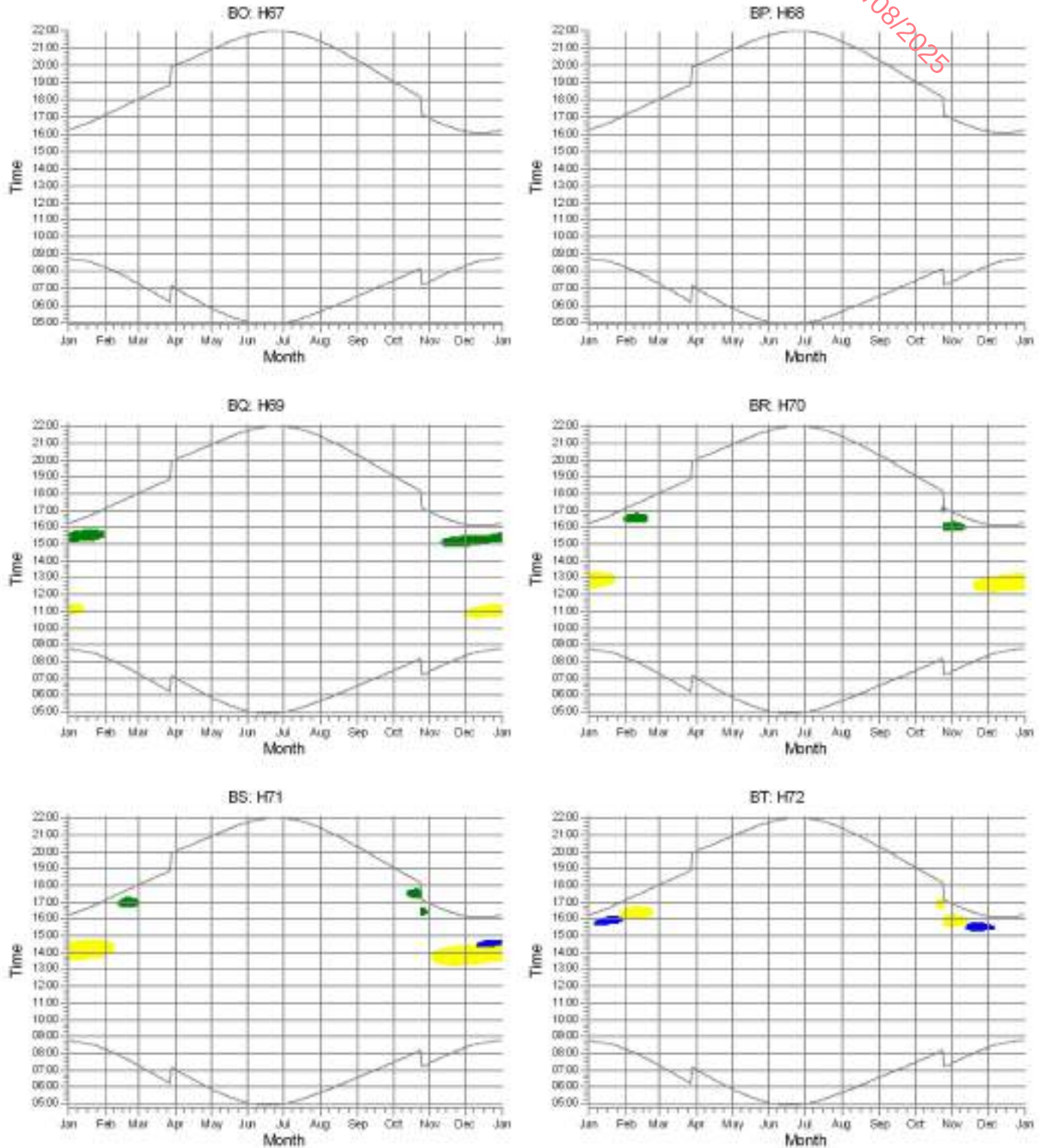


WTGs

1: T01 3: T03

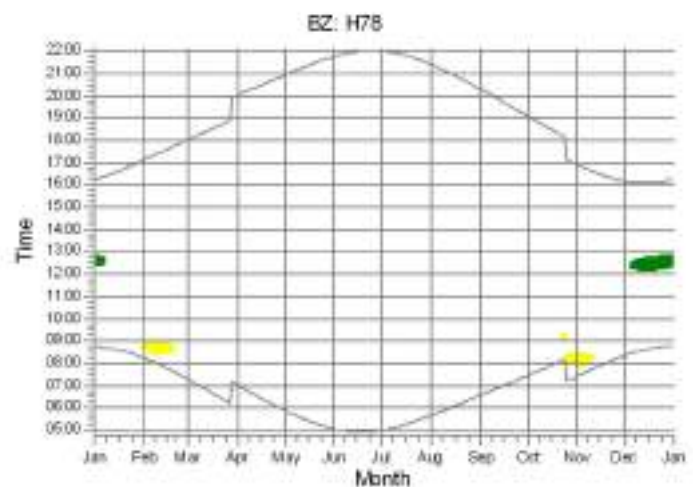
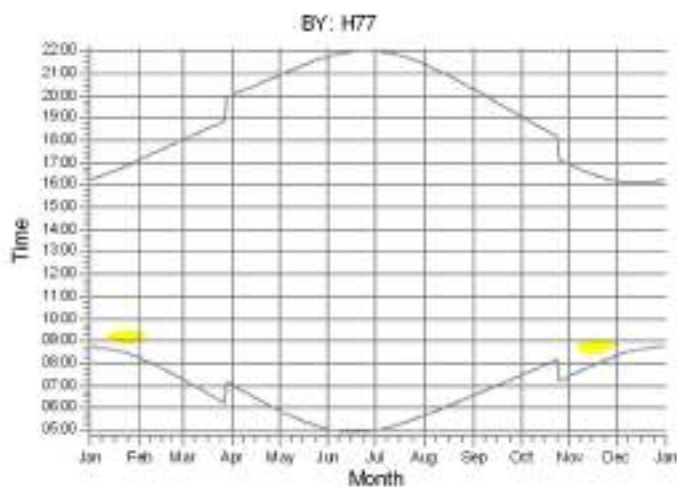
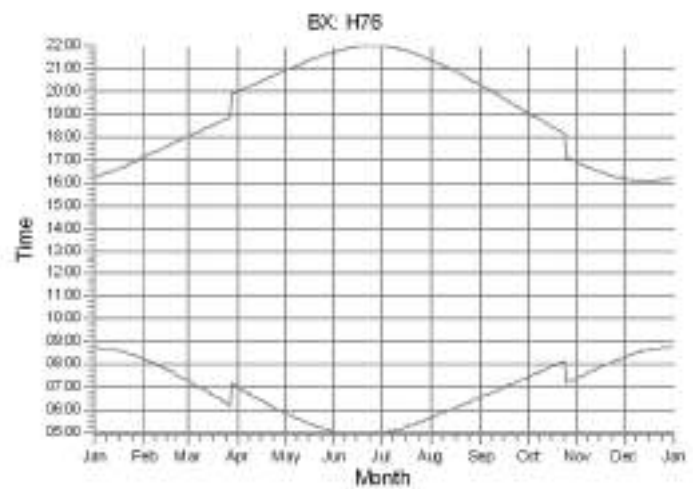
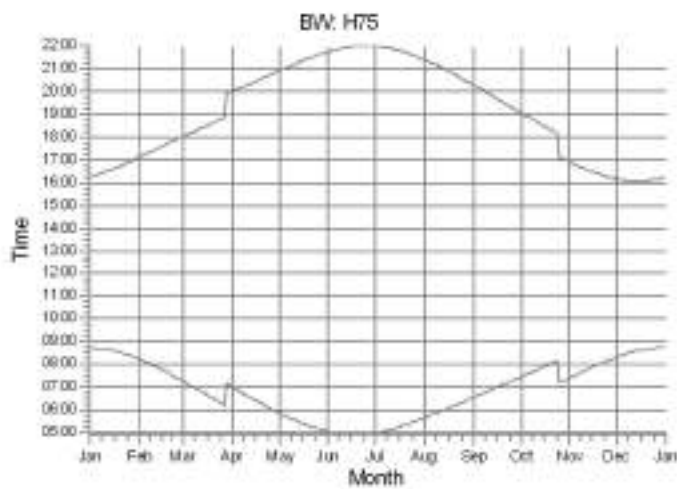
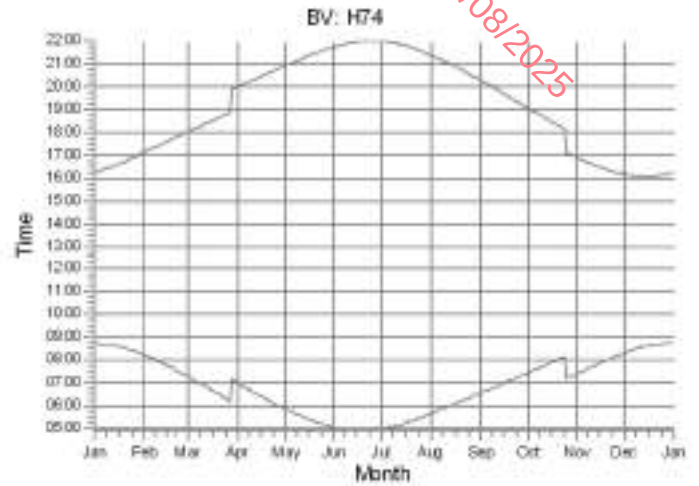
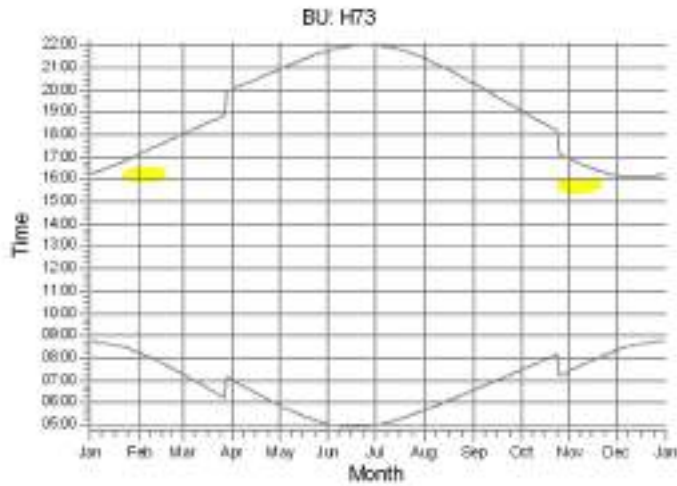
SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

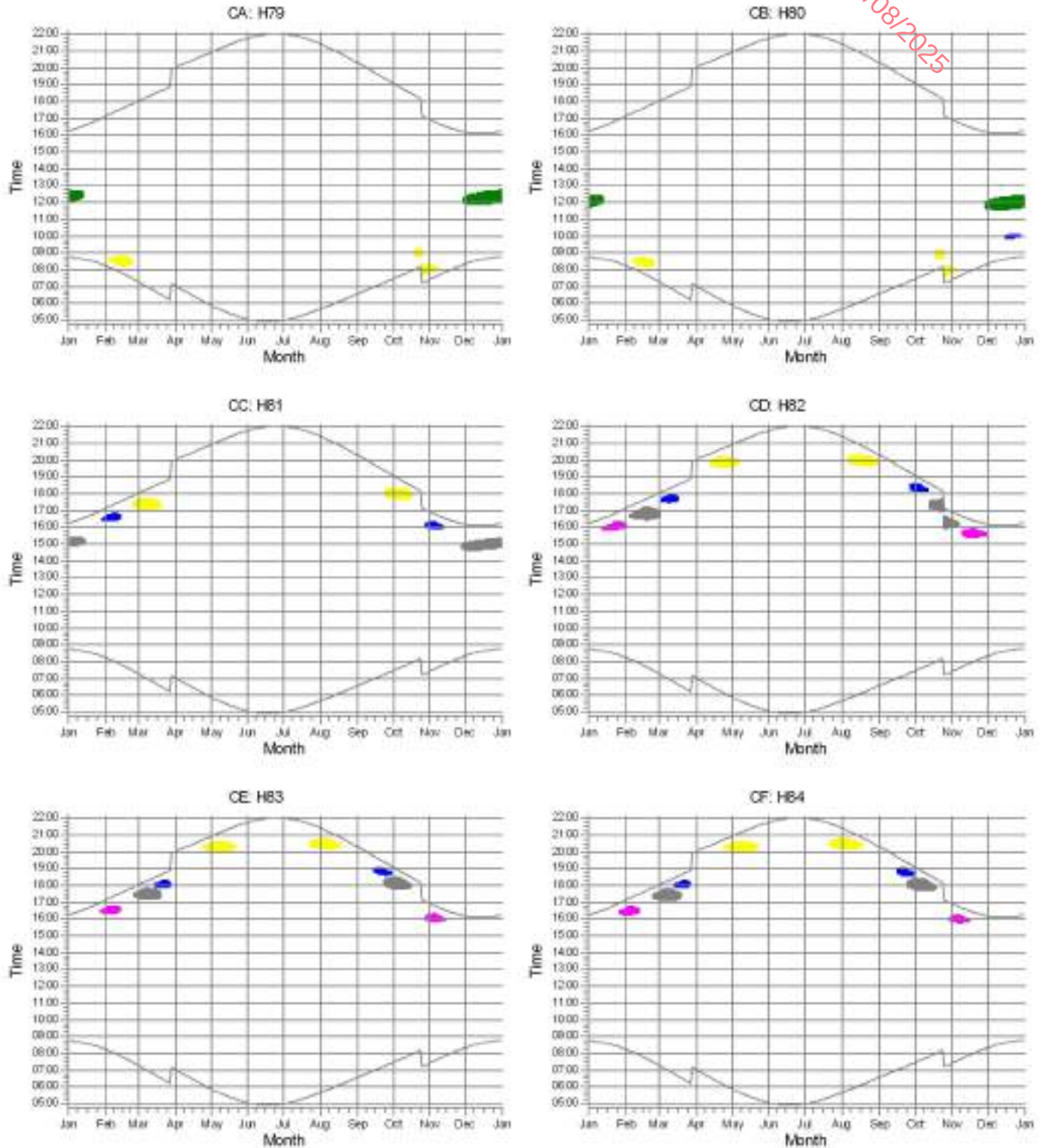


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

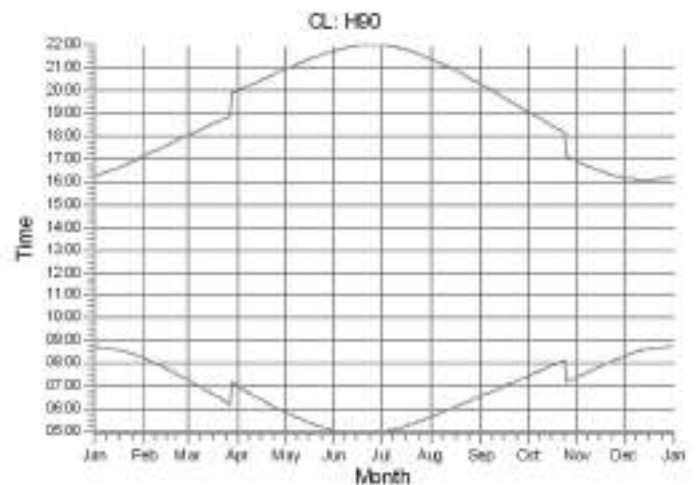
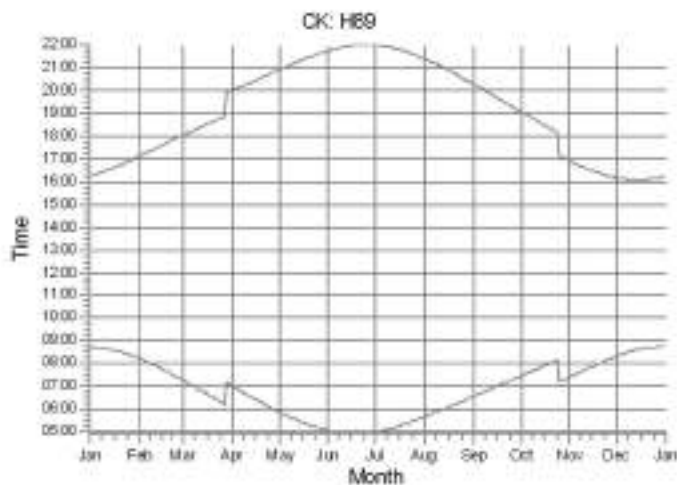
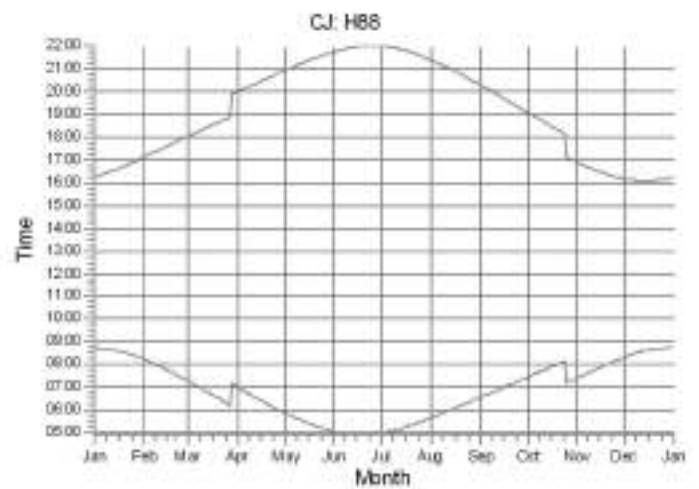
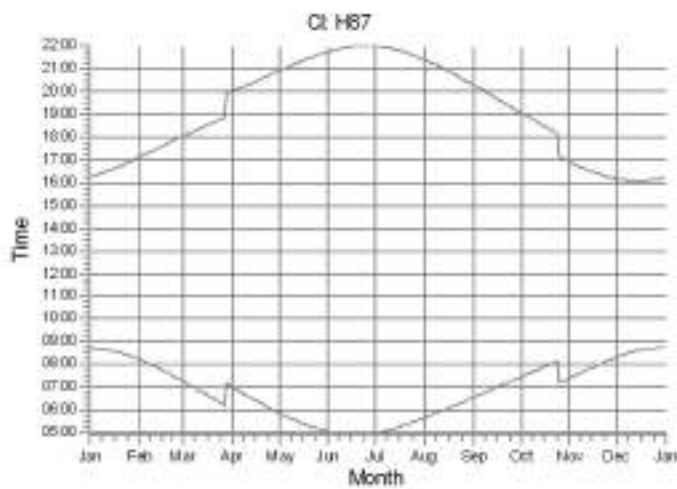
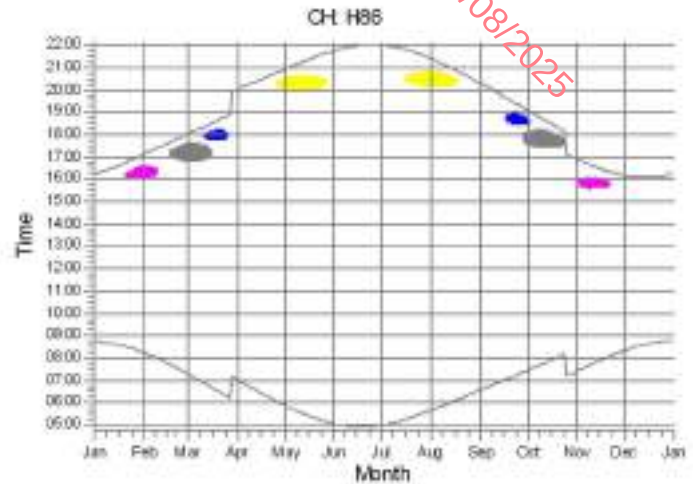
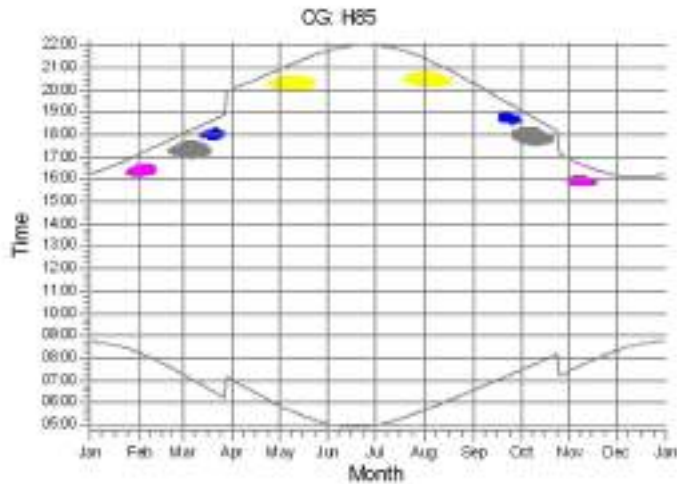


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

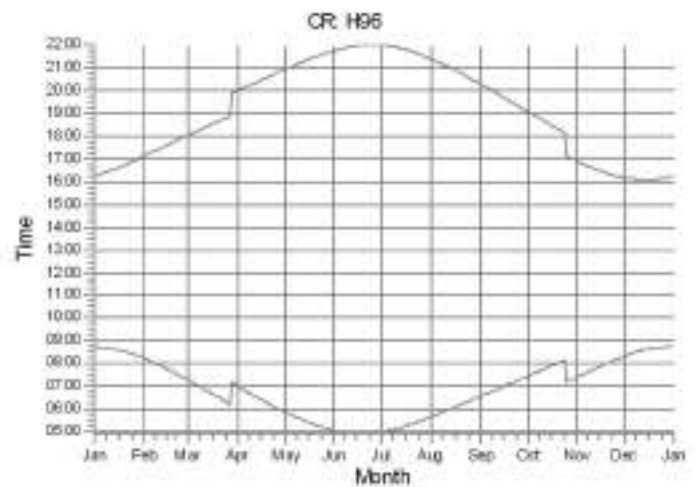
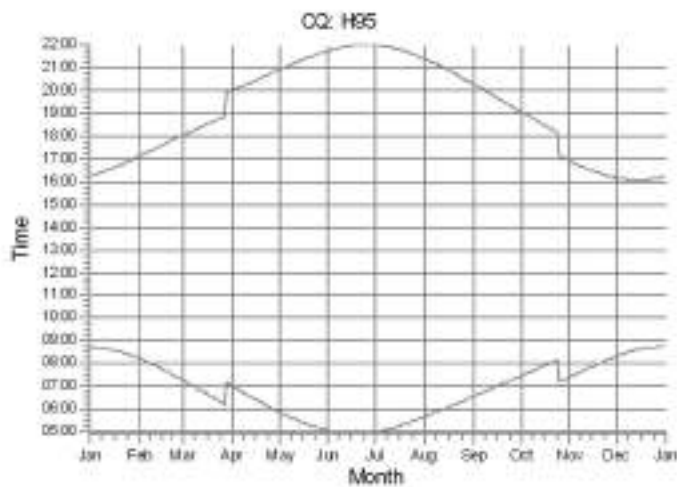
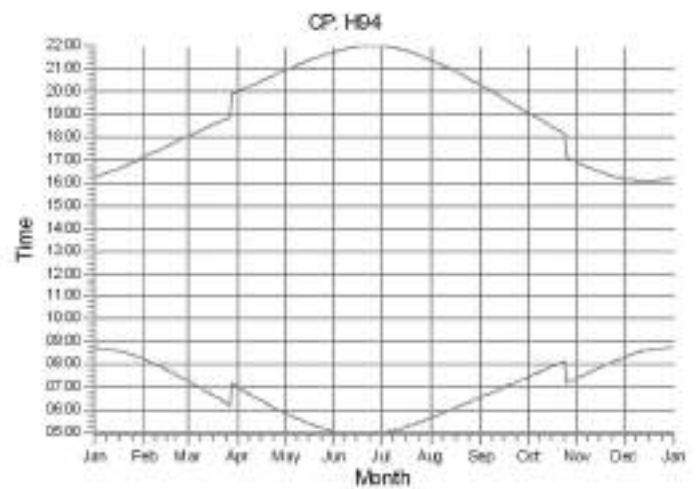
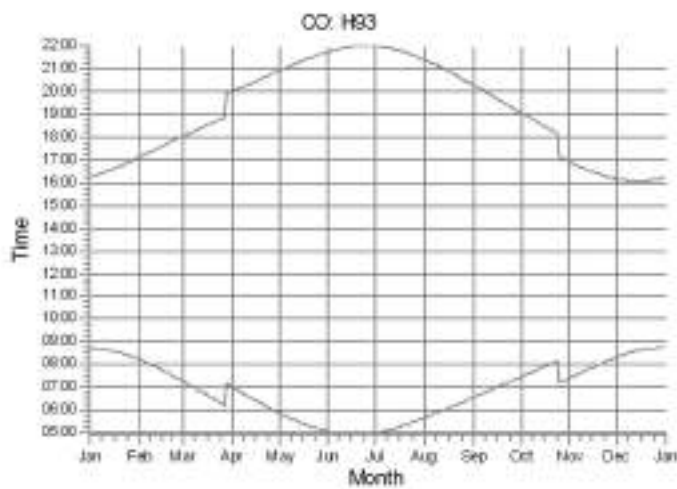
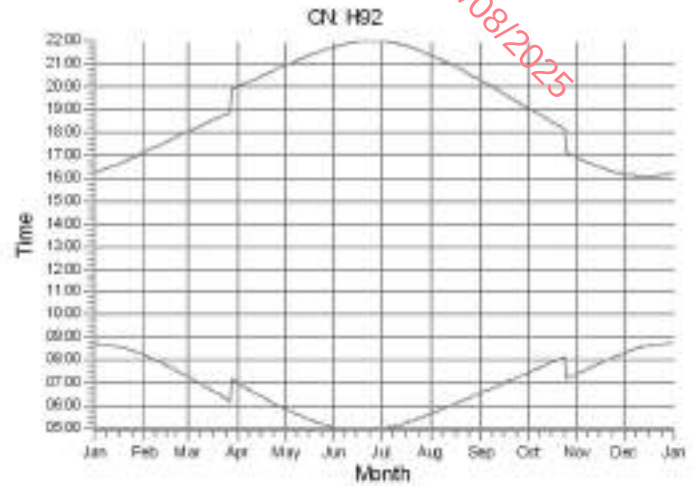
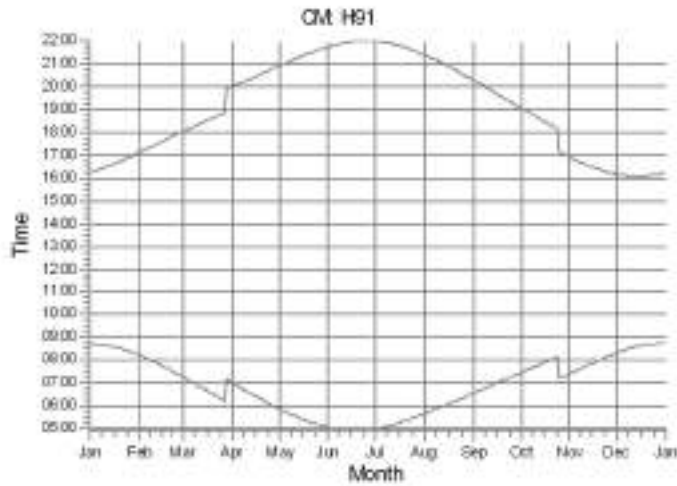


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

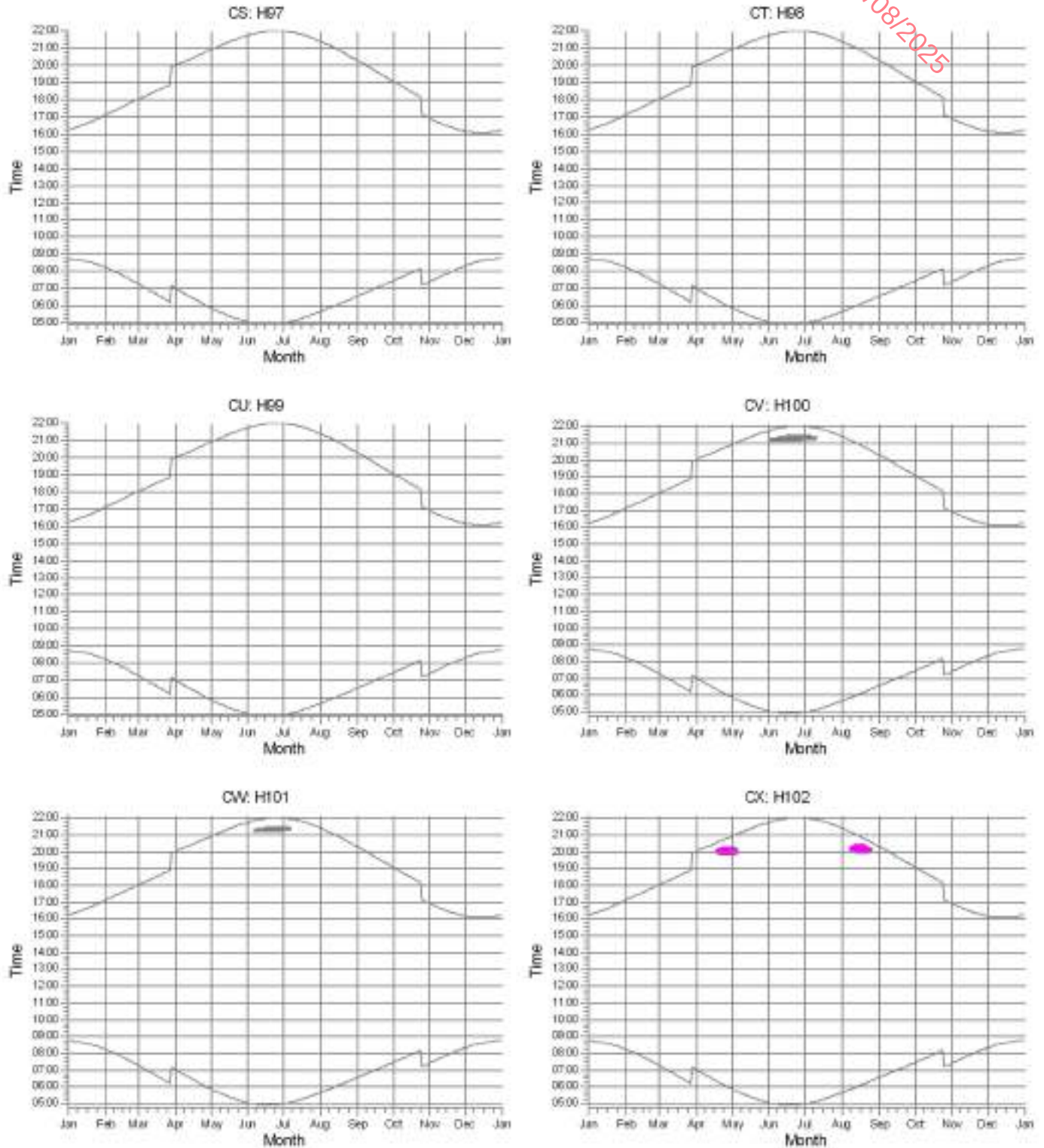
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

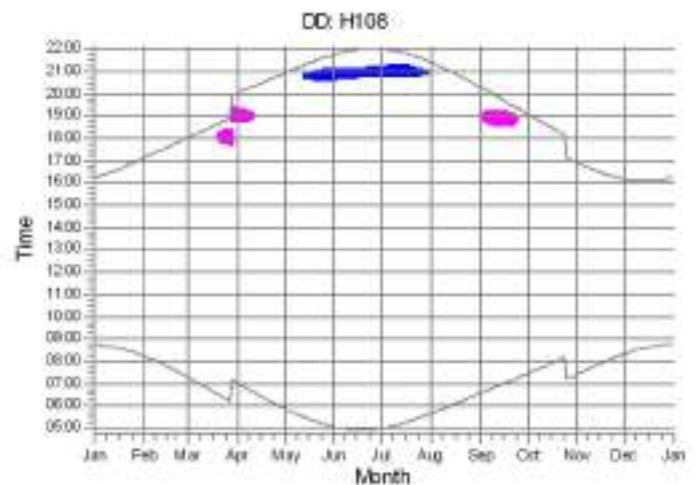
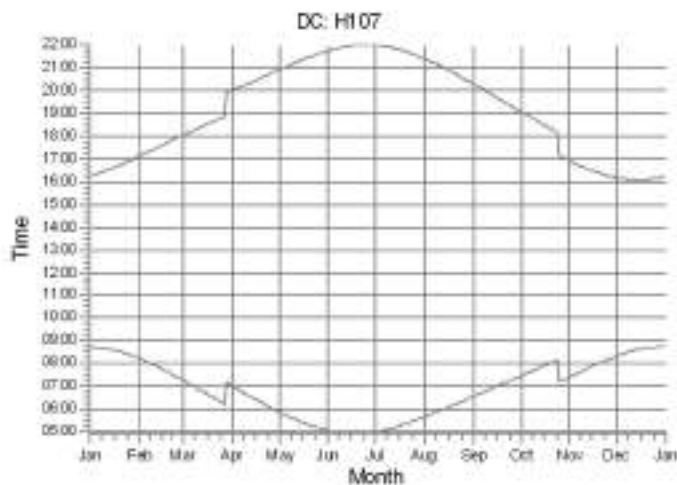
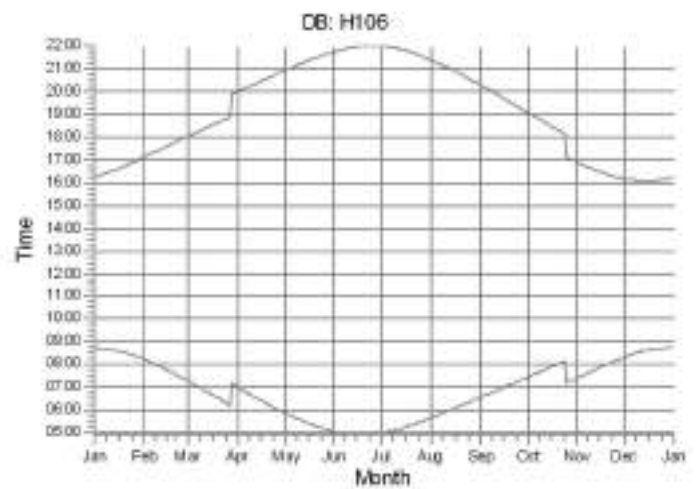
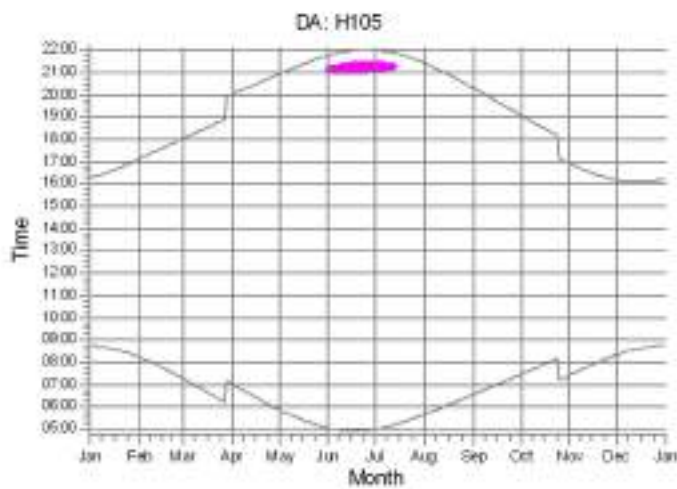
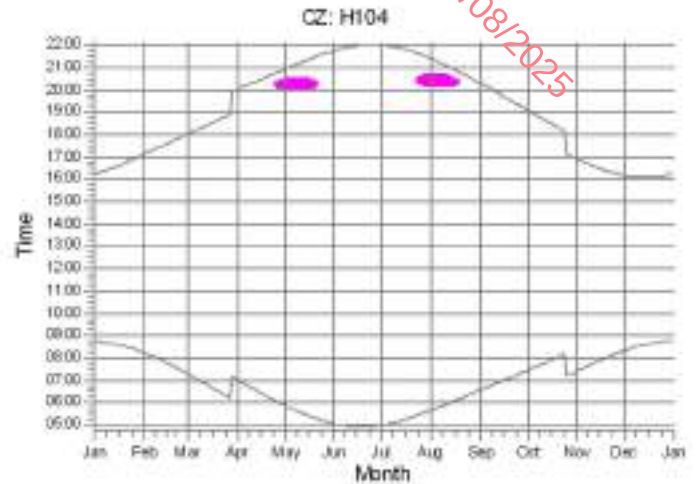
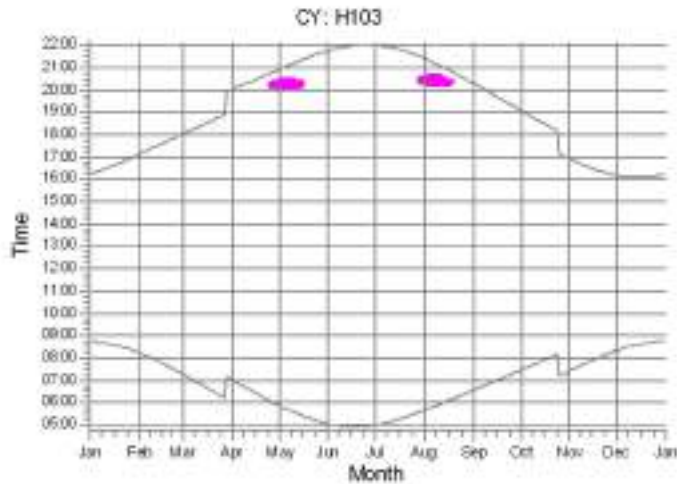


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

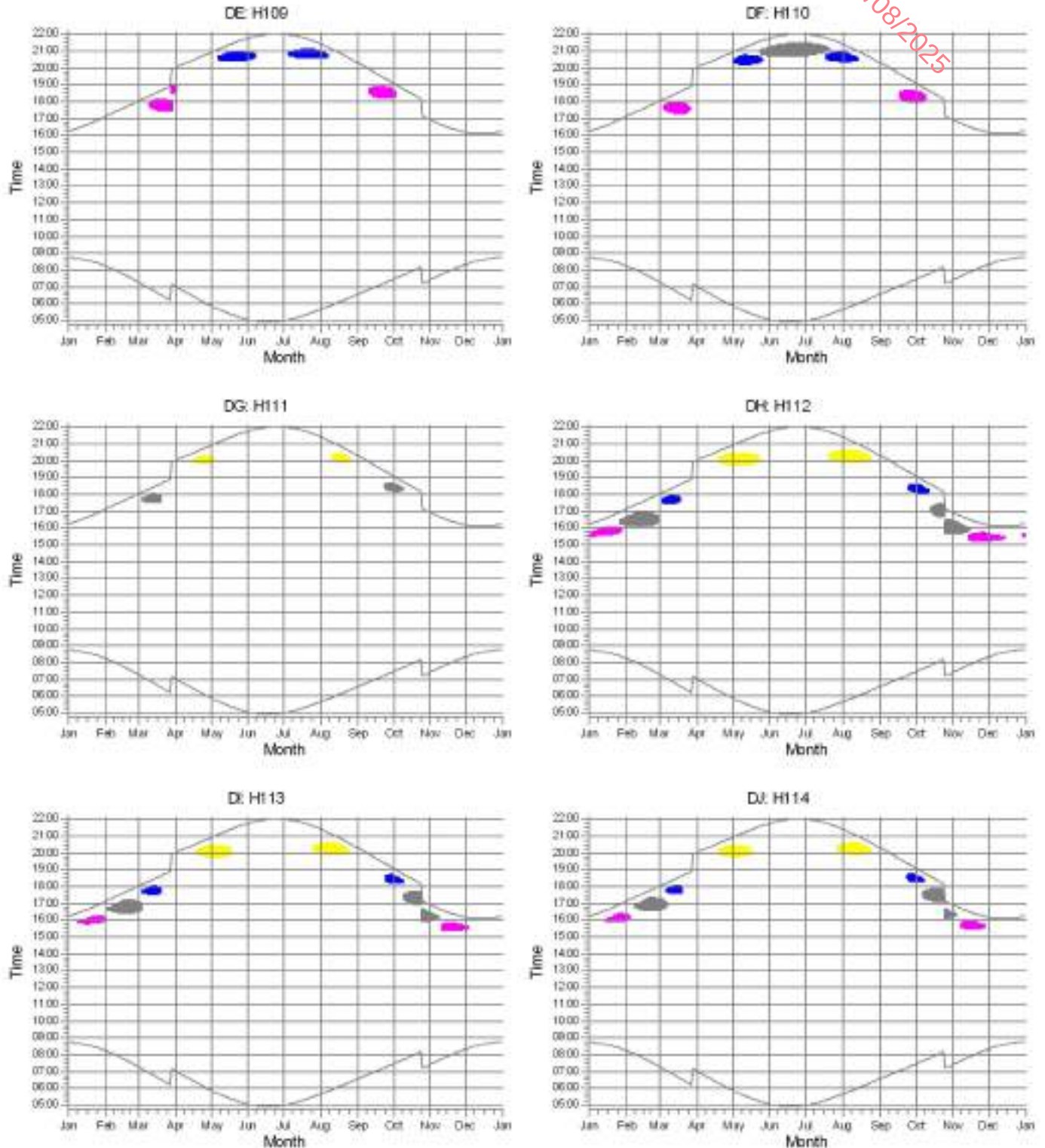


WTGs

3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

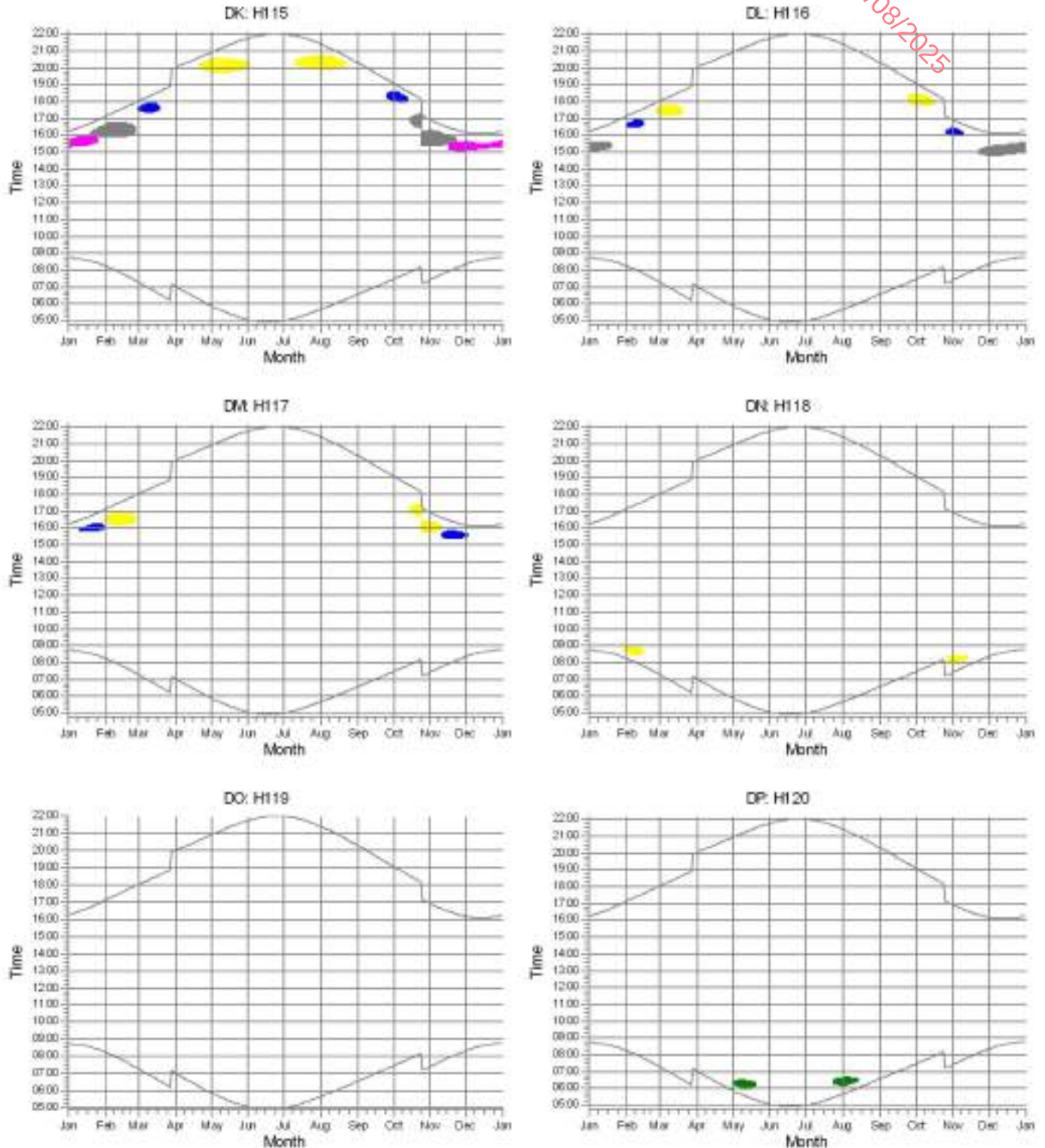


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

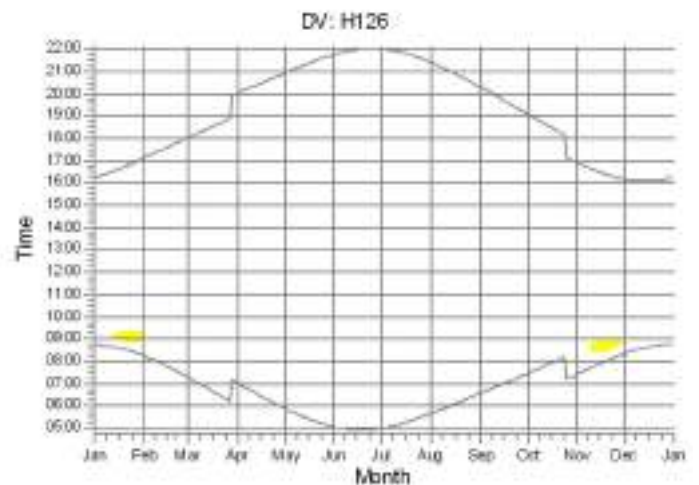
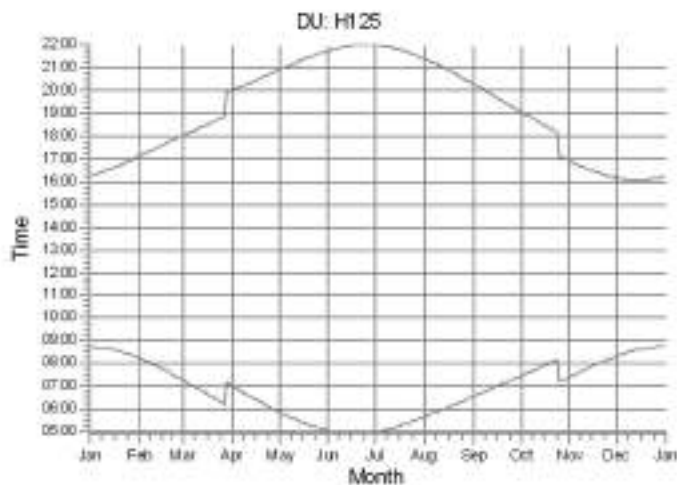
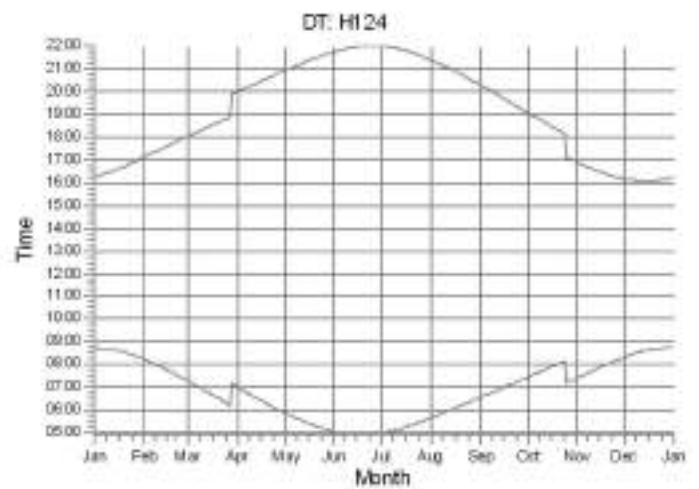
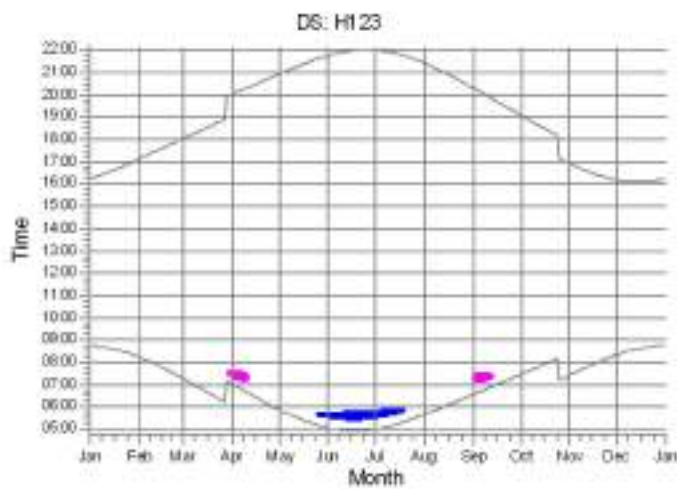
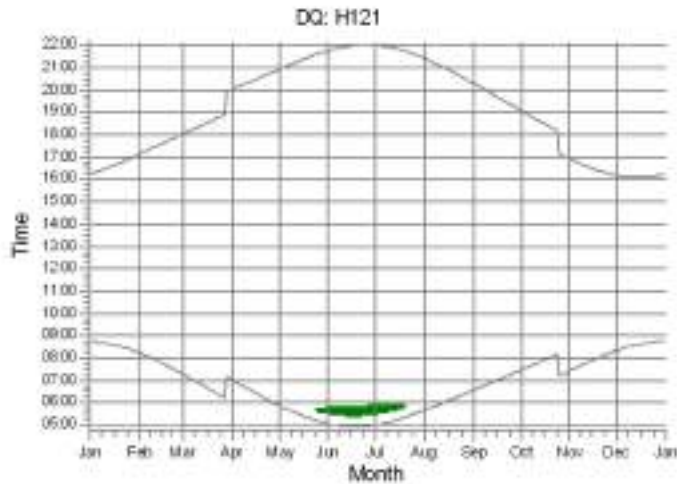


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

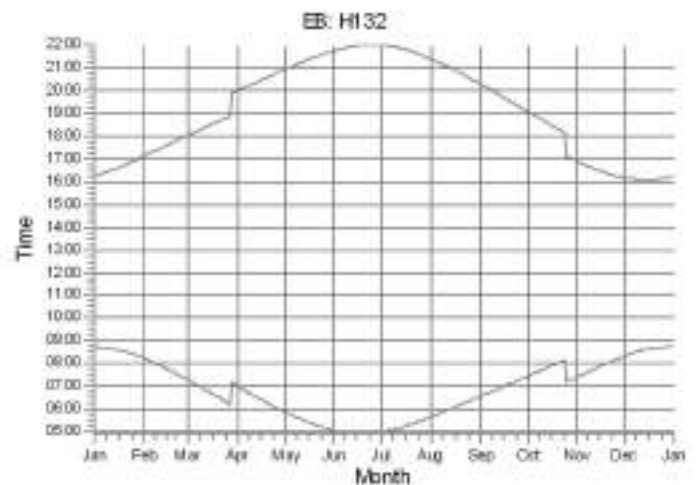
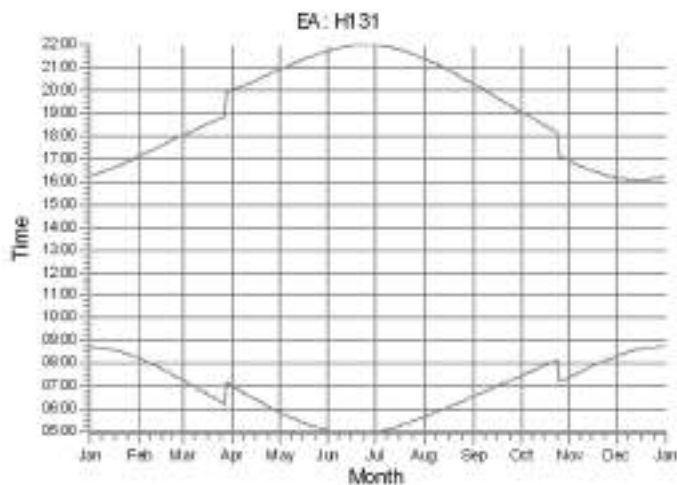
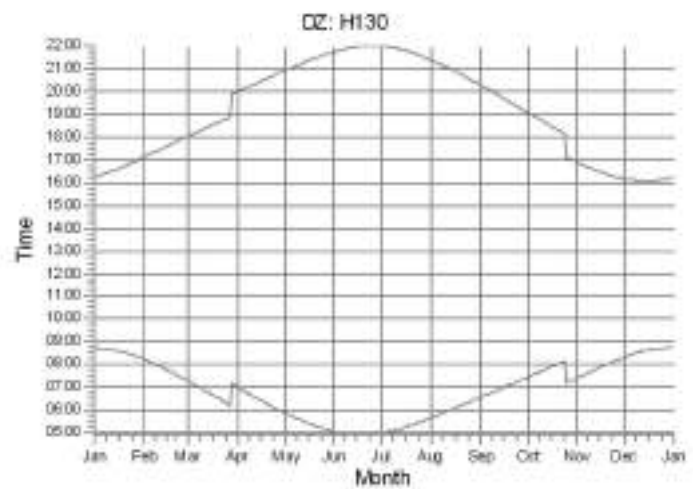
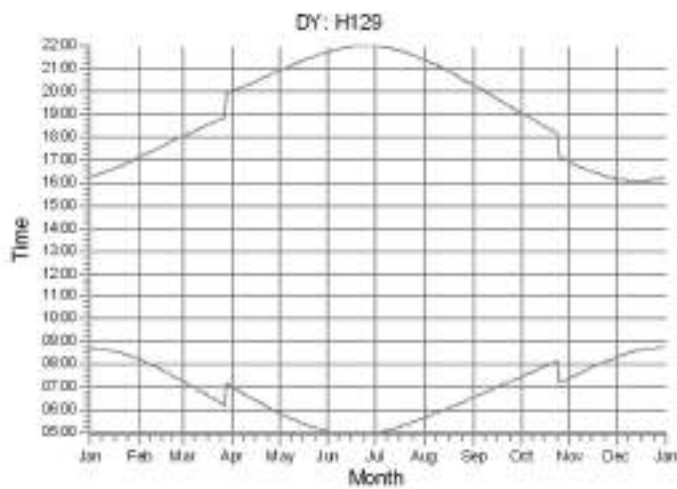
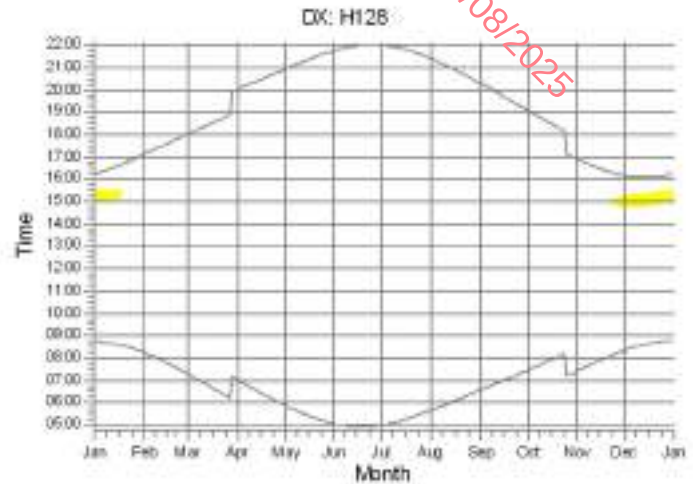
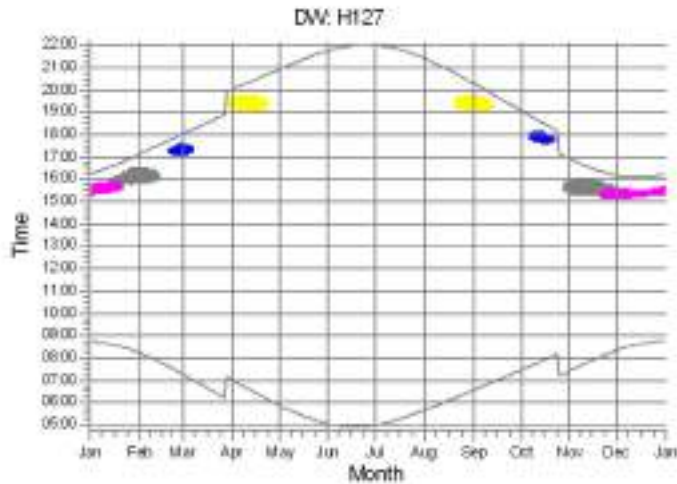


WTGs

1: T01 2: T02 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

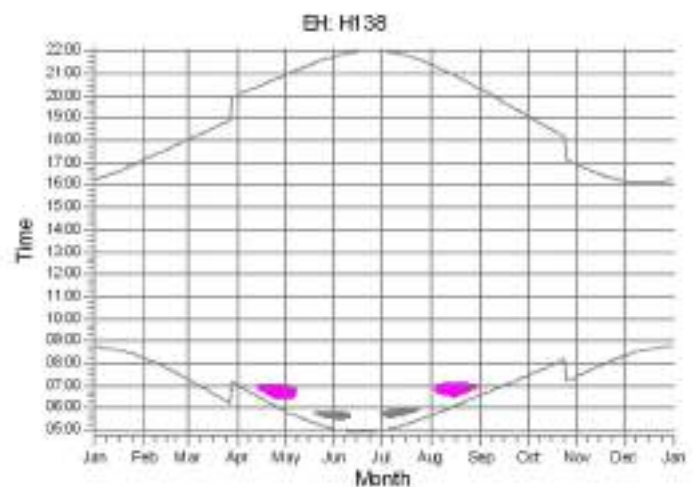
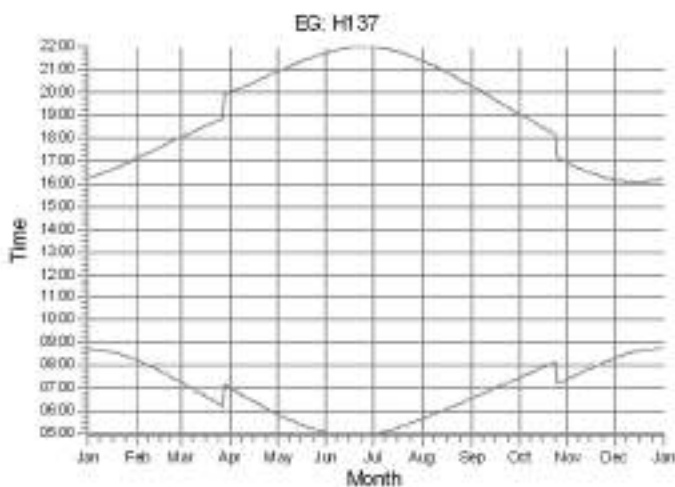
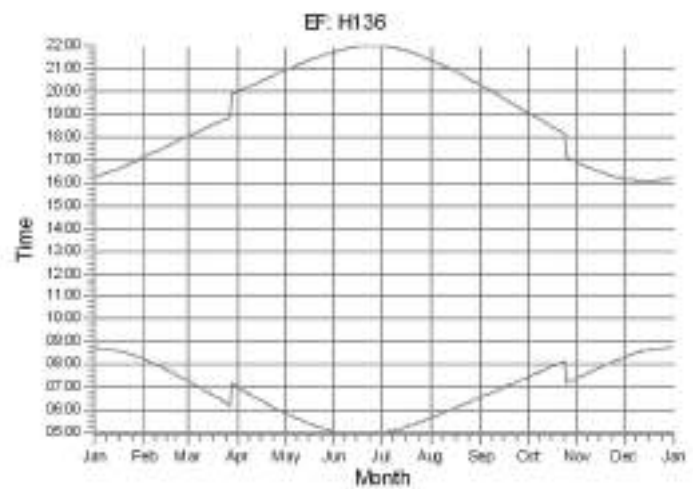
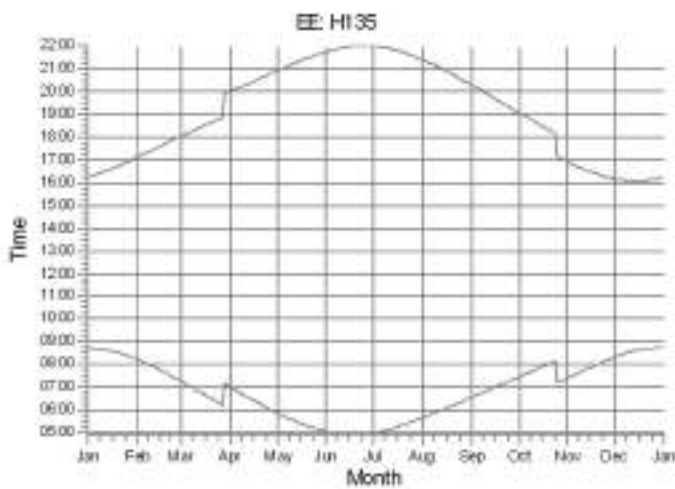
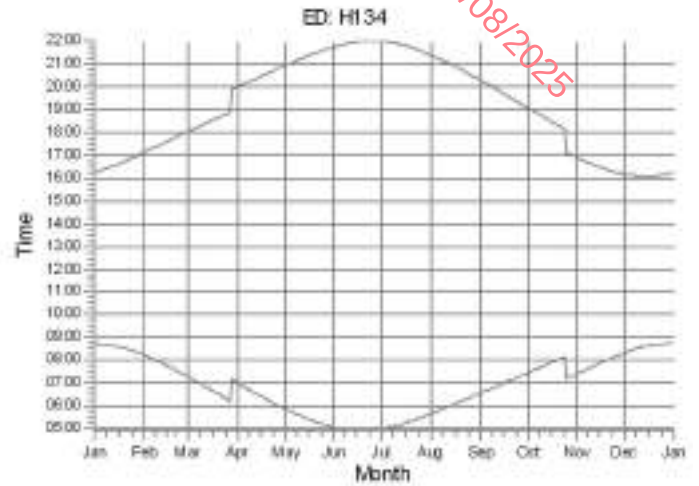
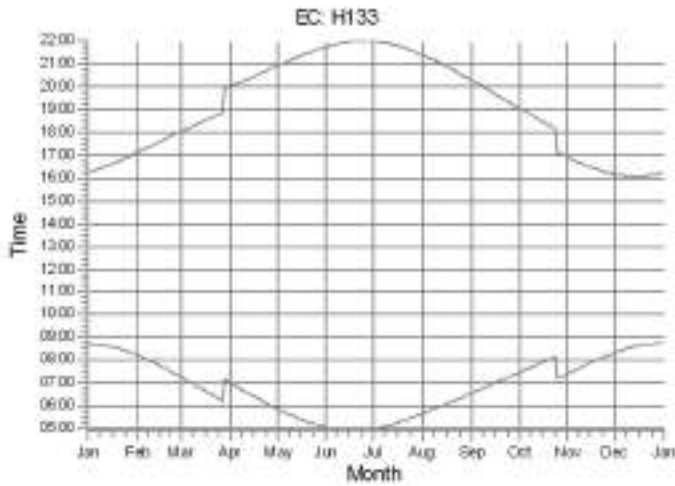


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

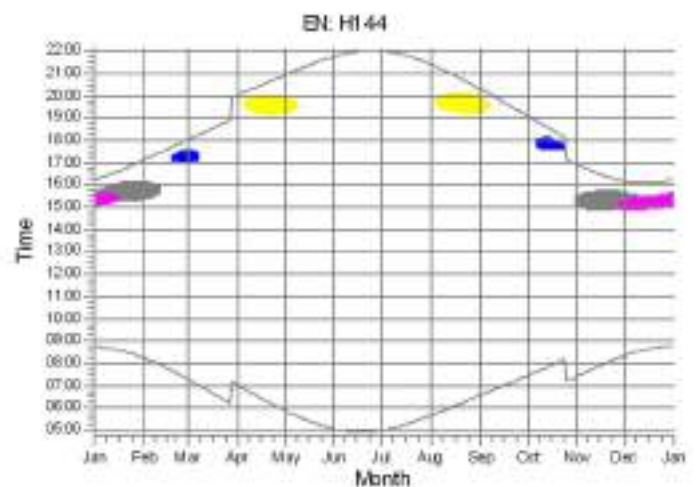
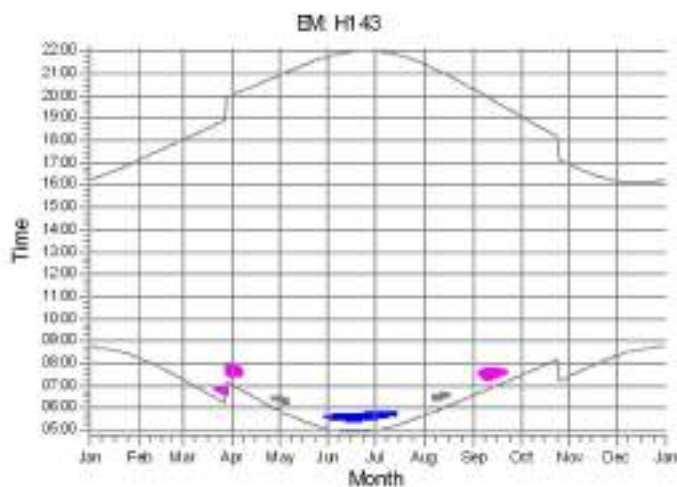
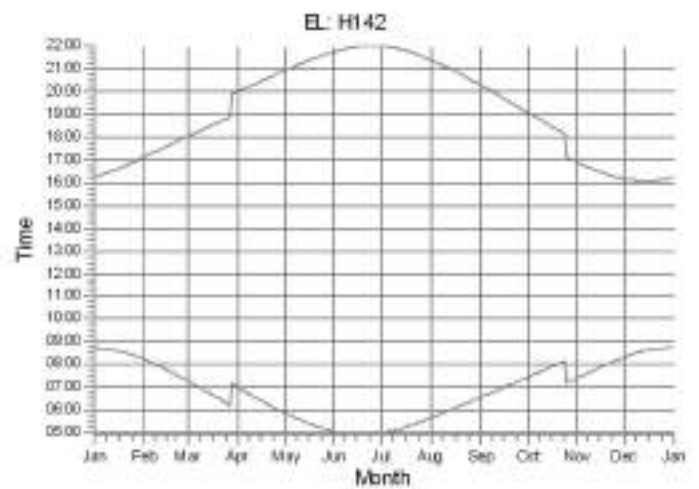
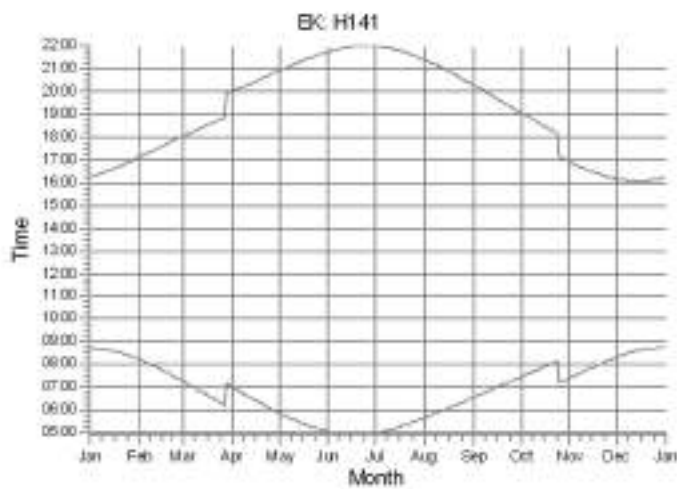
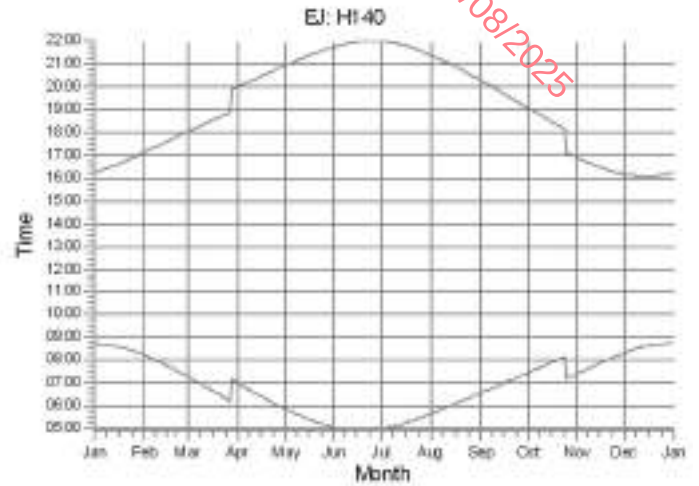
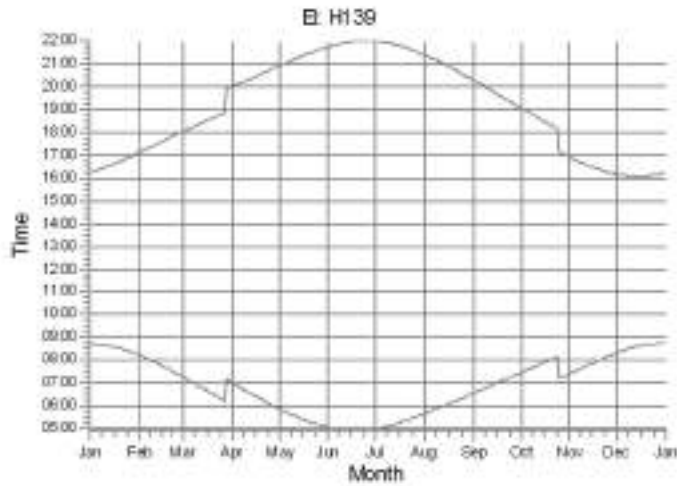


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

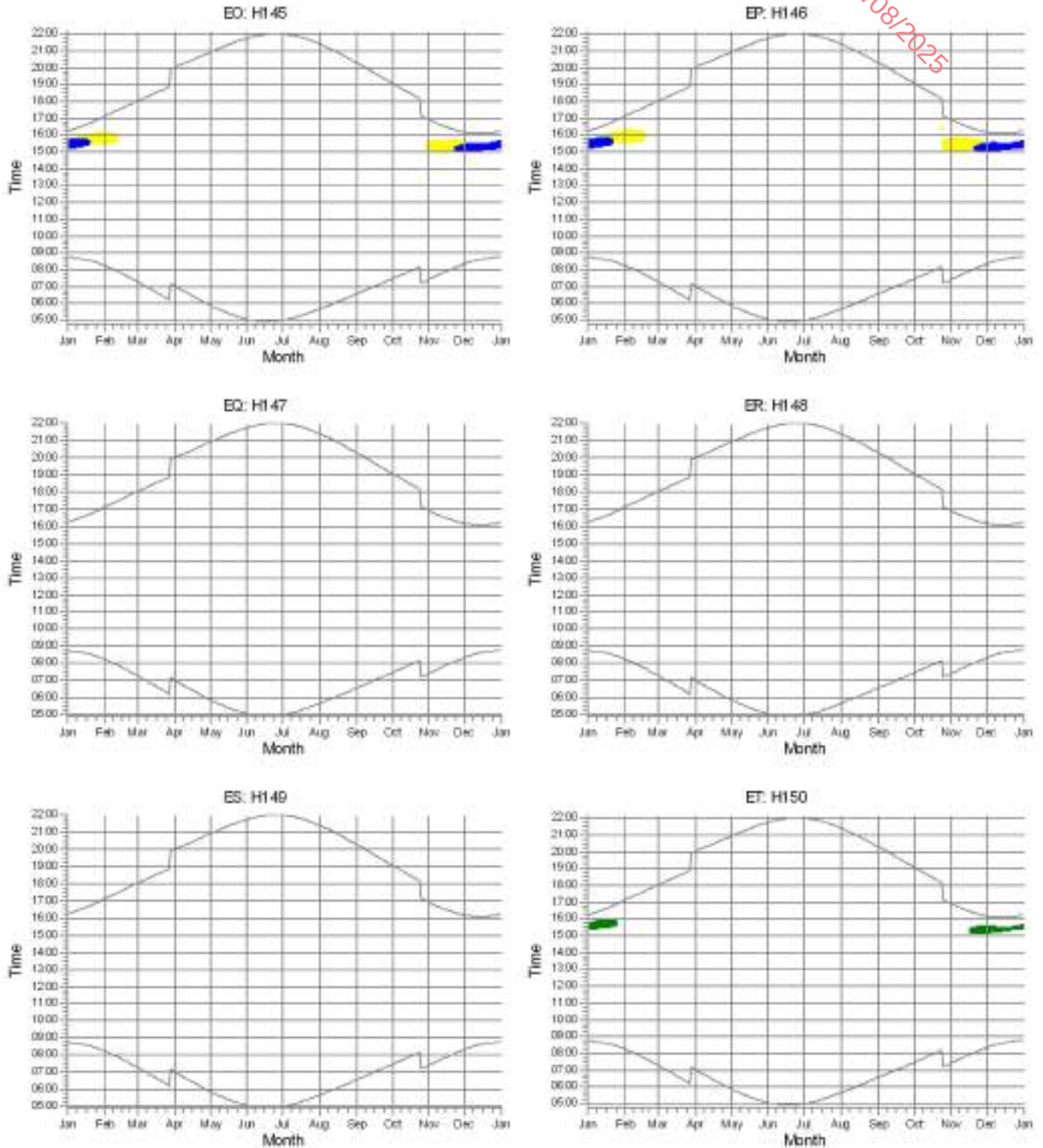


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

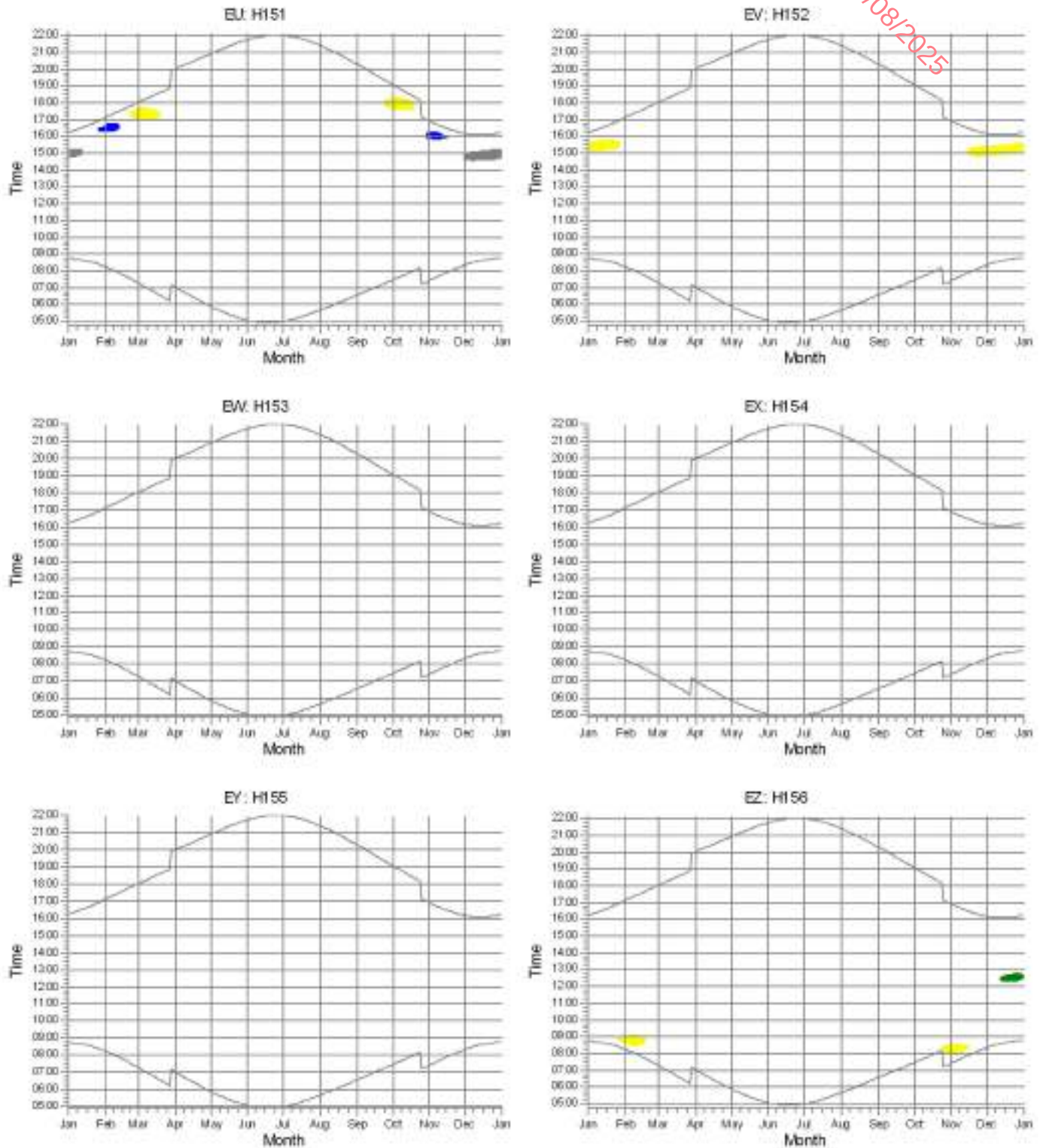


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

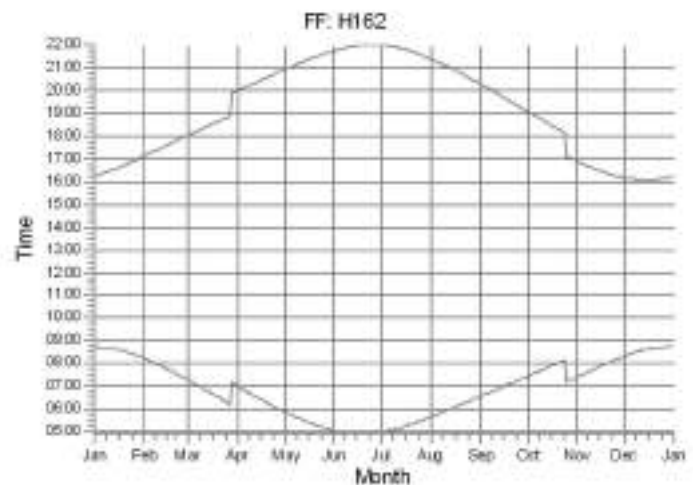
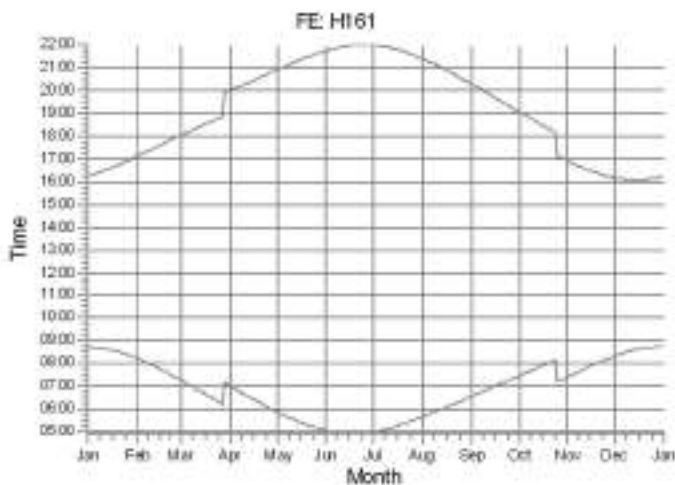
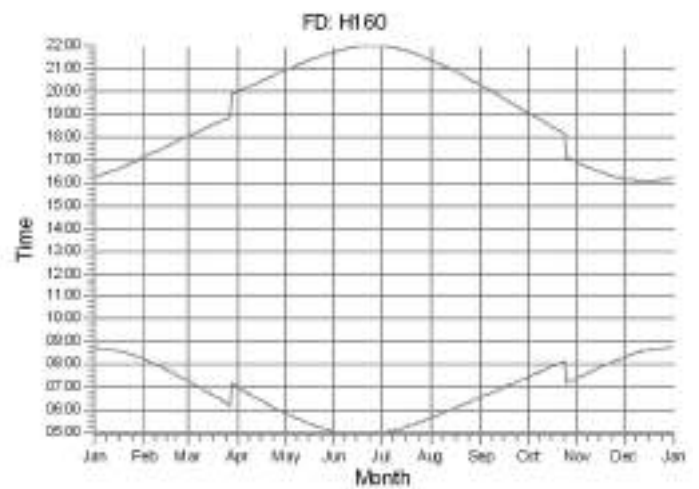
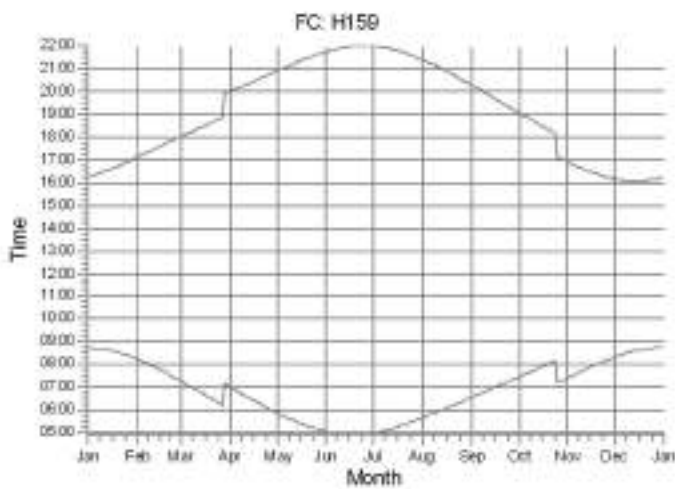
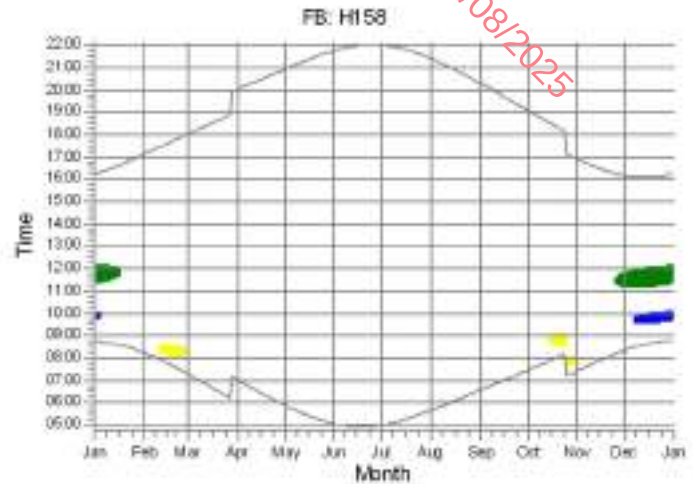
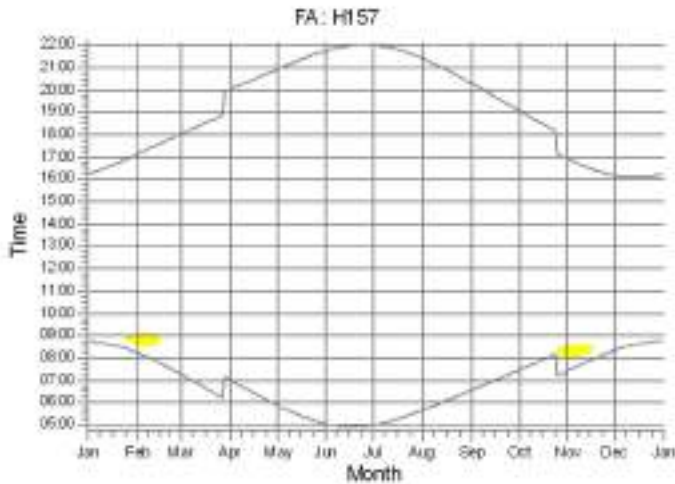


WTGs

1: T01 2: T02 3: T03 4: T04

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

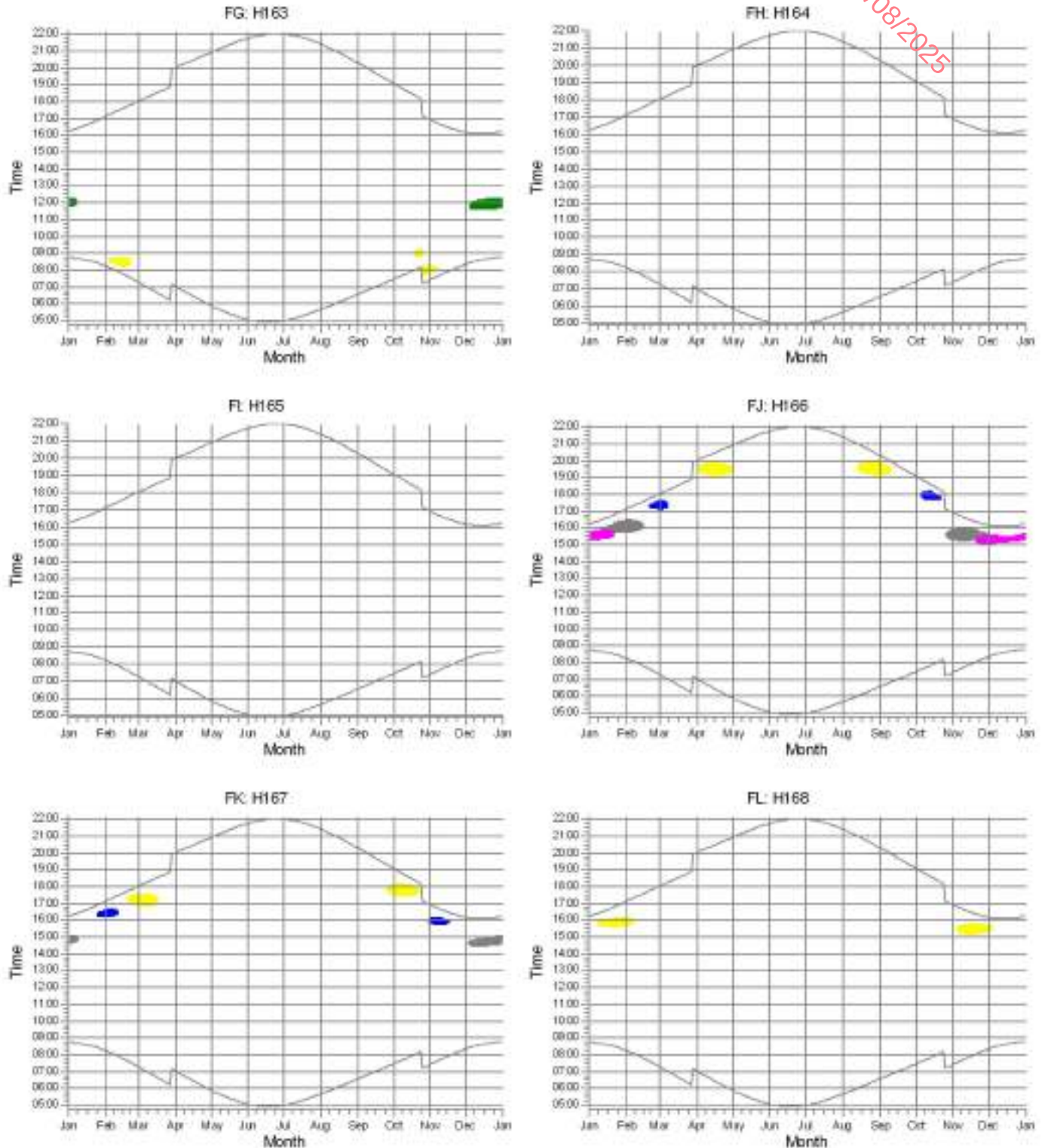


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

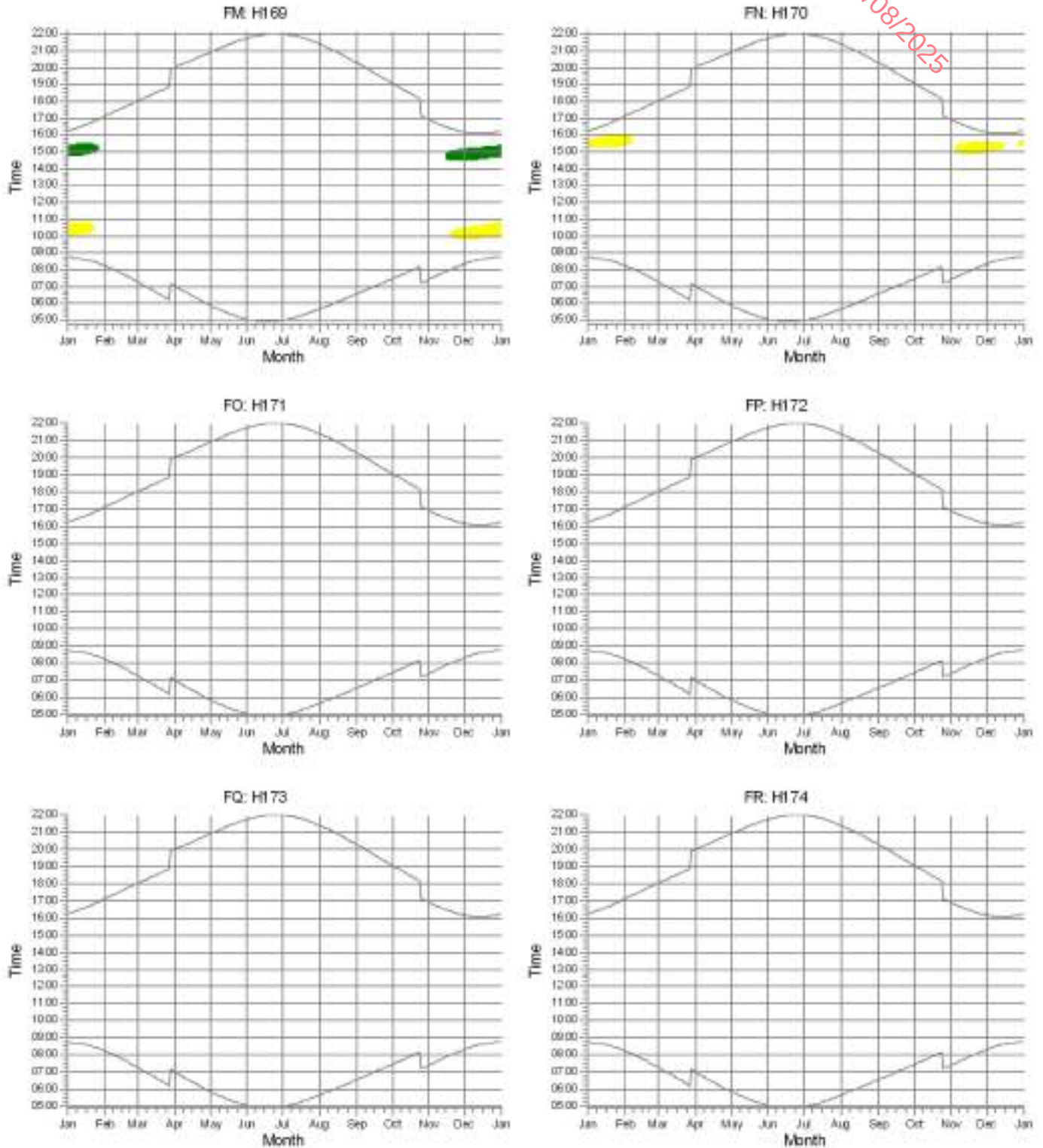


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

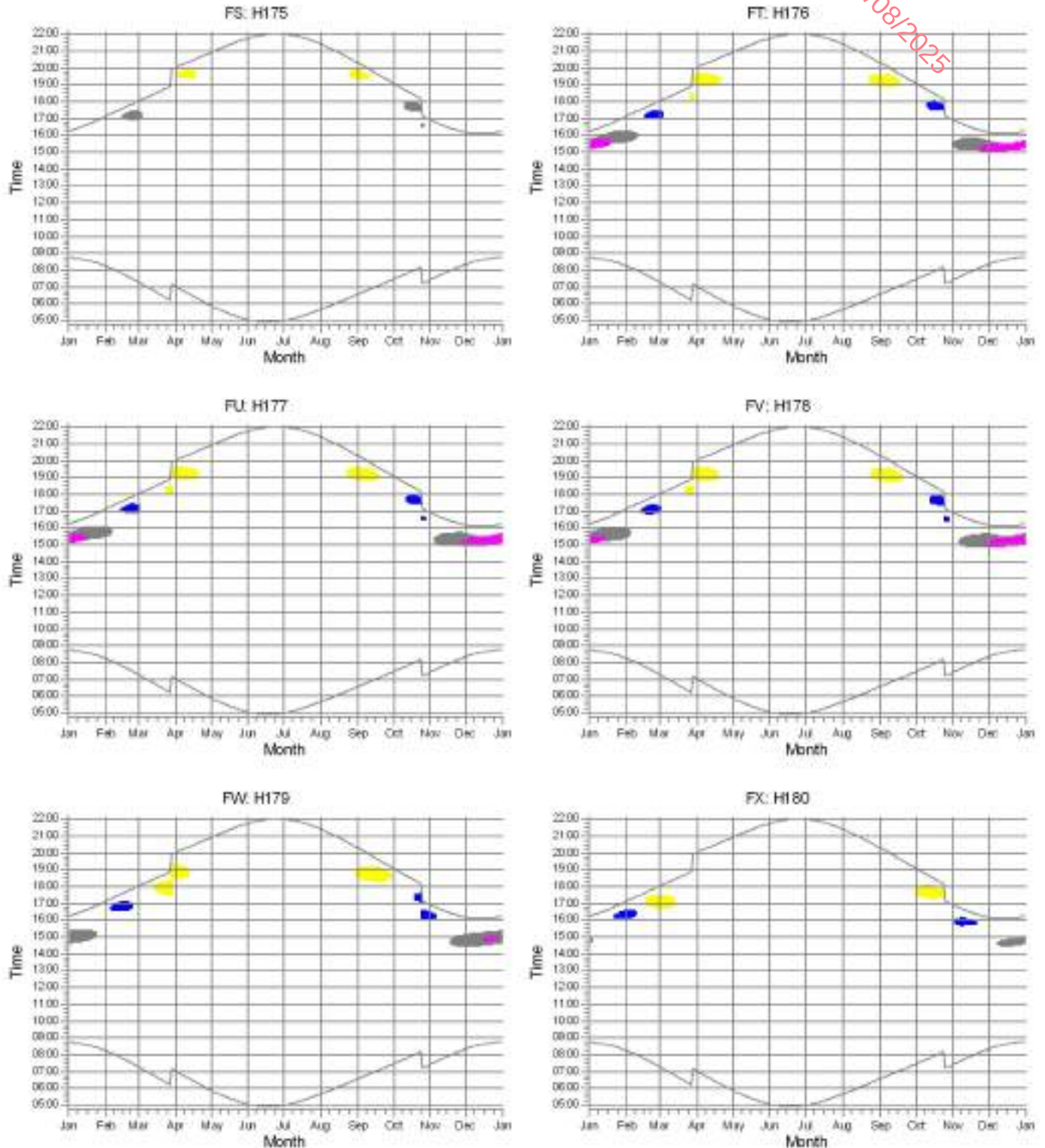


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

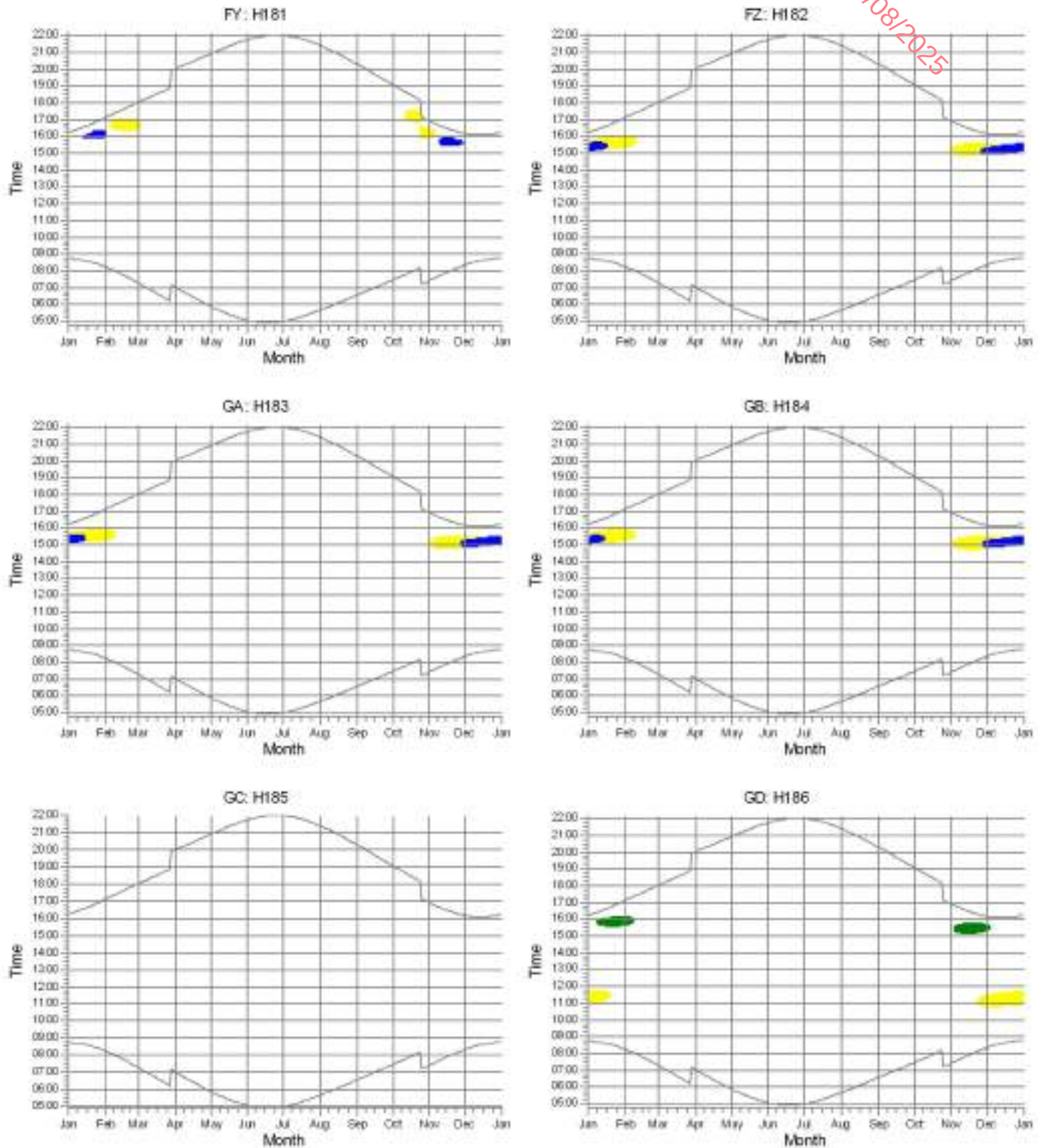


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

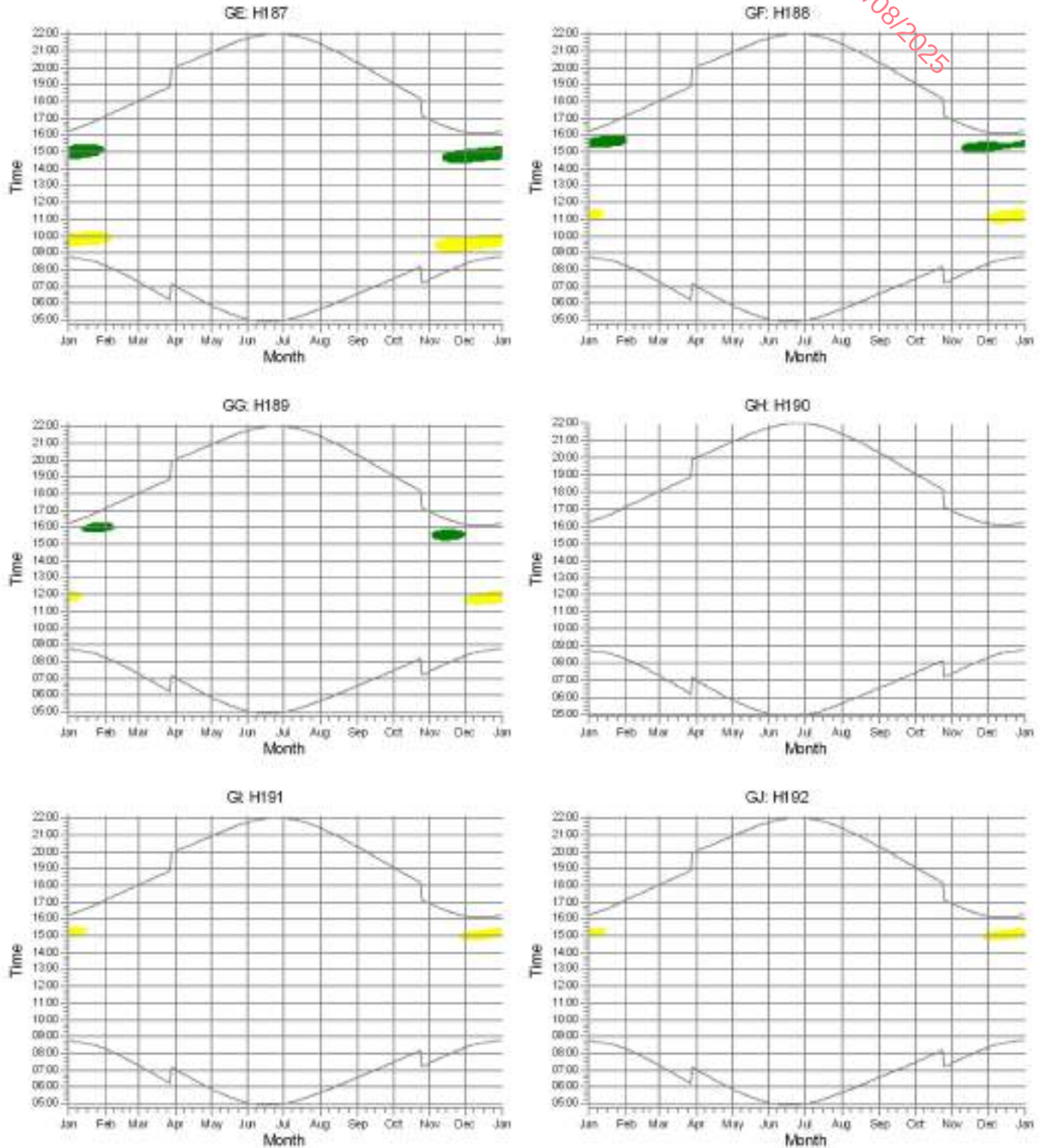


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

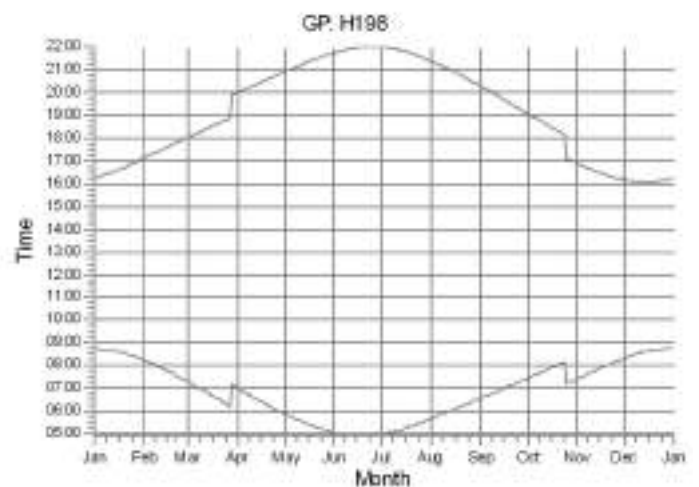
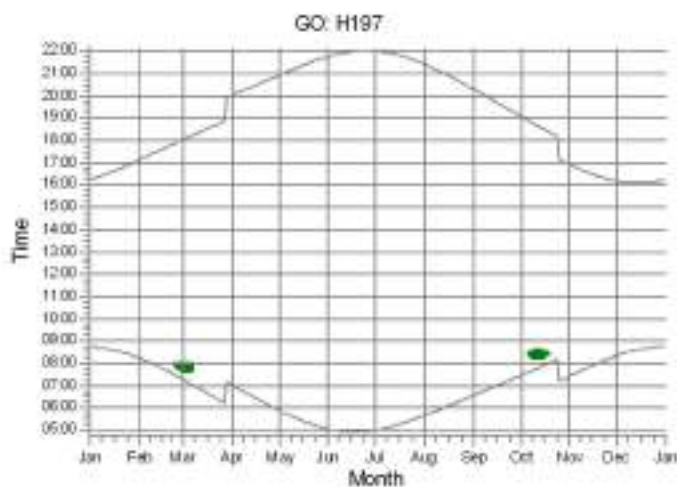
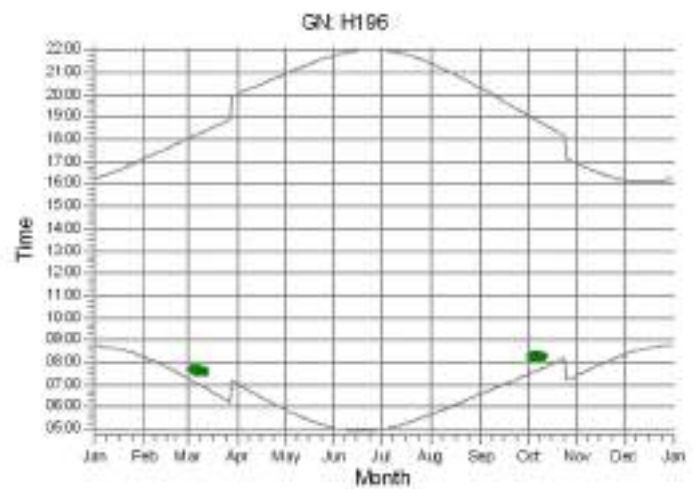
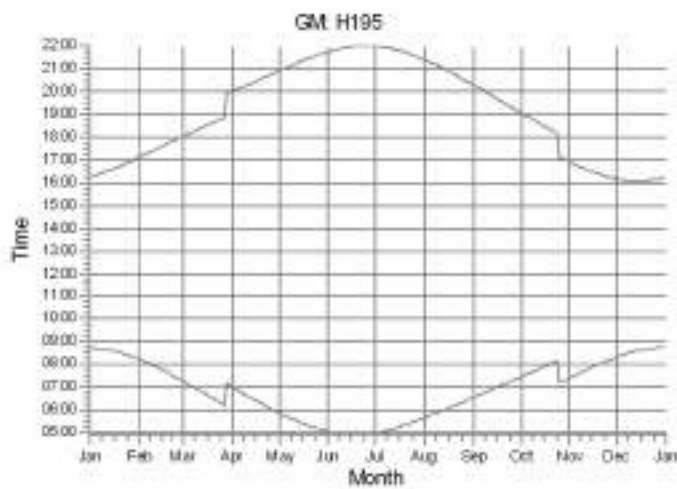
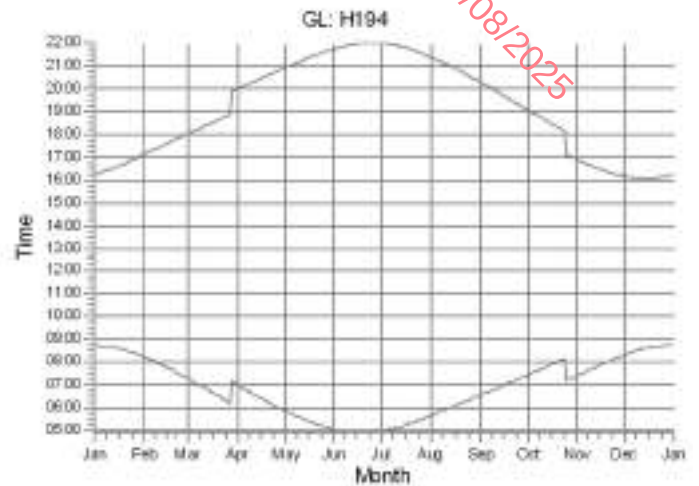
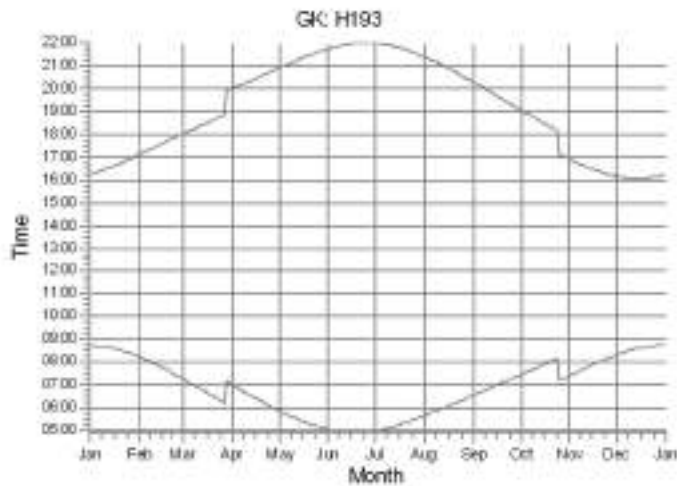


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

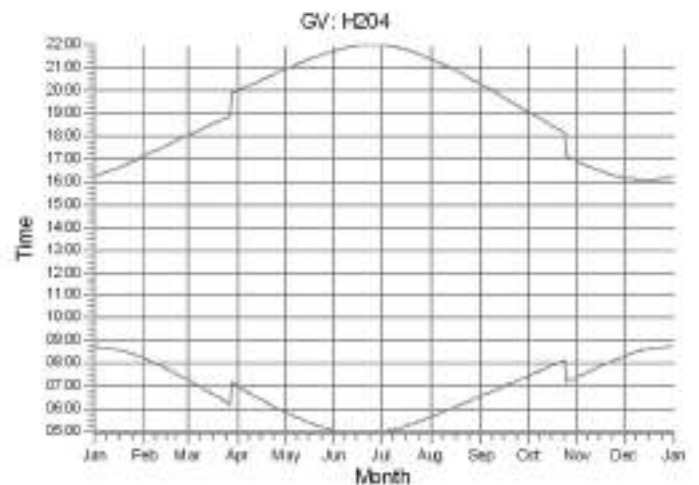
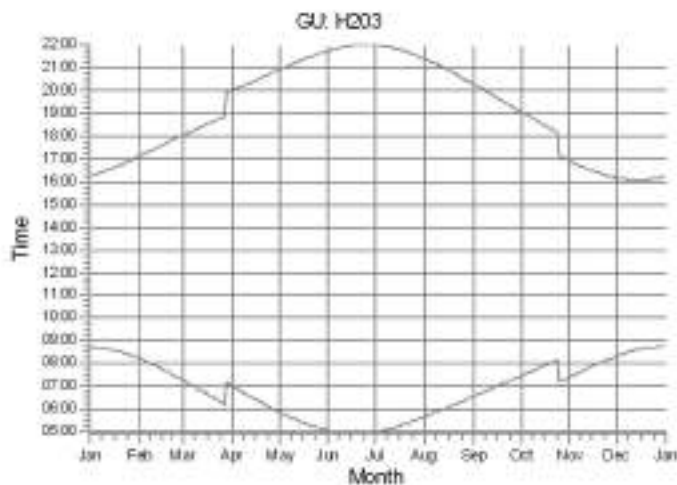
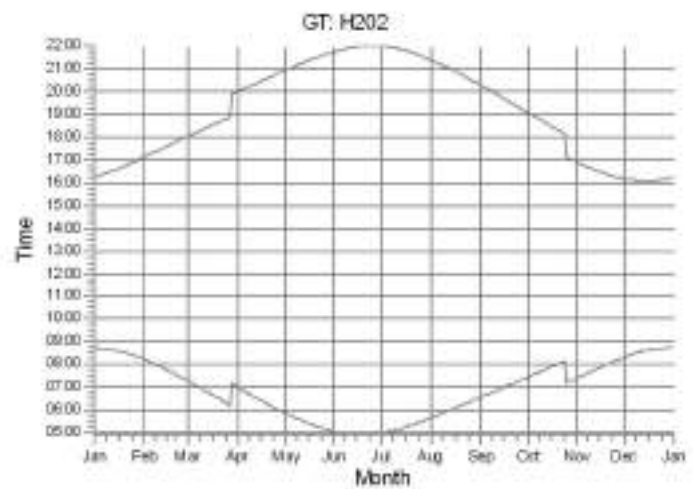
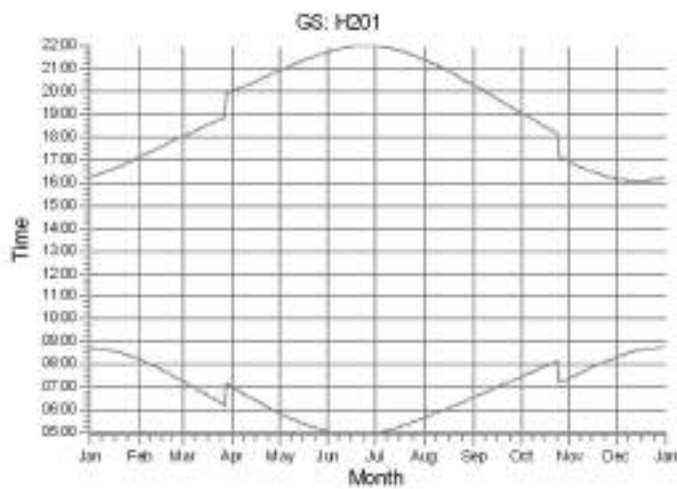
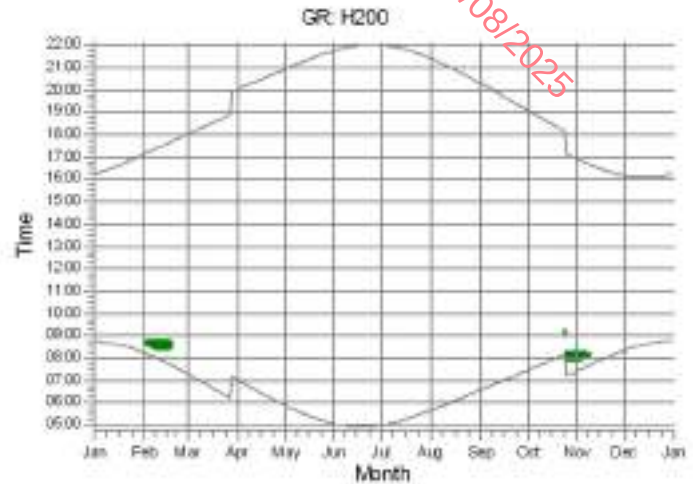
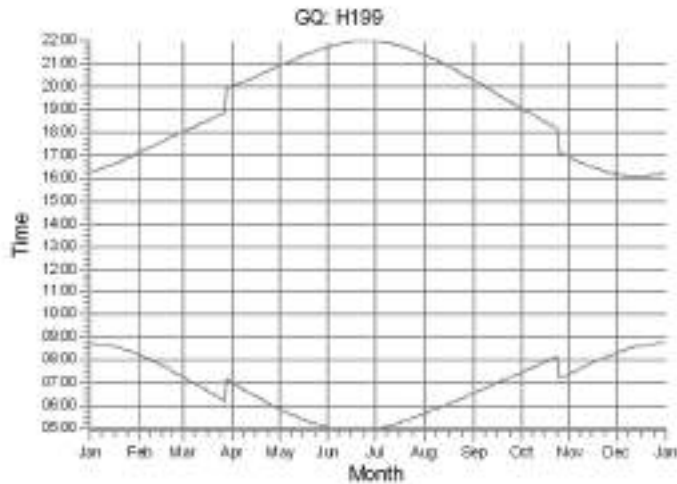


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



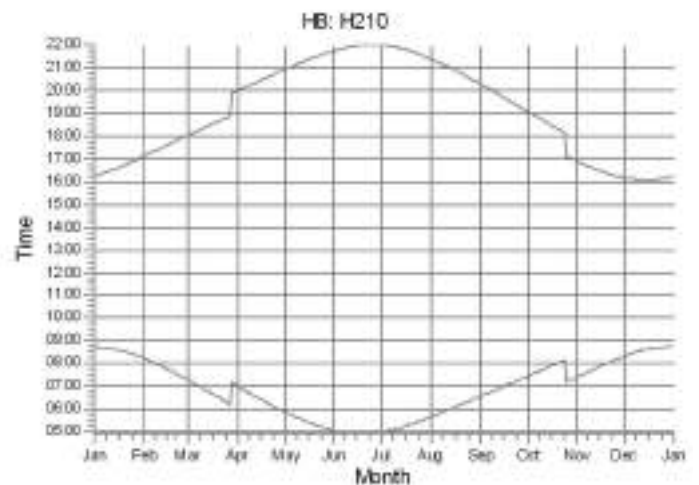
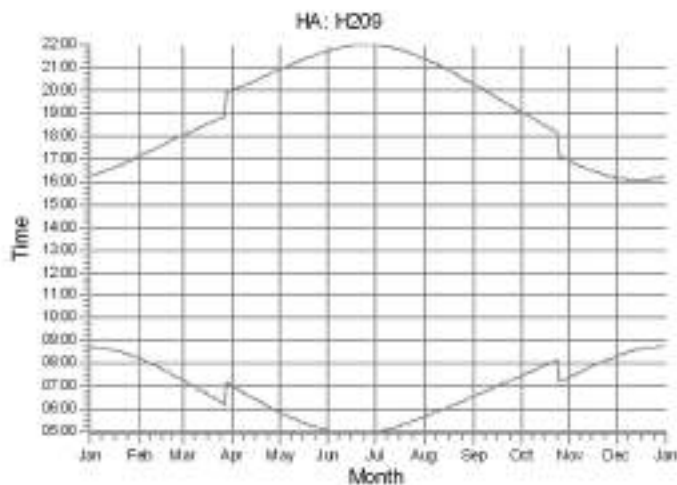
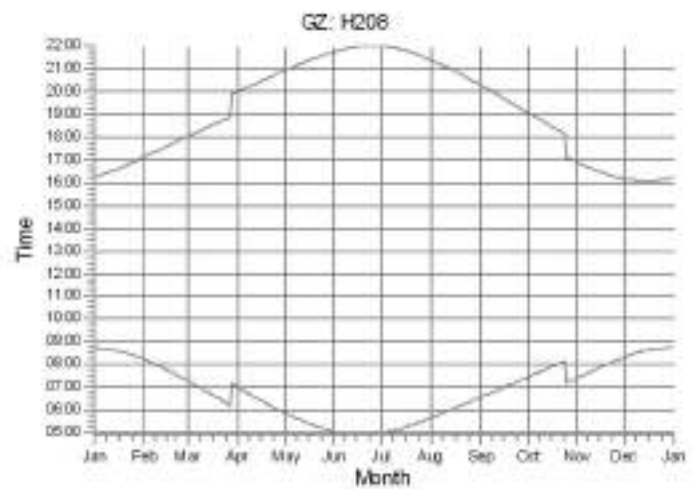
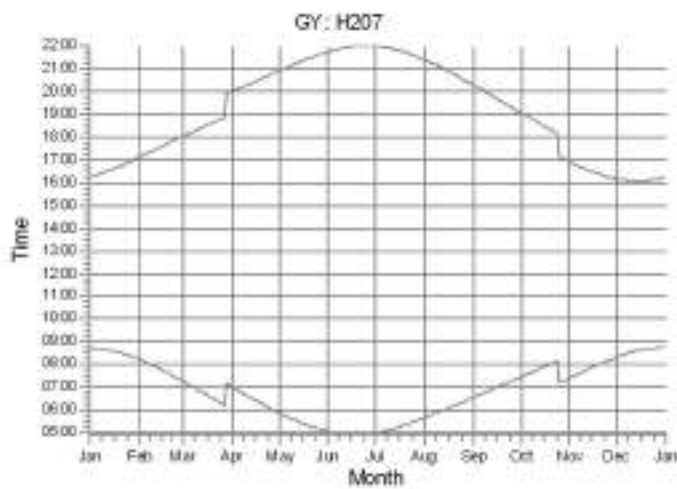
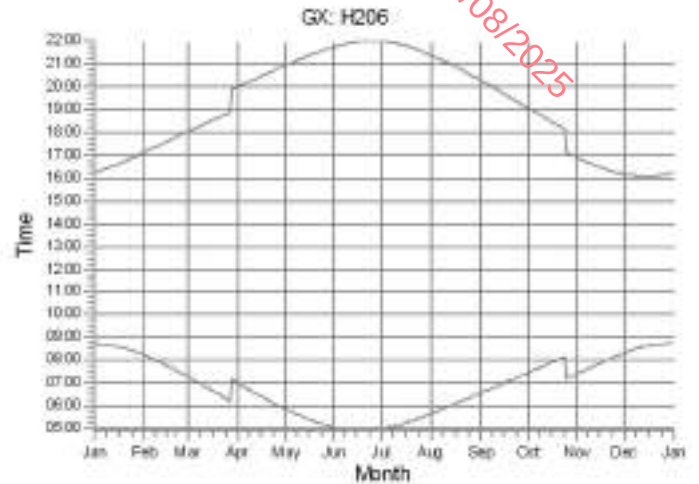
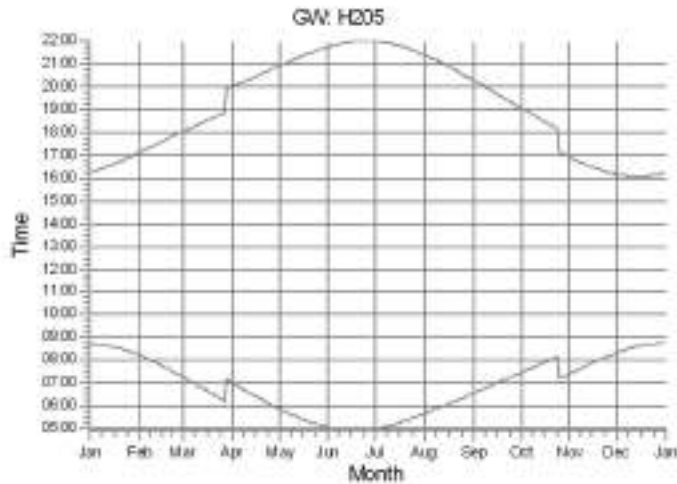
WTGs



1: T01

SHADOW - Calendar, graphical

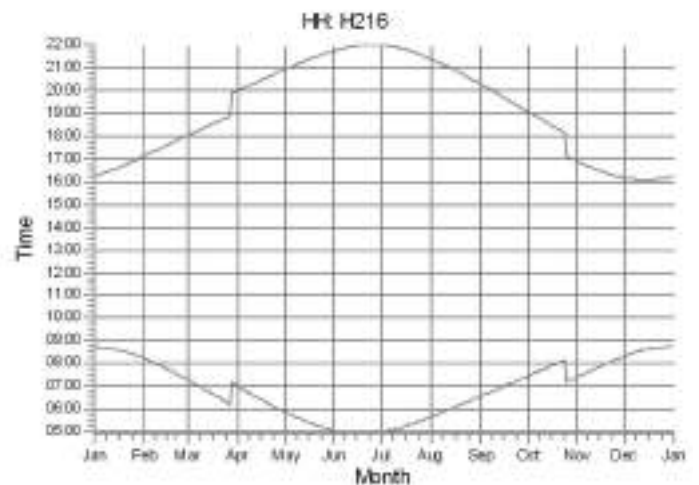
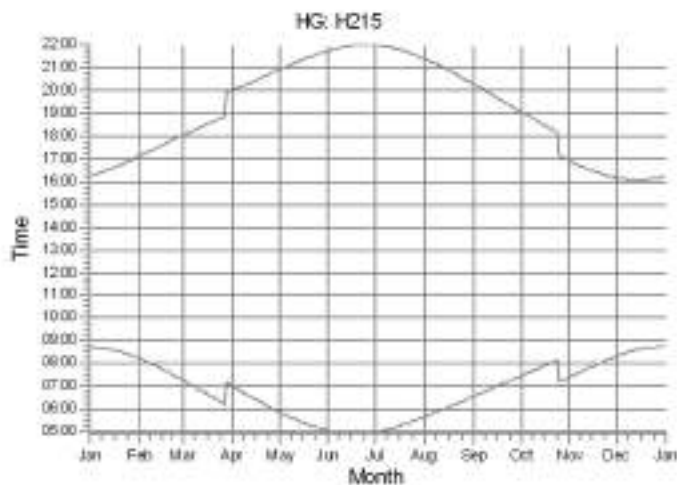
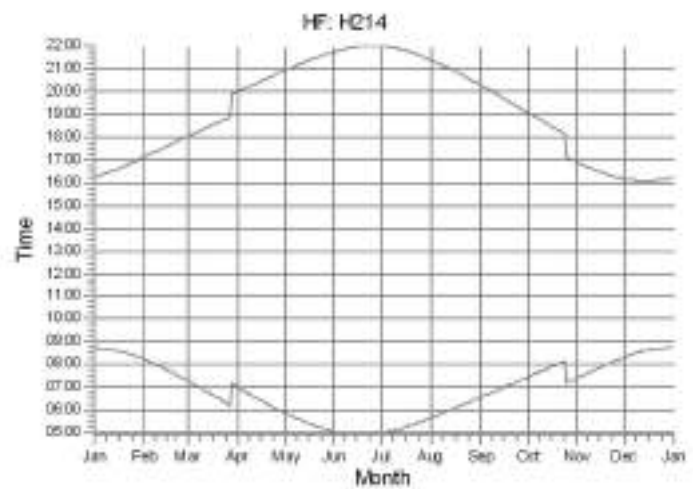
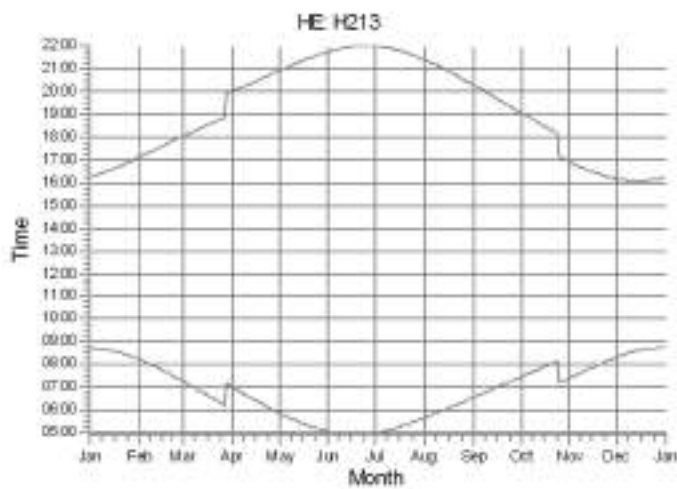
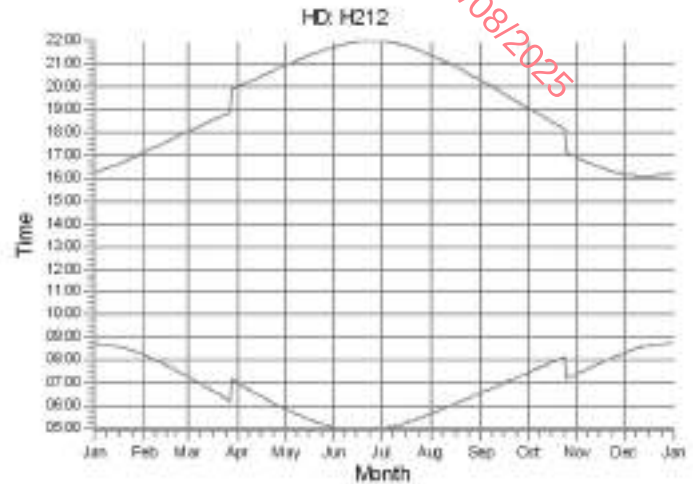
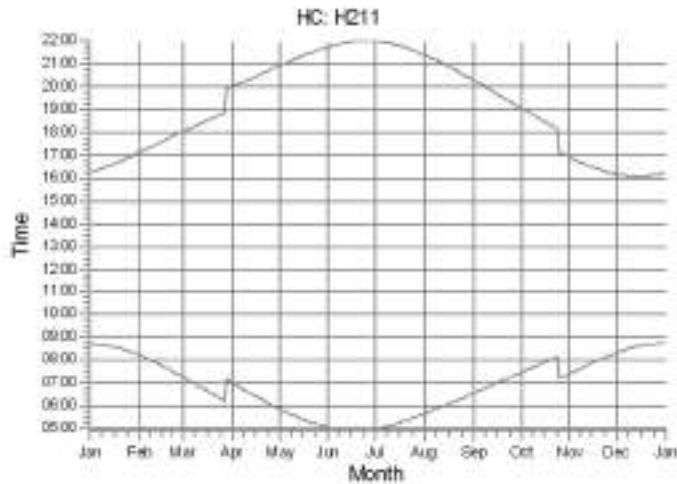
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

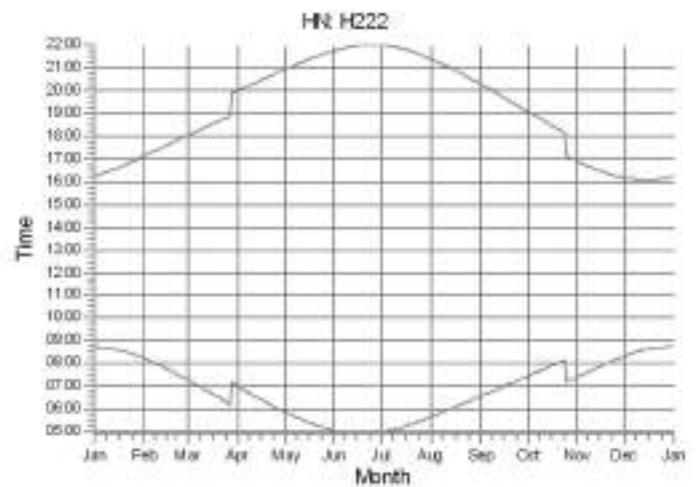
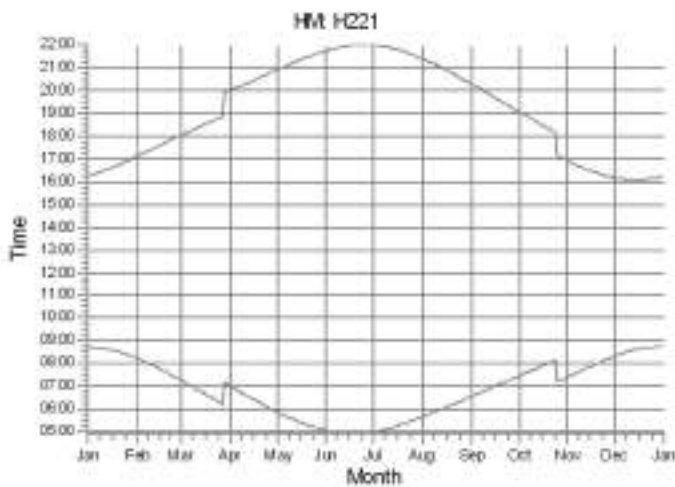
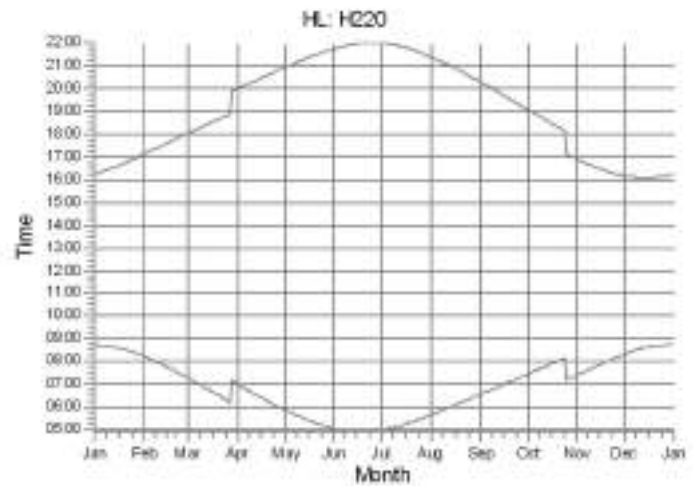
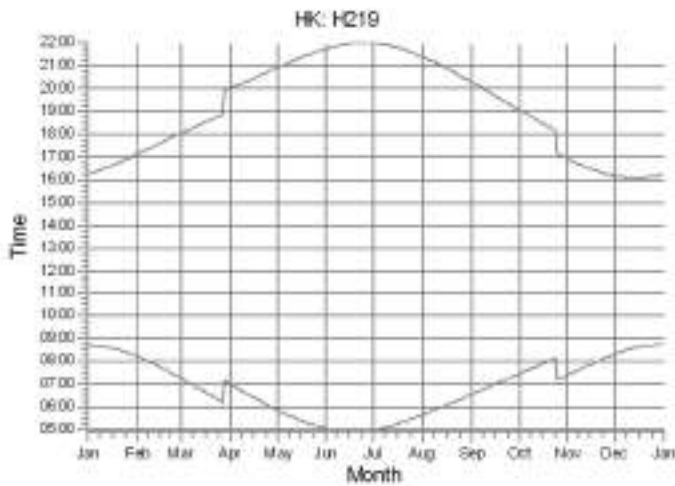
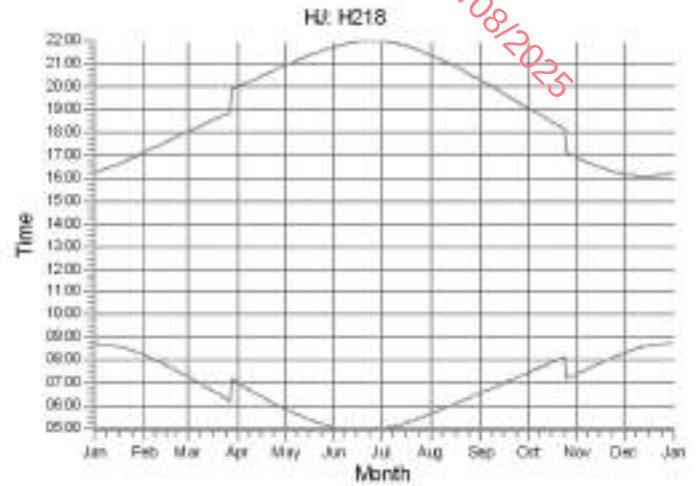
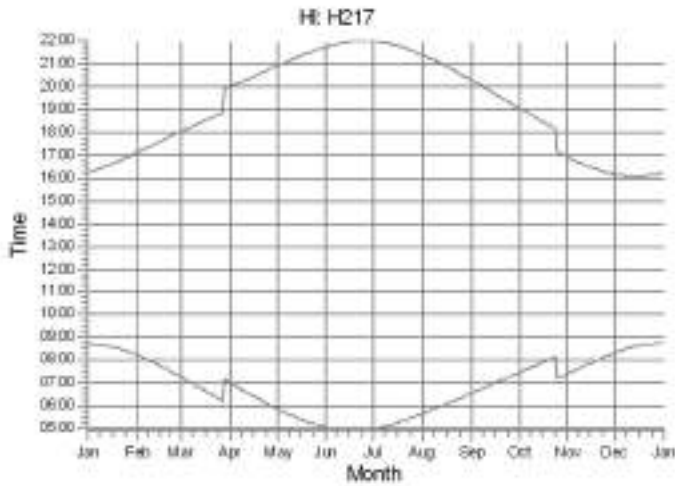
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

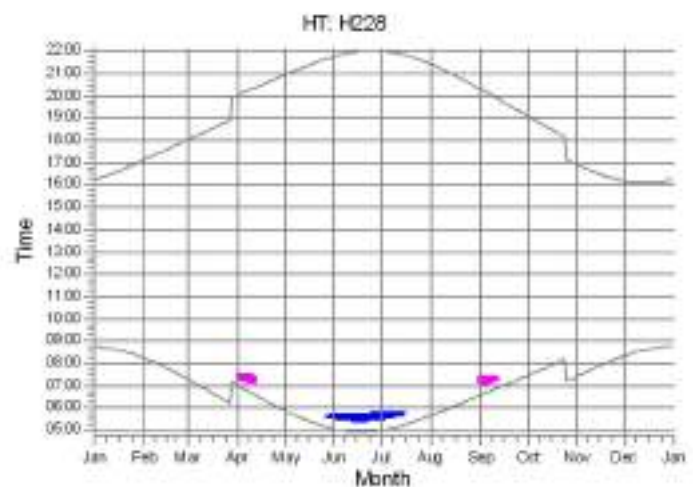
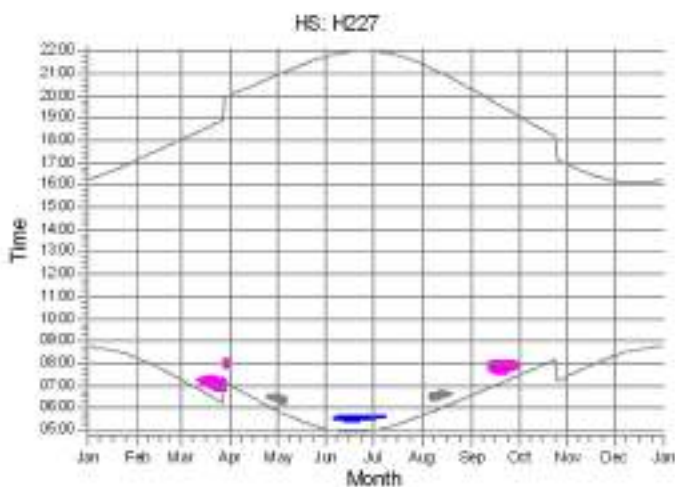
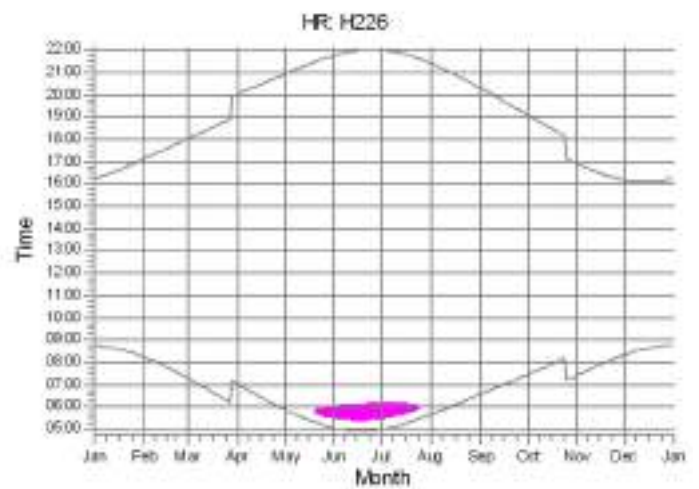
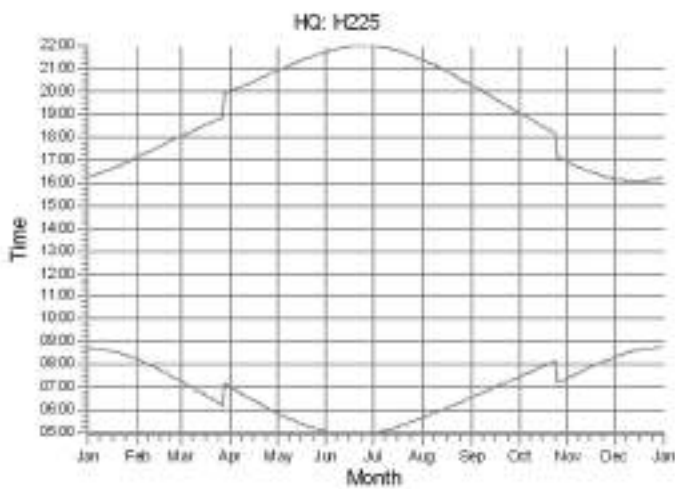
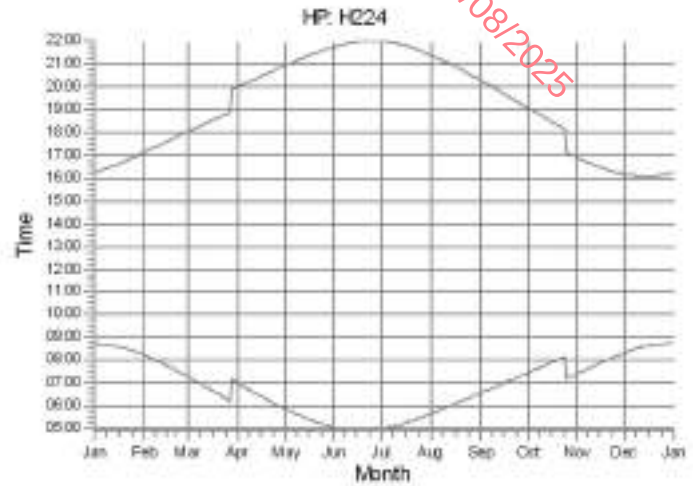
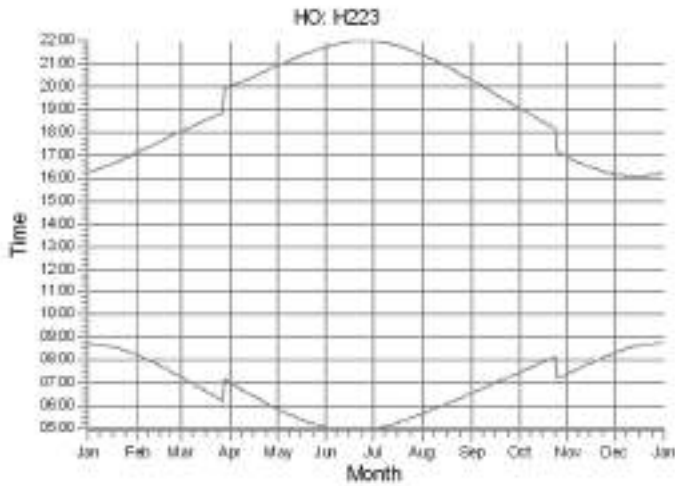
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

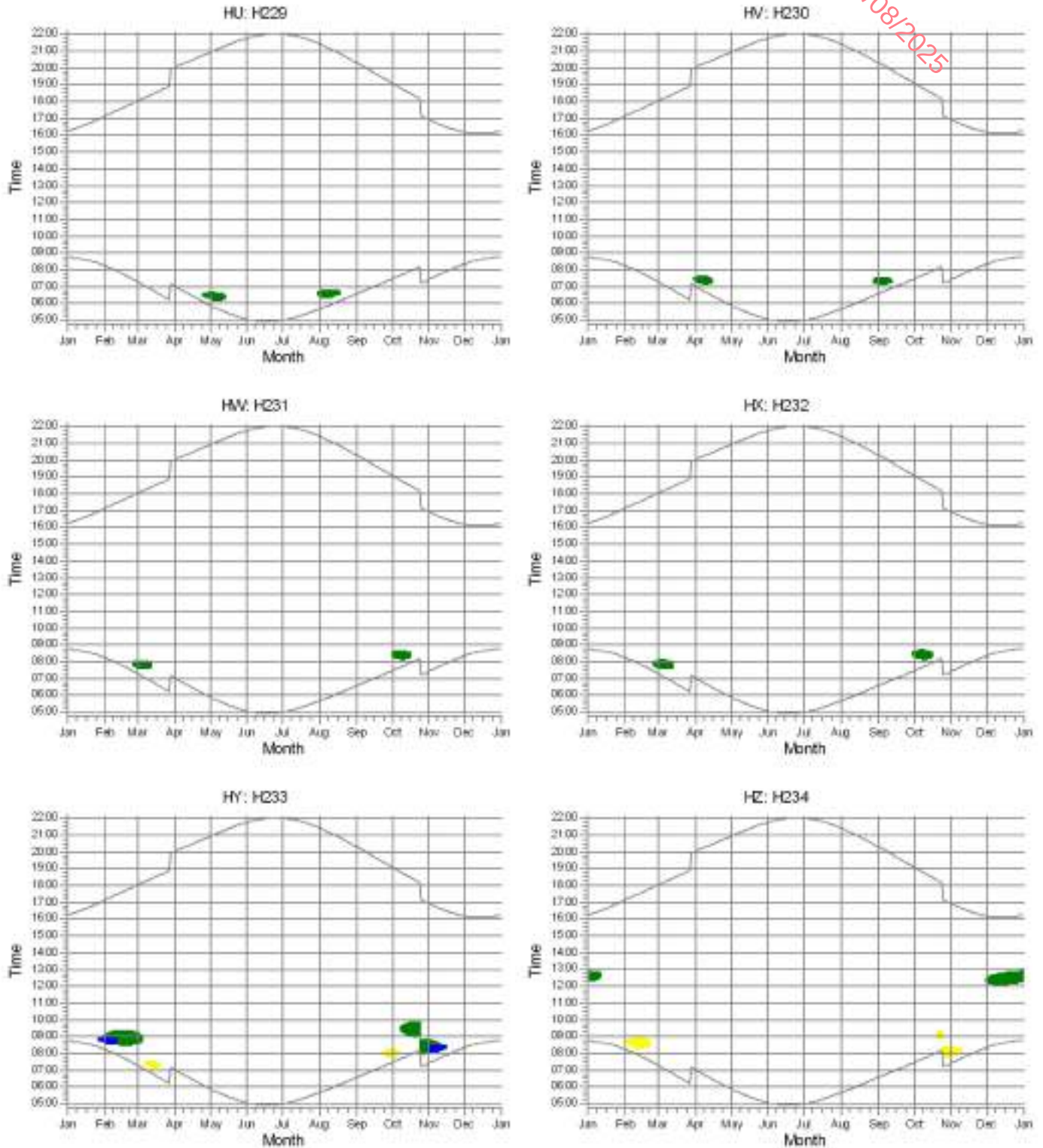


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

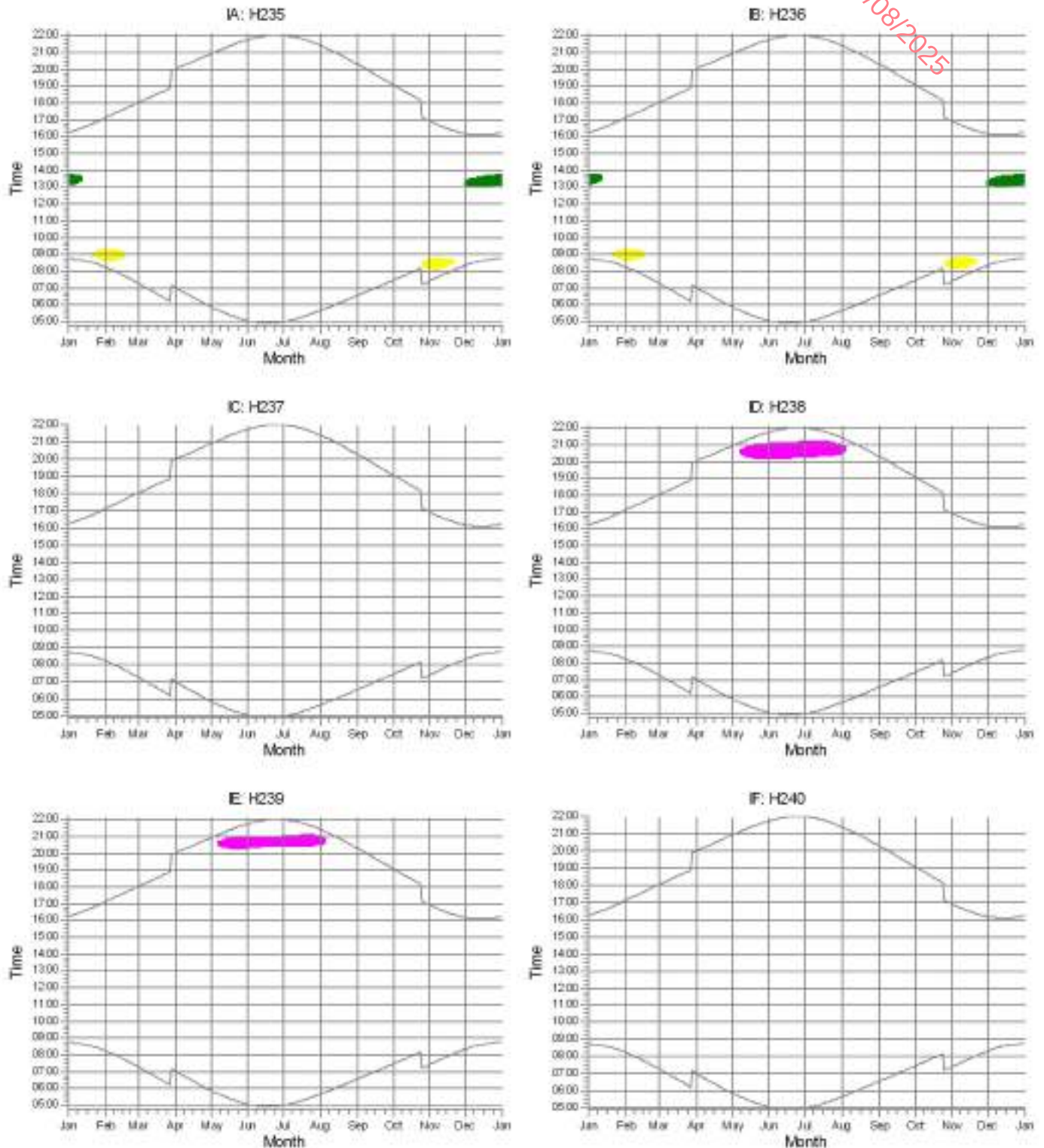


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

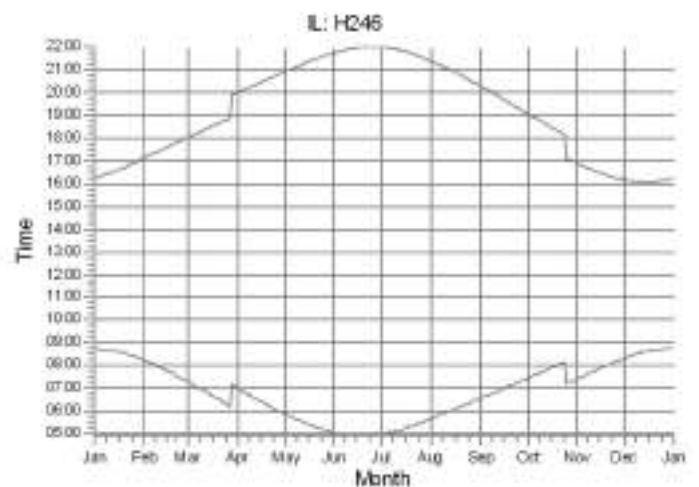
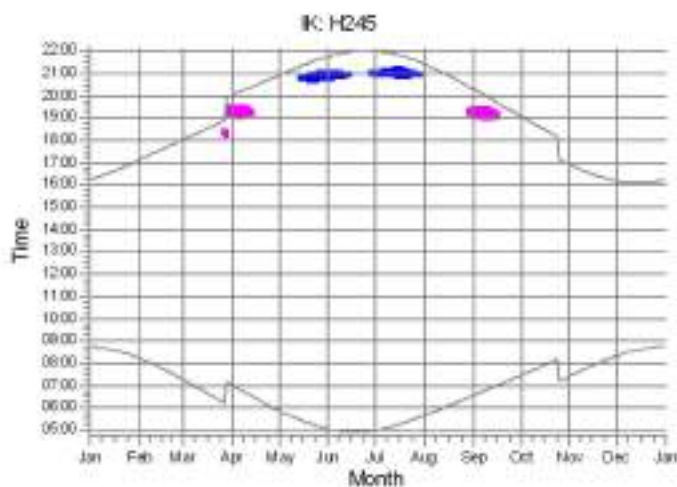
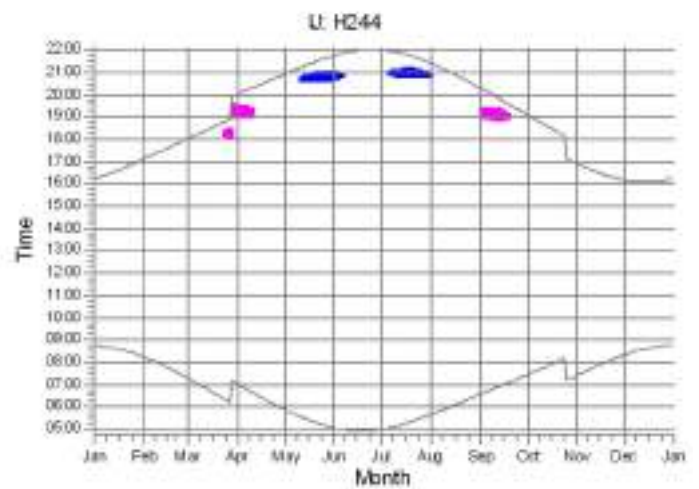
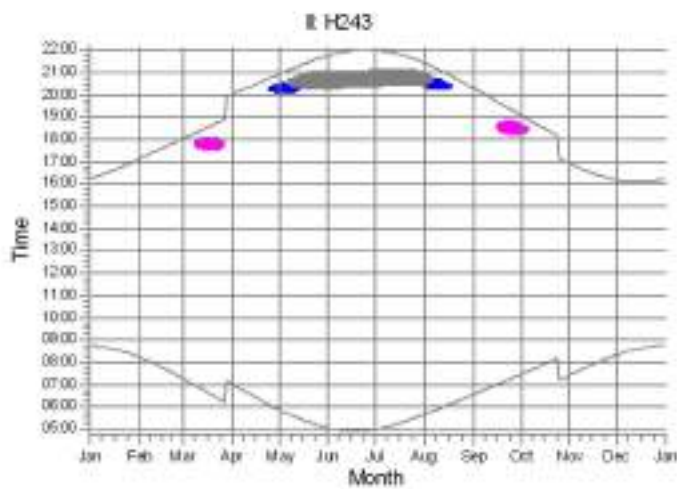
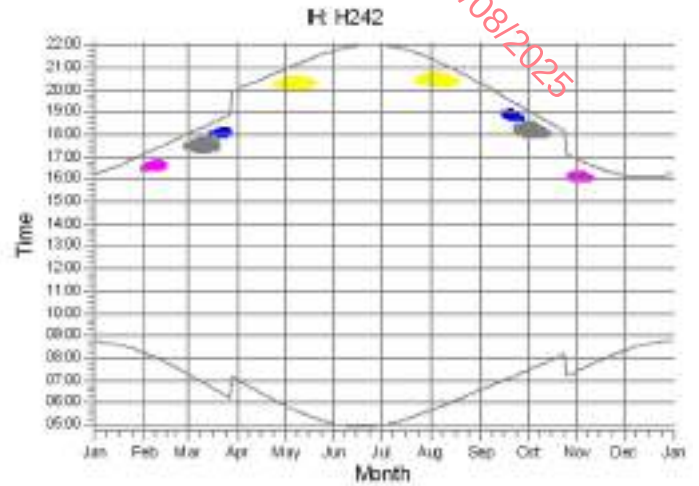
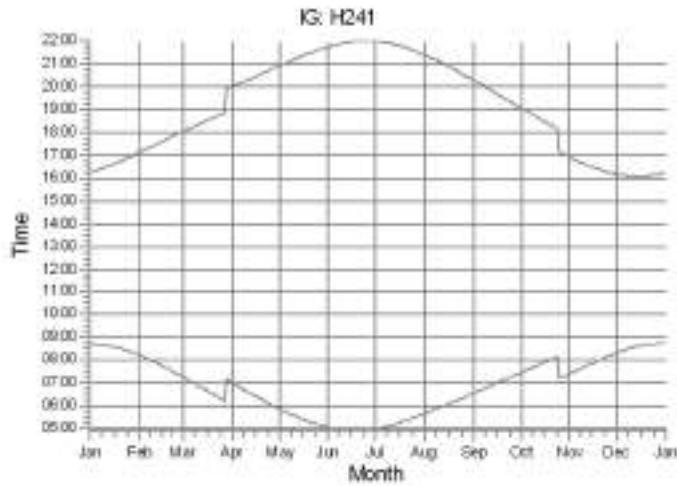


WTGs

1: T01 2: T02 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

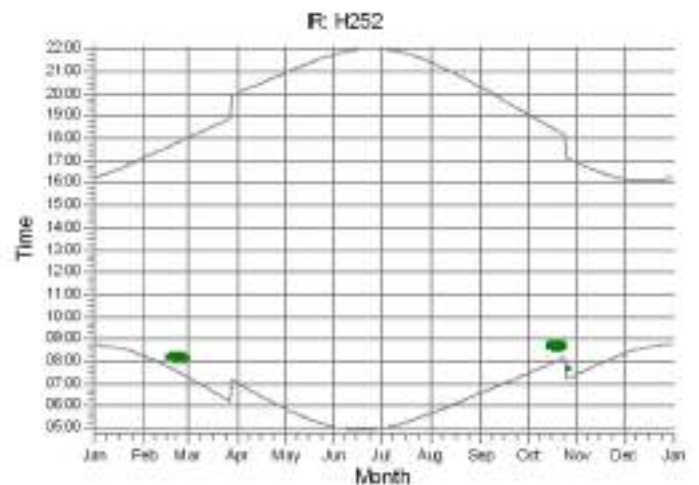
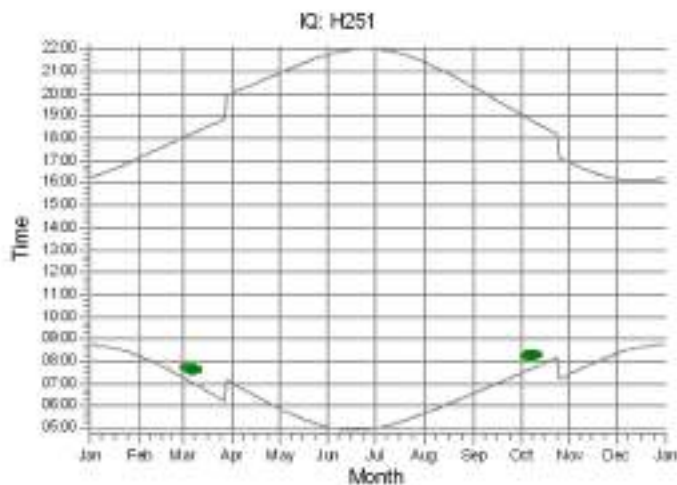
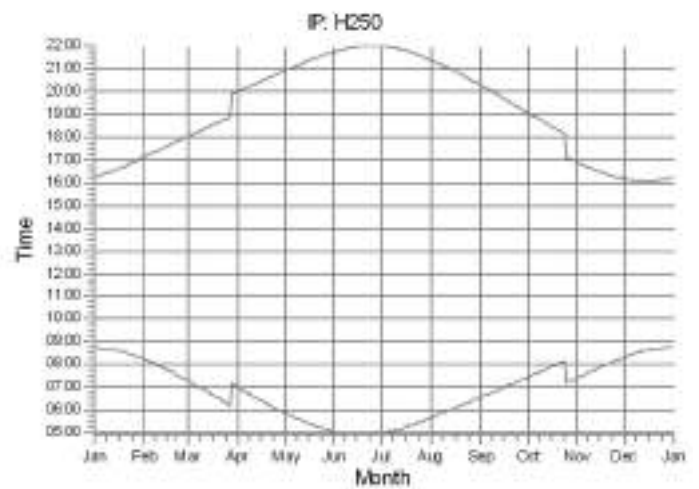
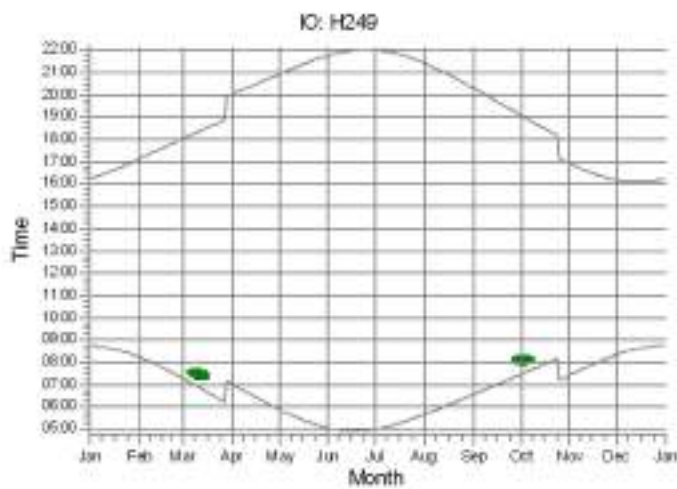
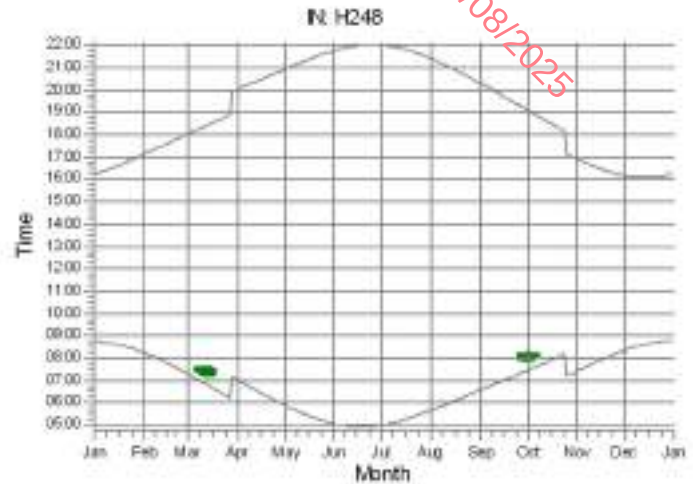
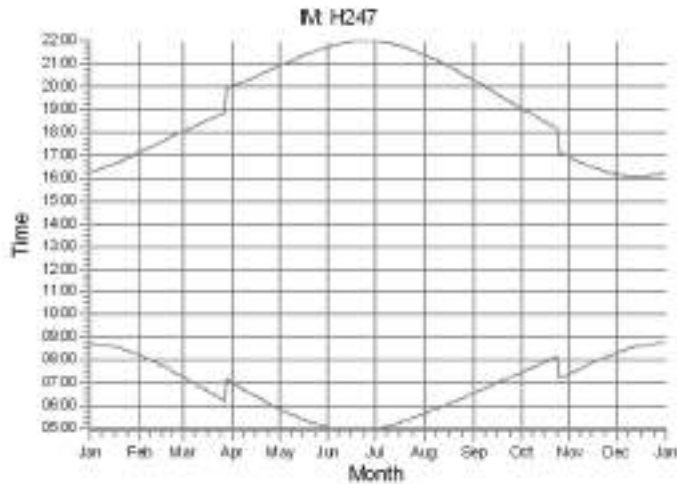


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

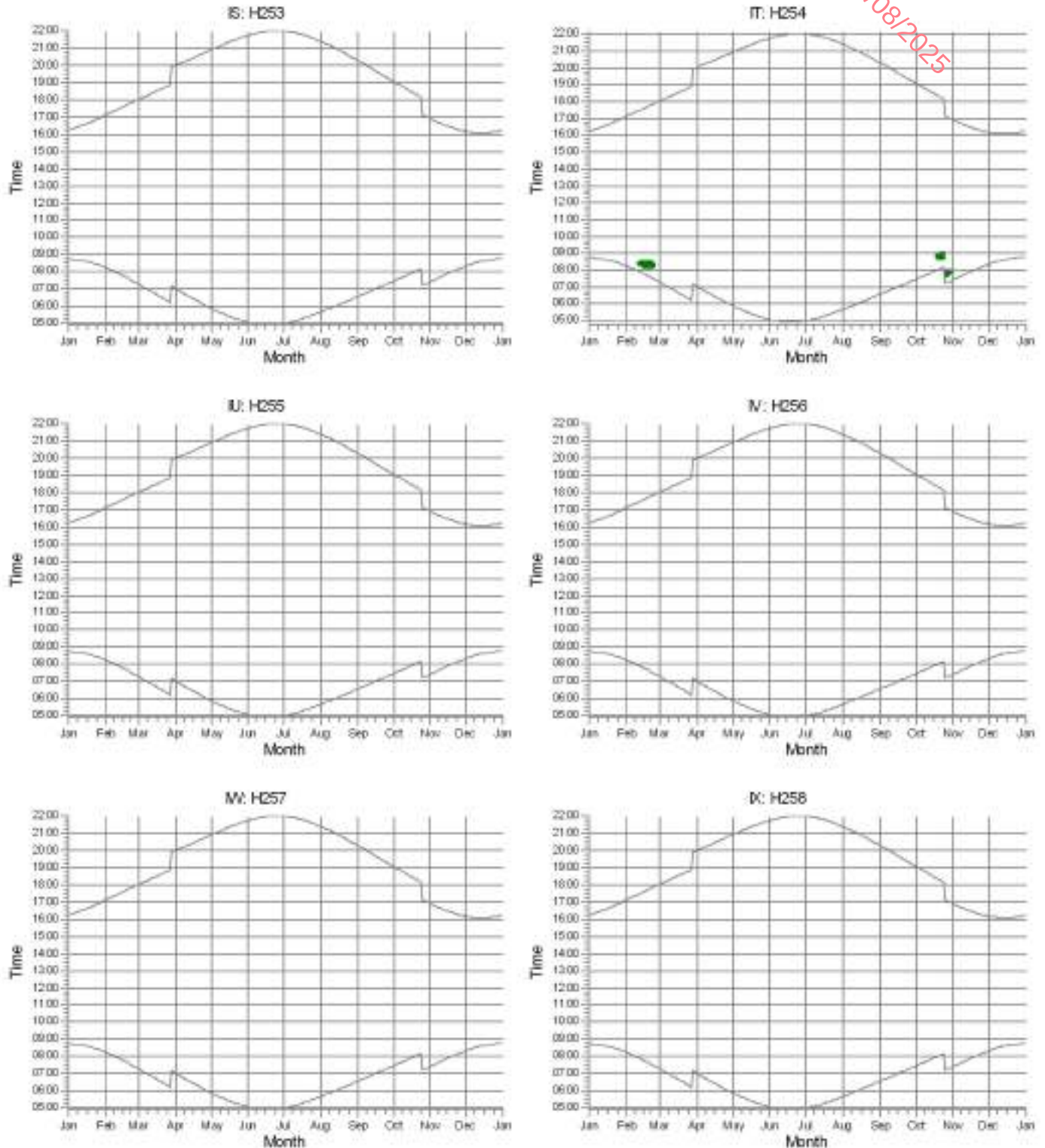


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

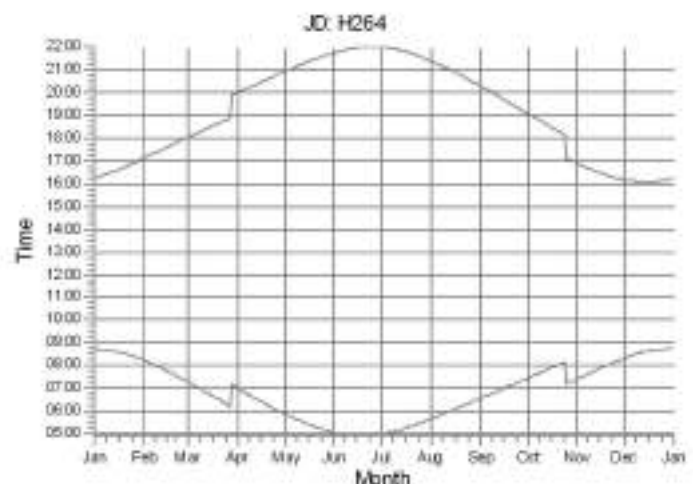
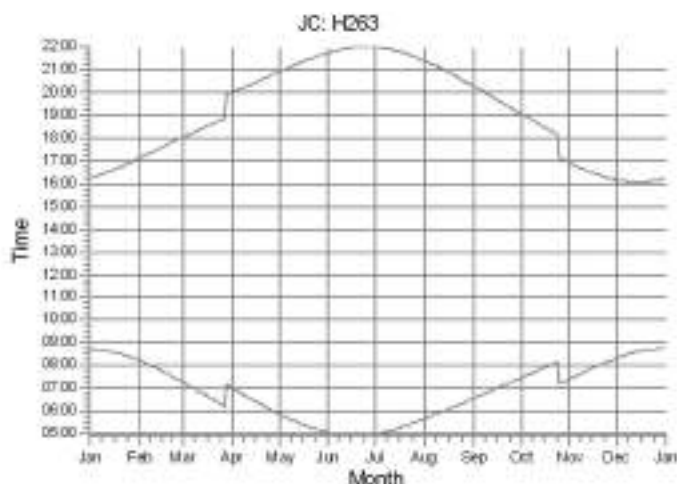
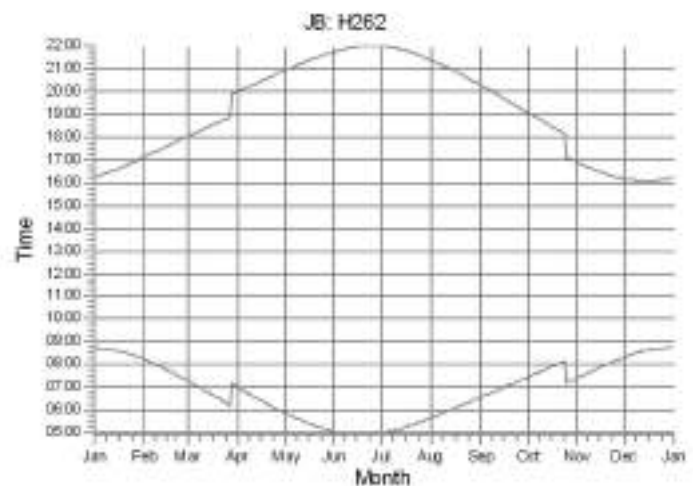
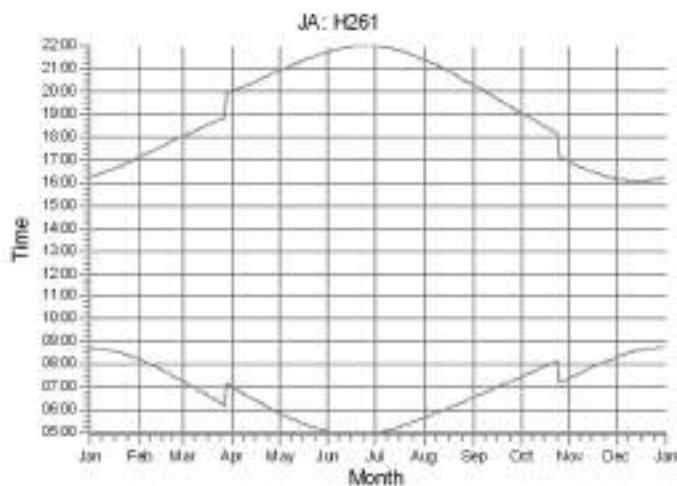
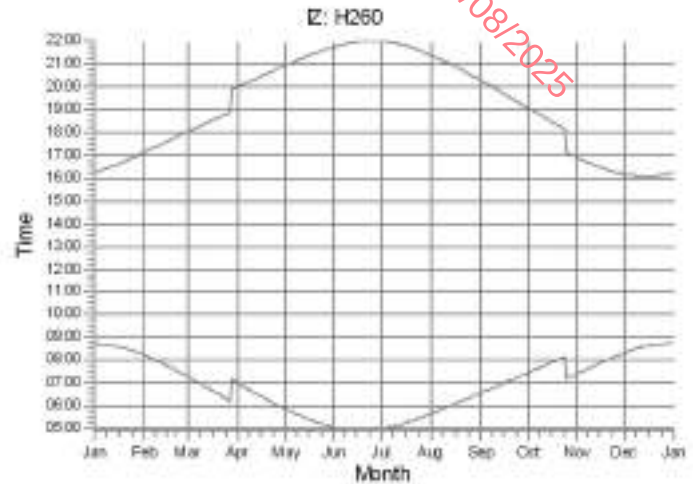
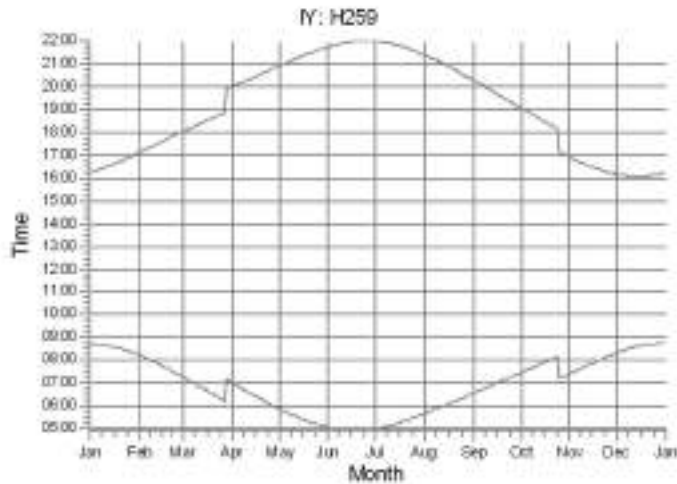


WTGs

1: T01

SHADOW - Calendar, graphical

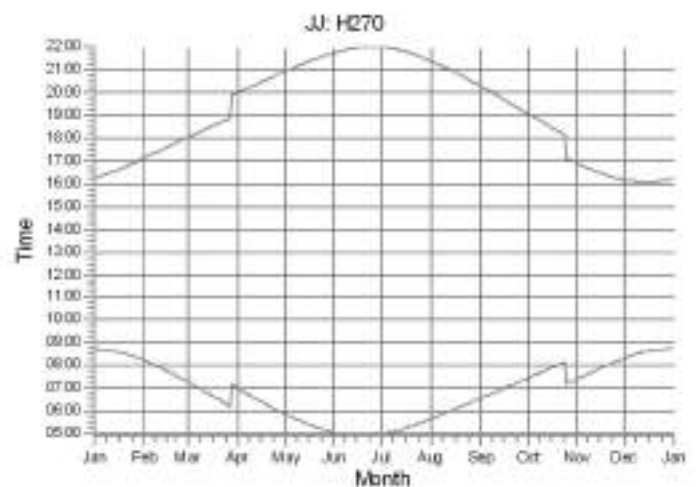
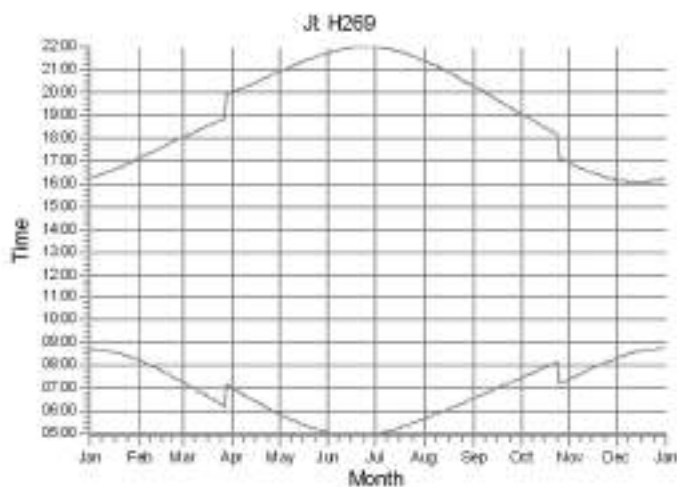
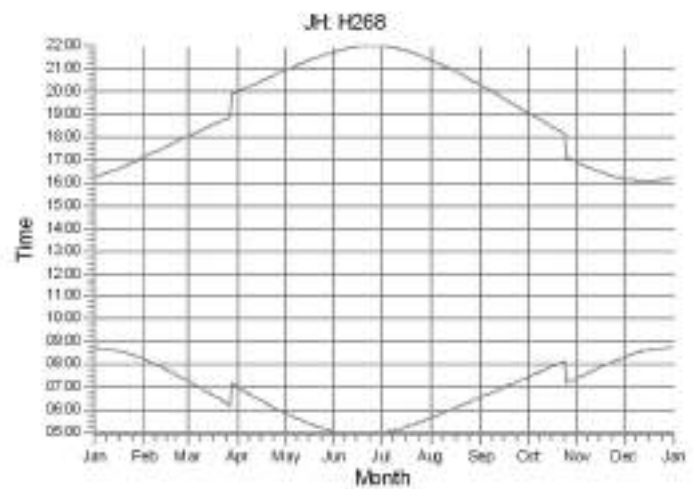
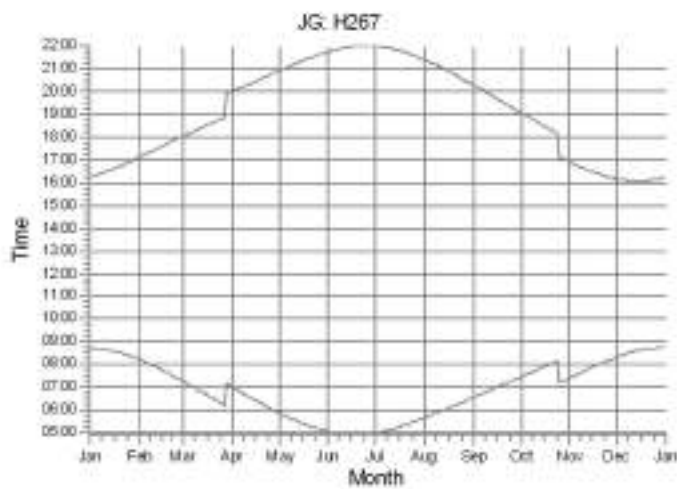
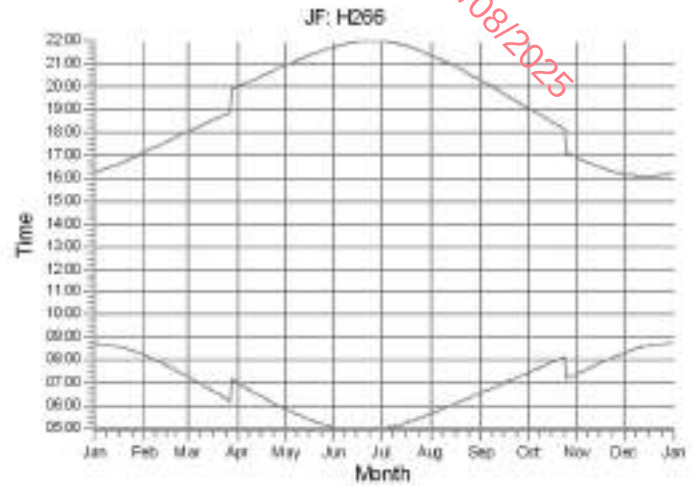
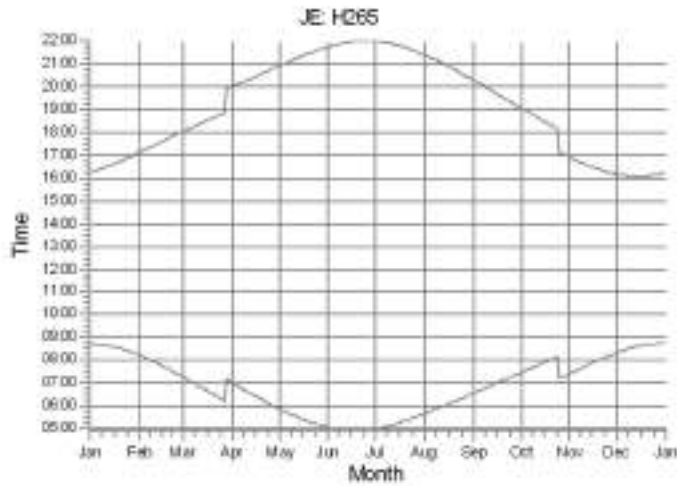
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

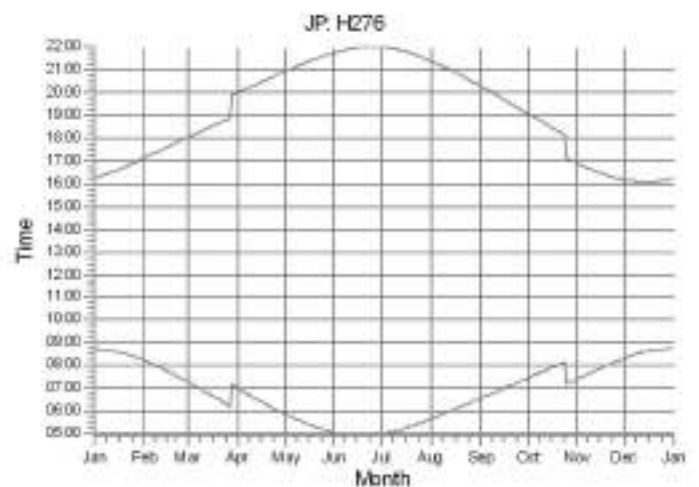
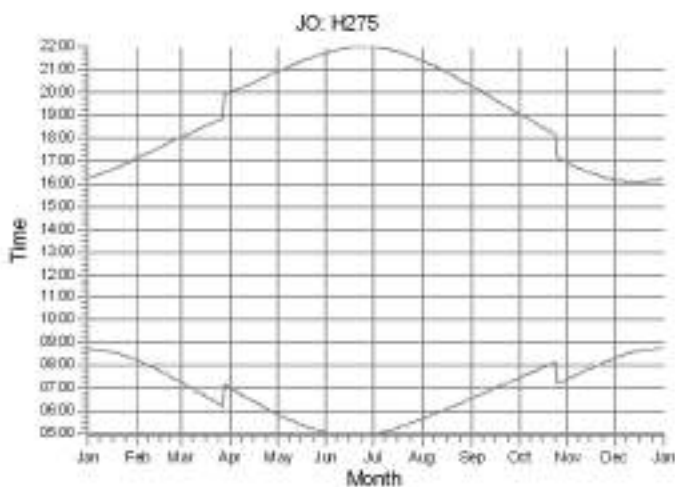
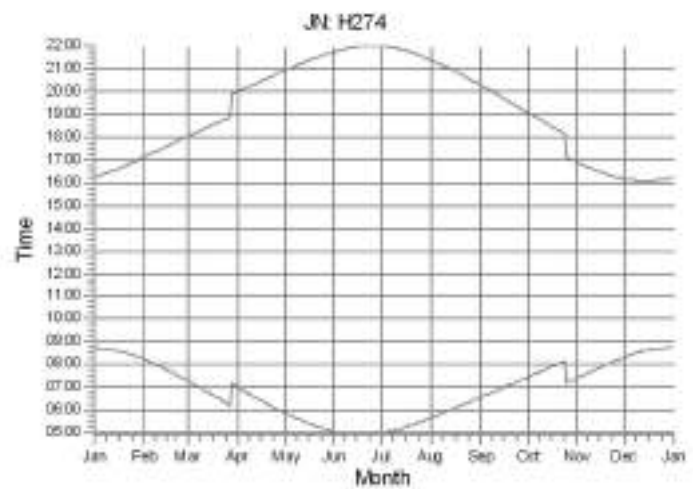
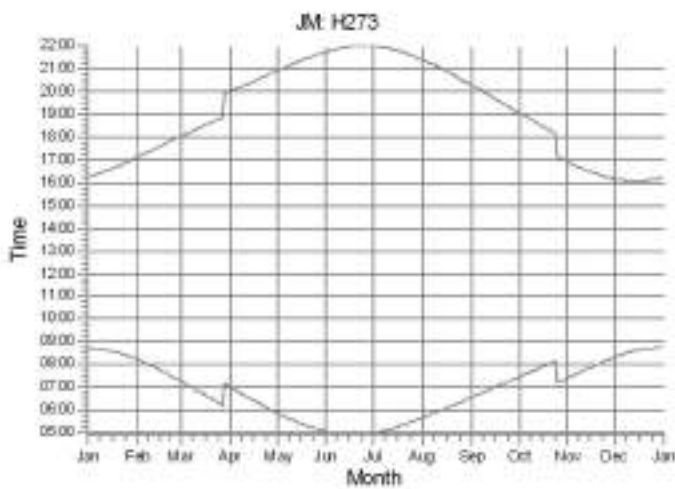
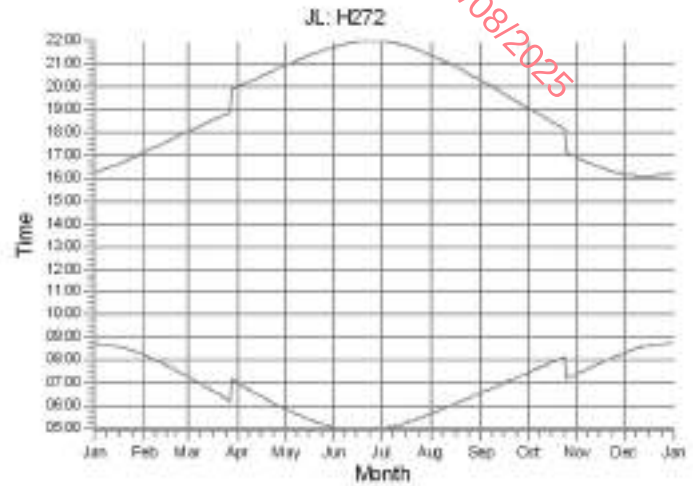
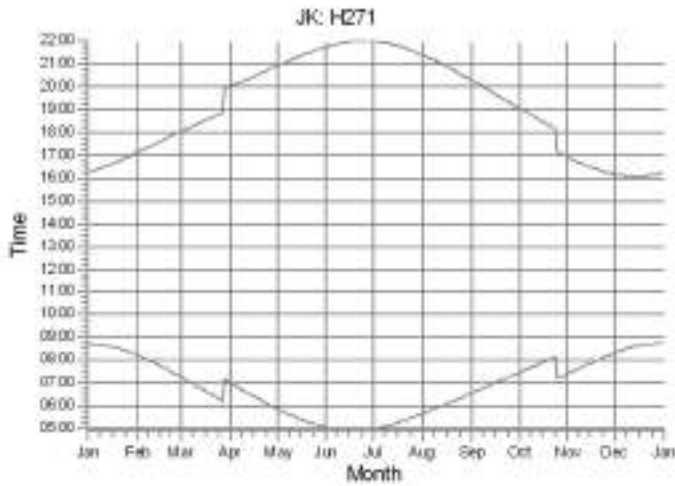
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

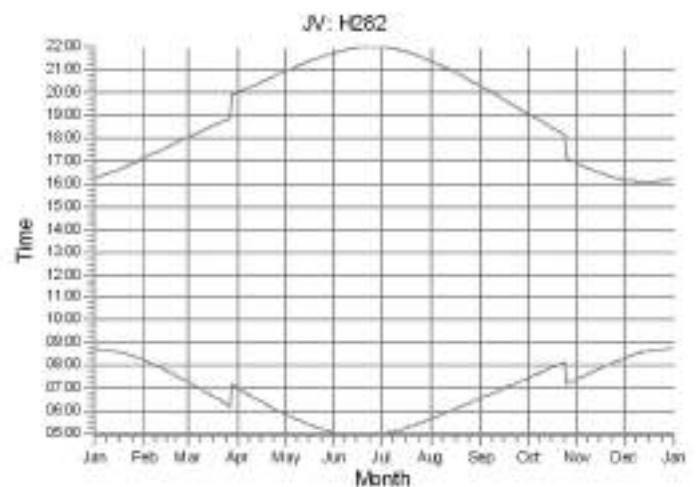
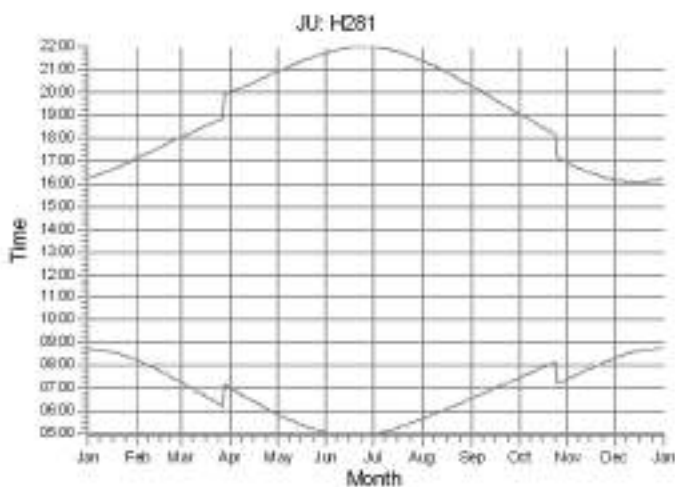
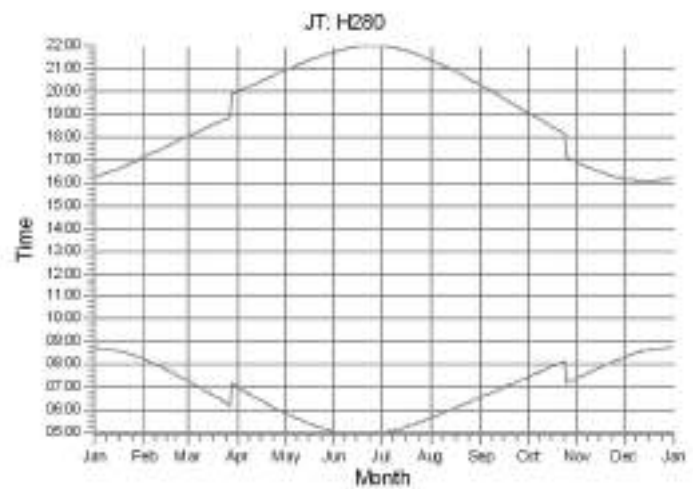
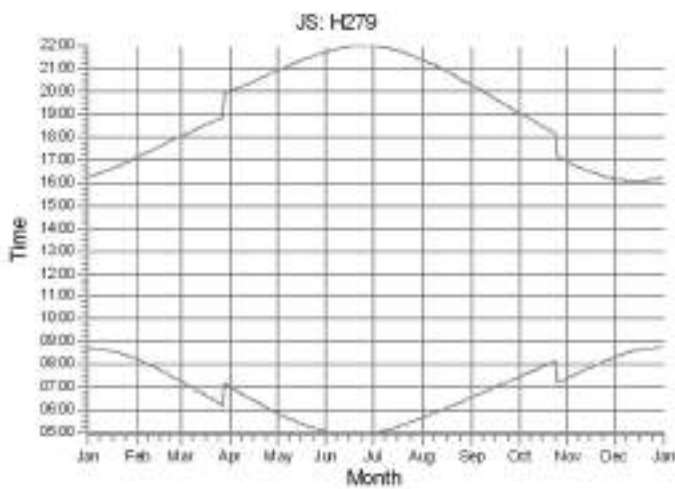
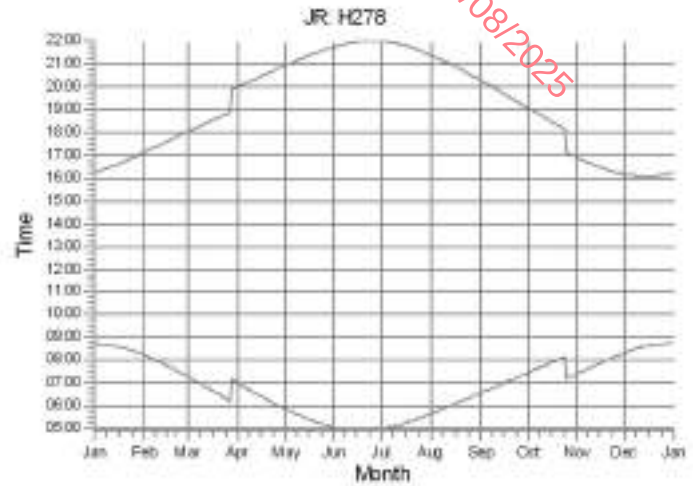
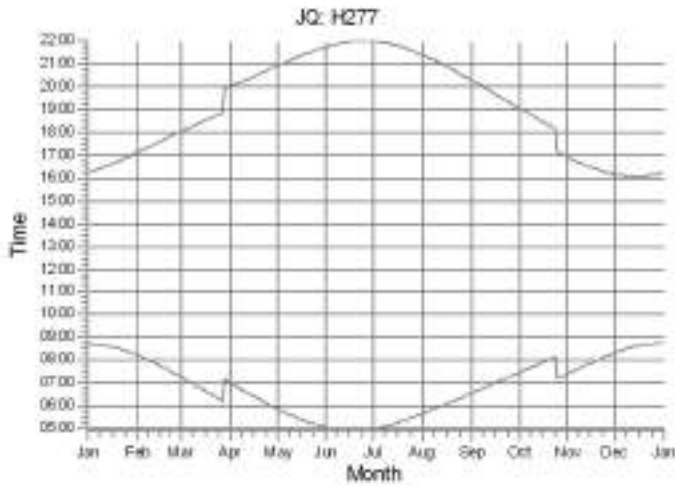
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

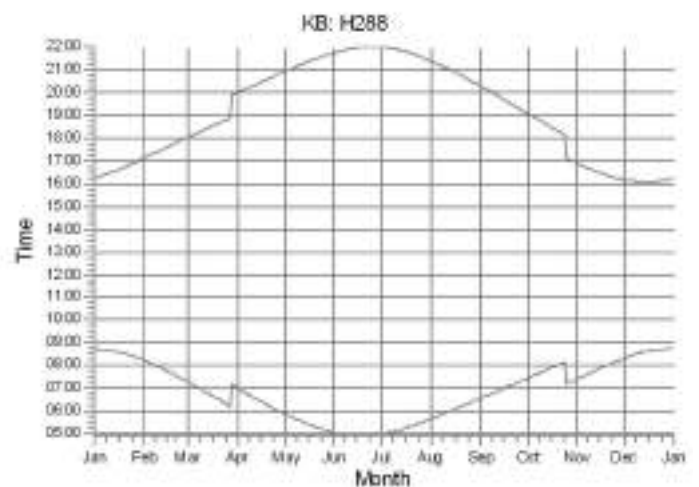
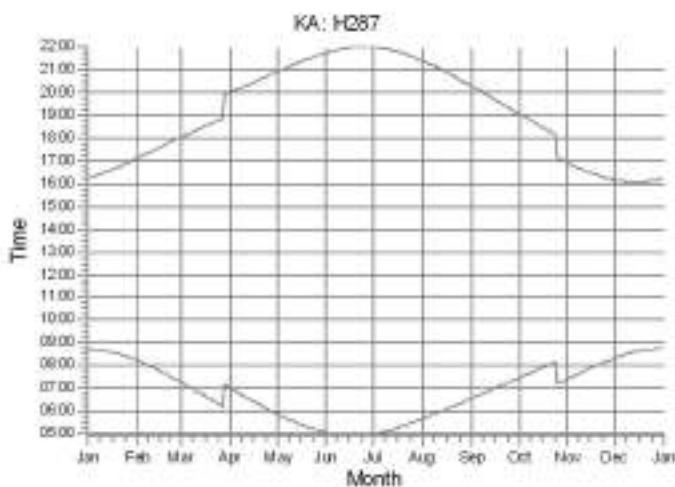
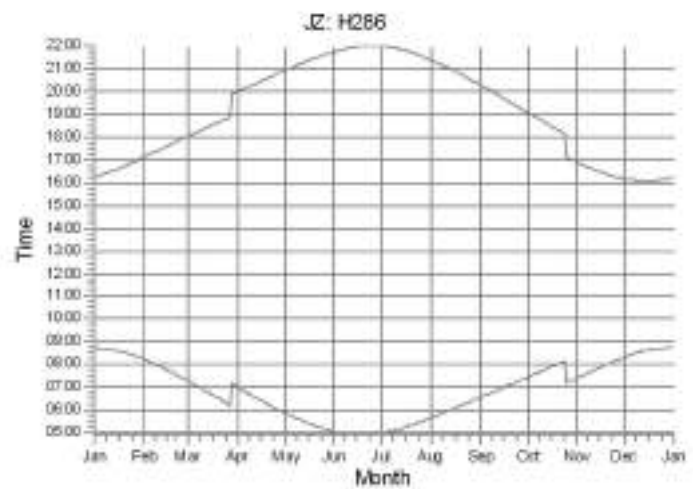
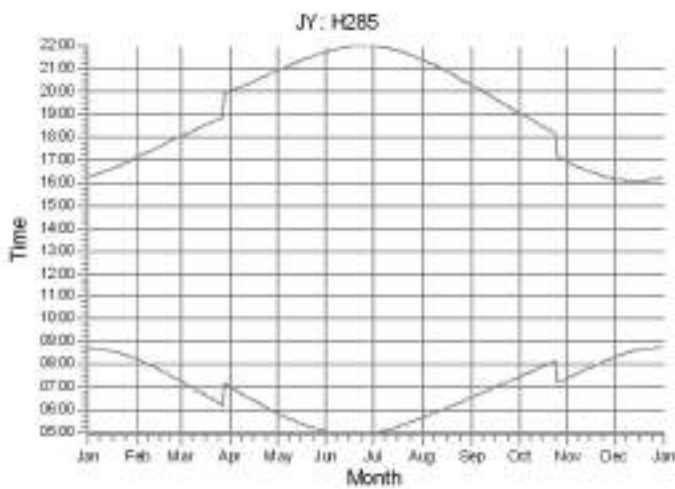
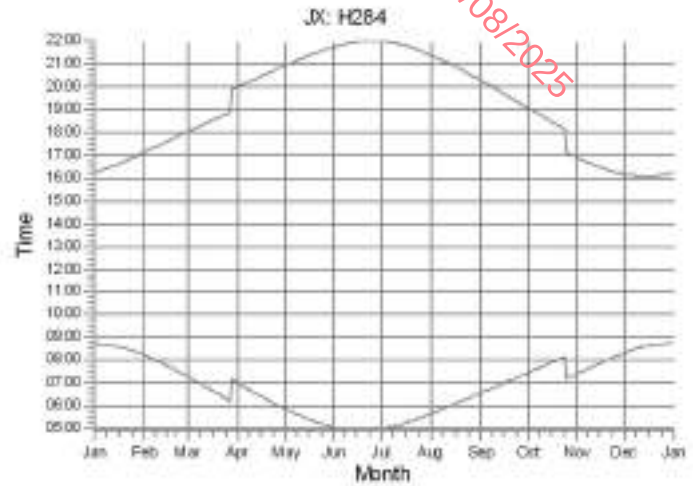
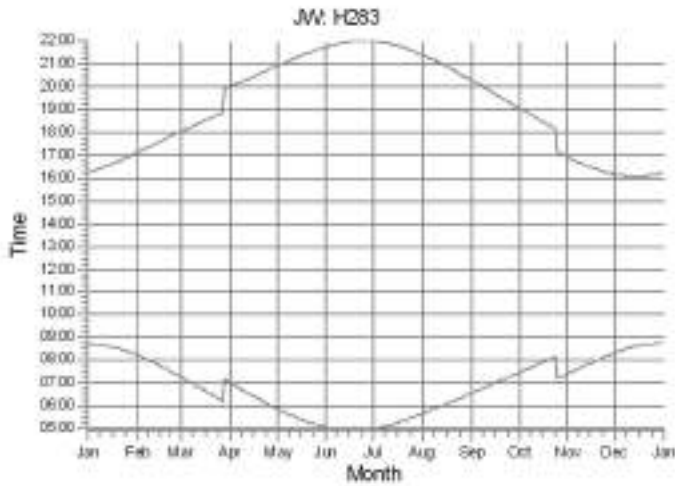
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

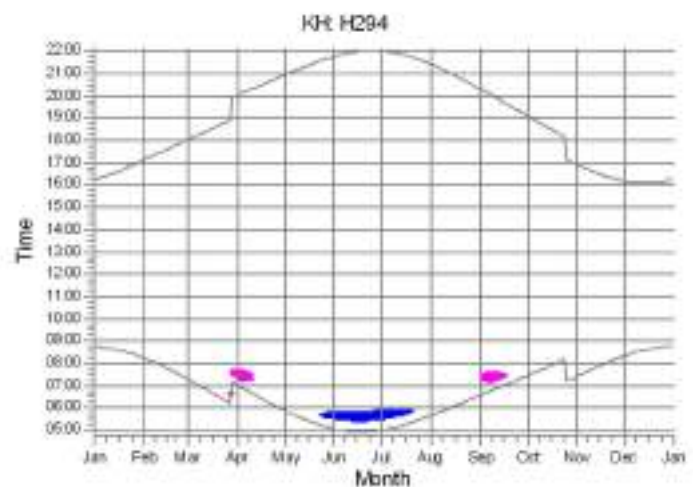
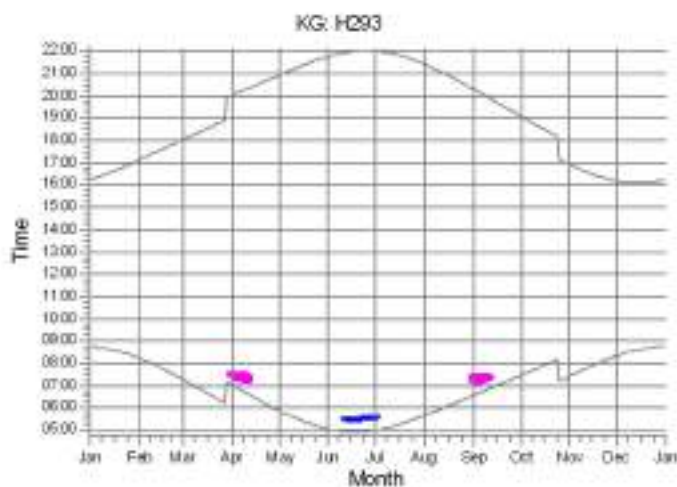
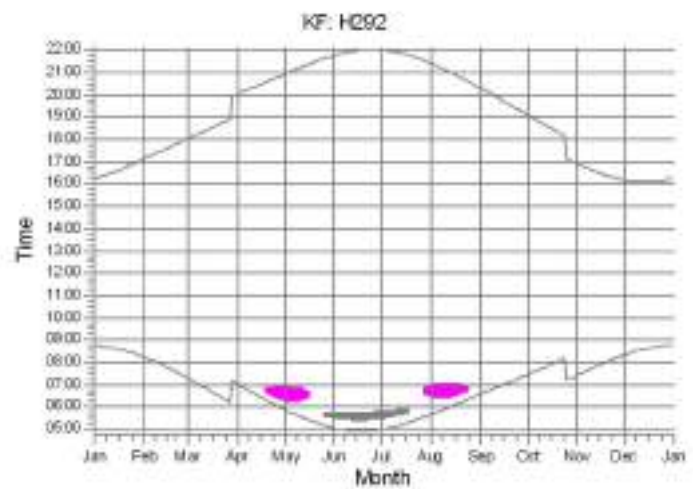
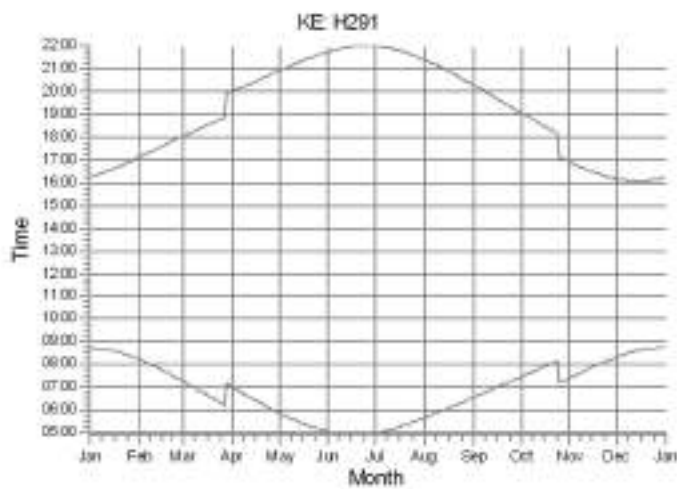
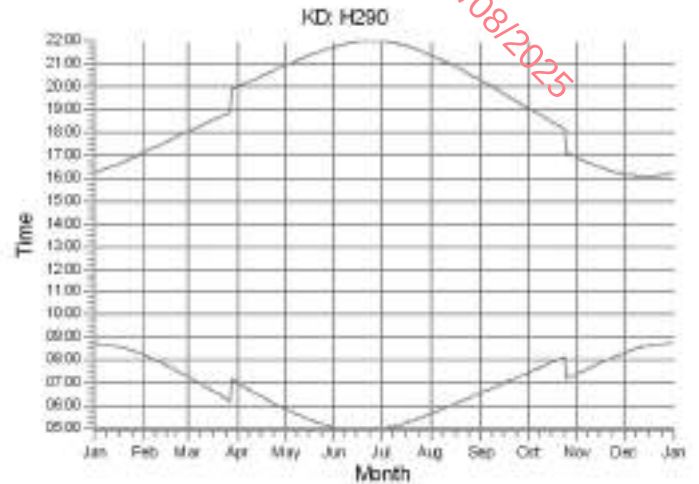
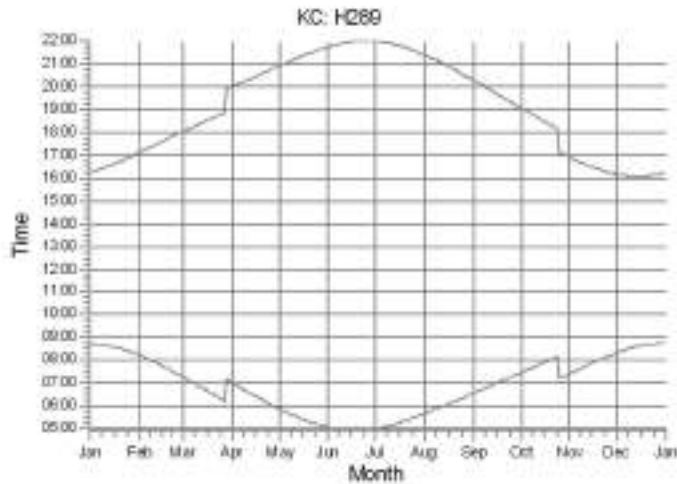
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

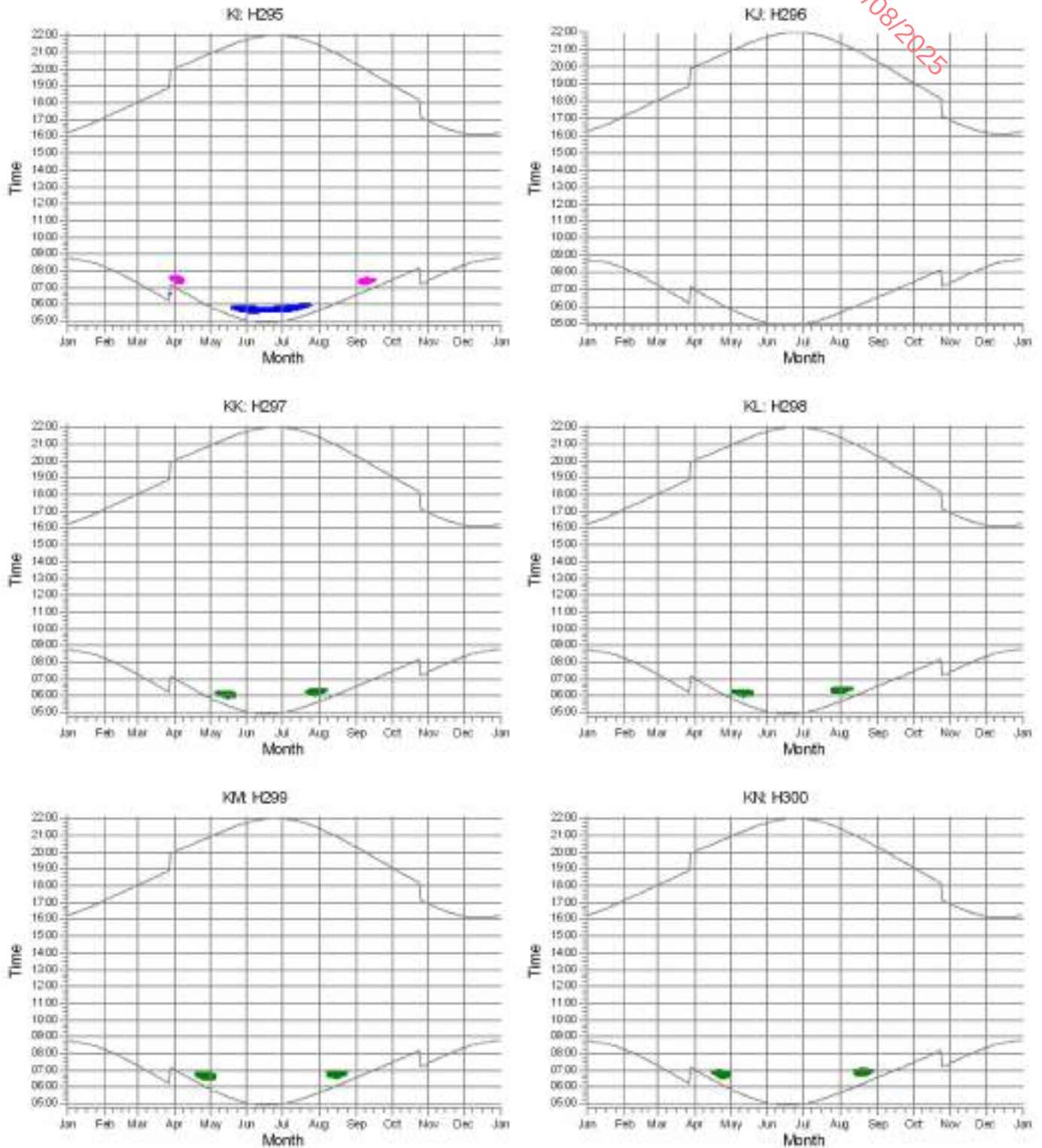


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

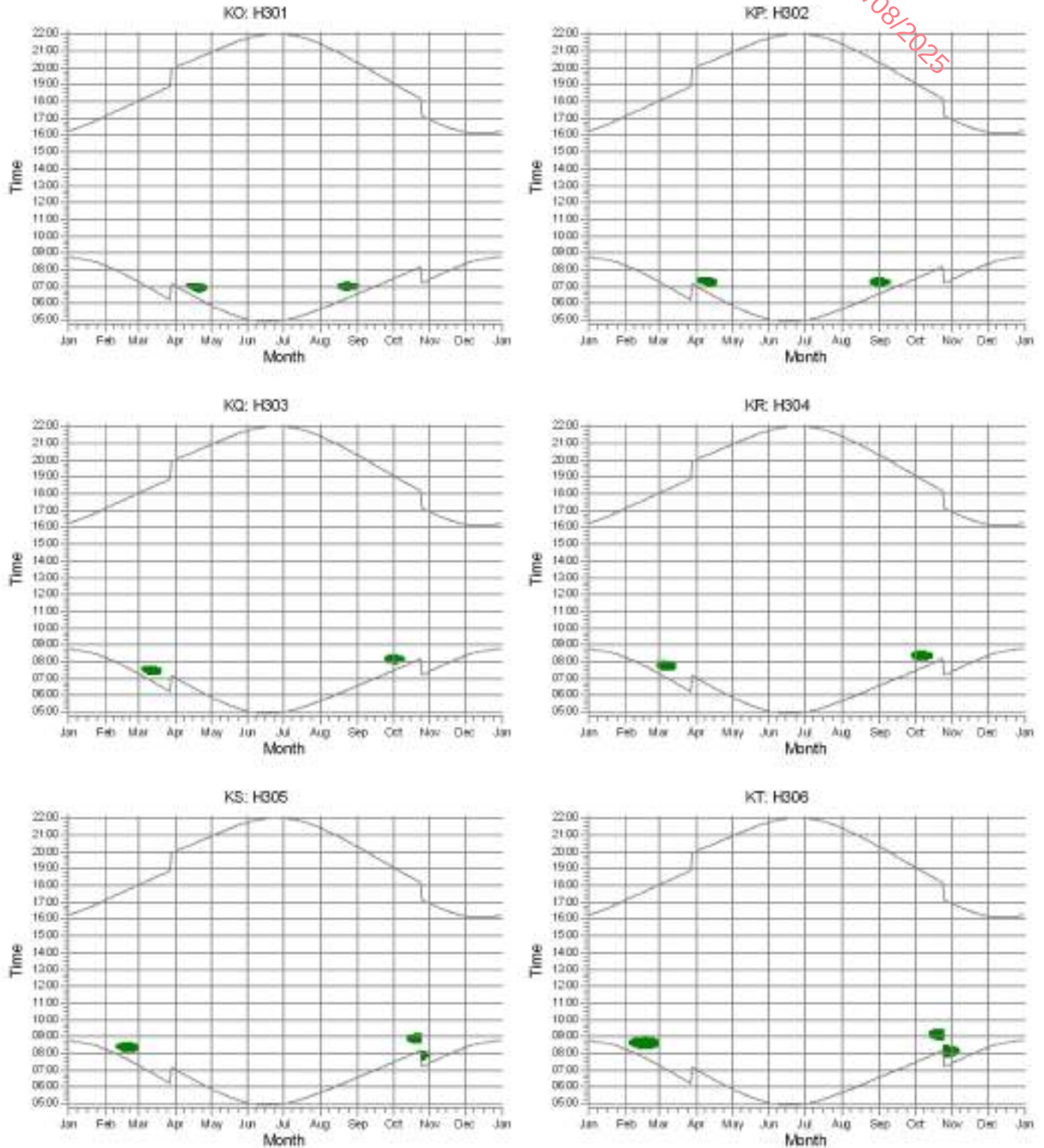


WTGs

1: T01 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

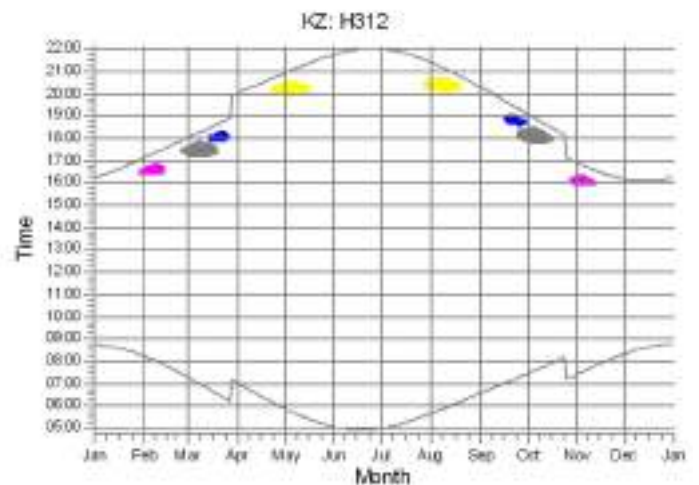
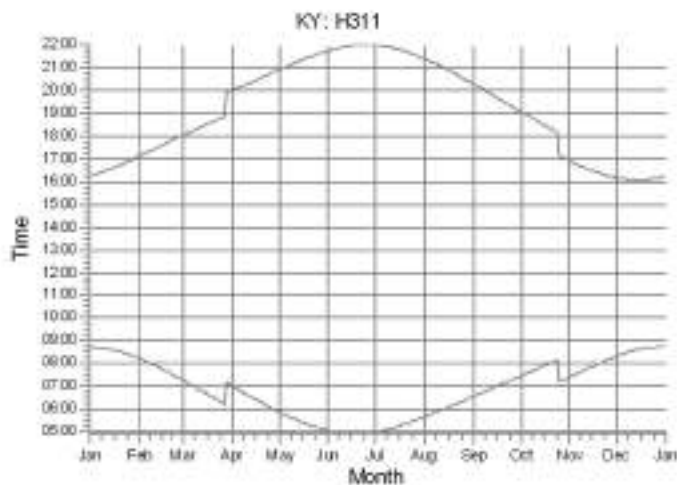
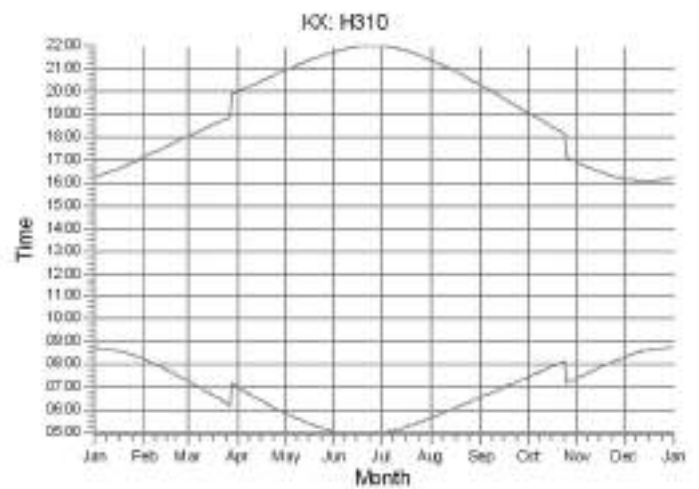
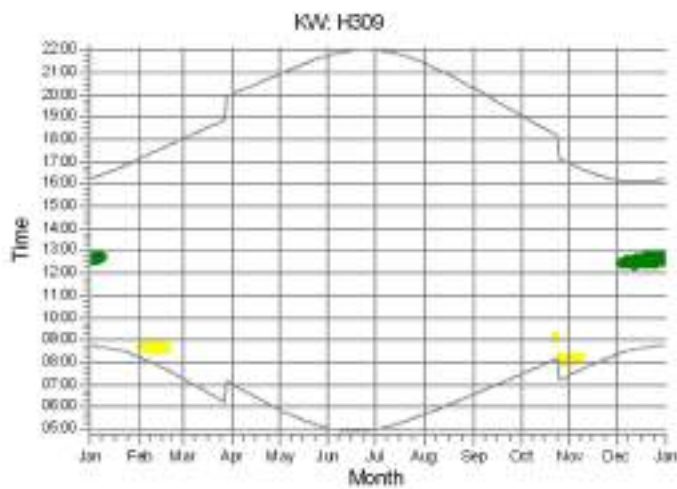
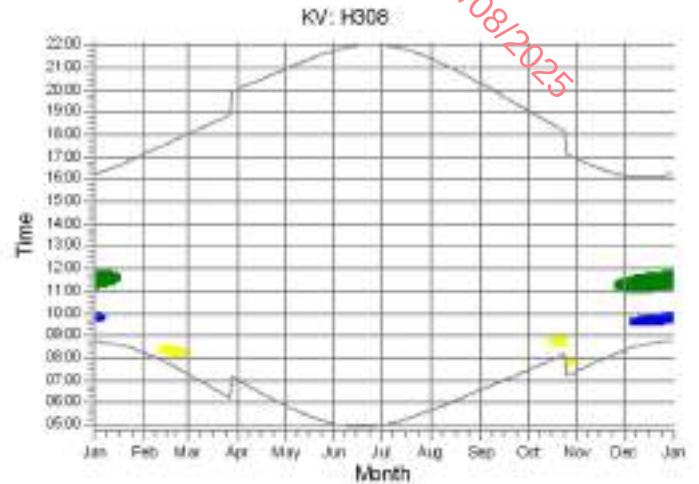
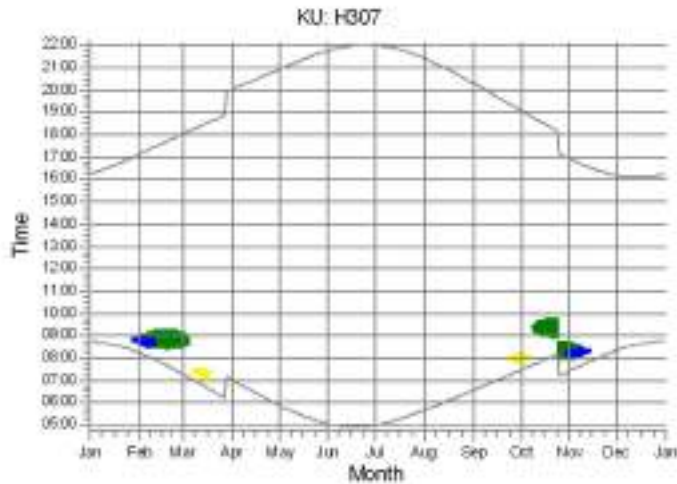


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

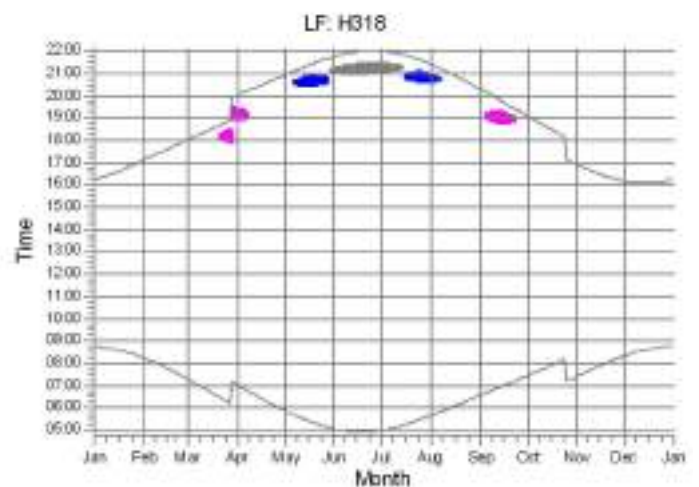
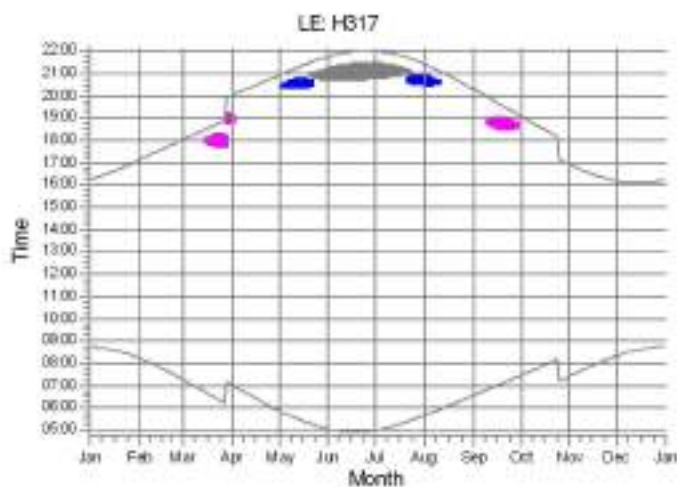
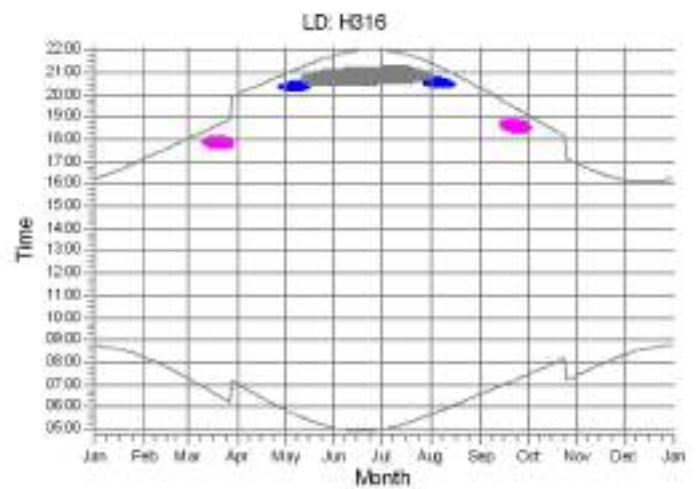
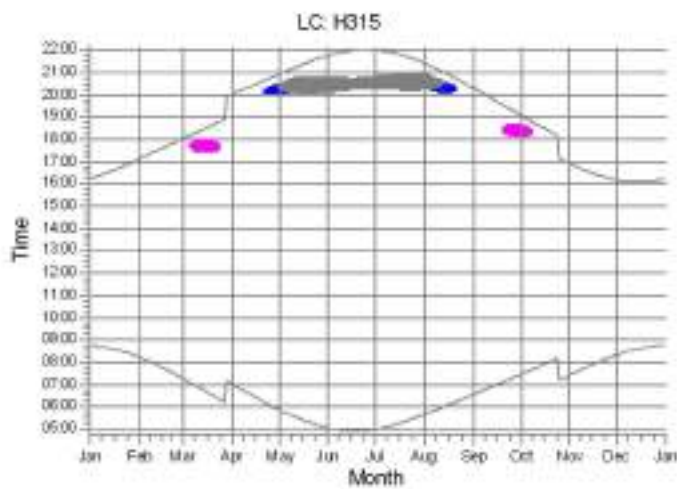
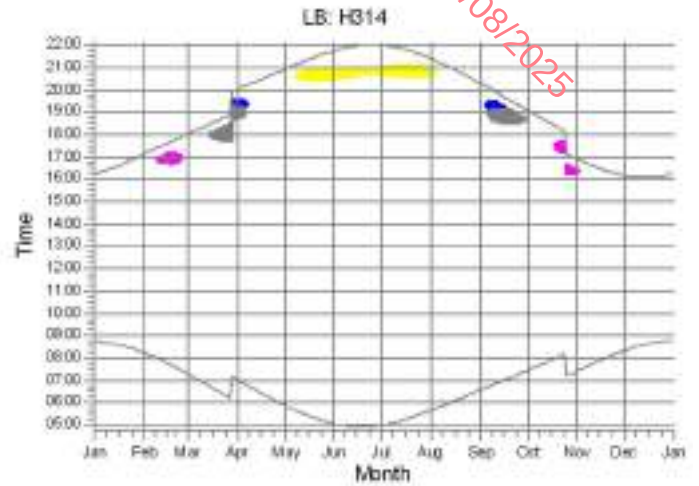
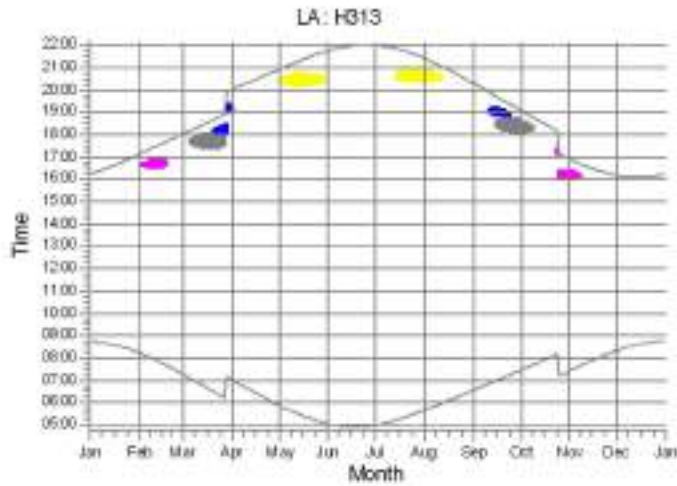


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

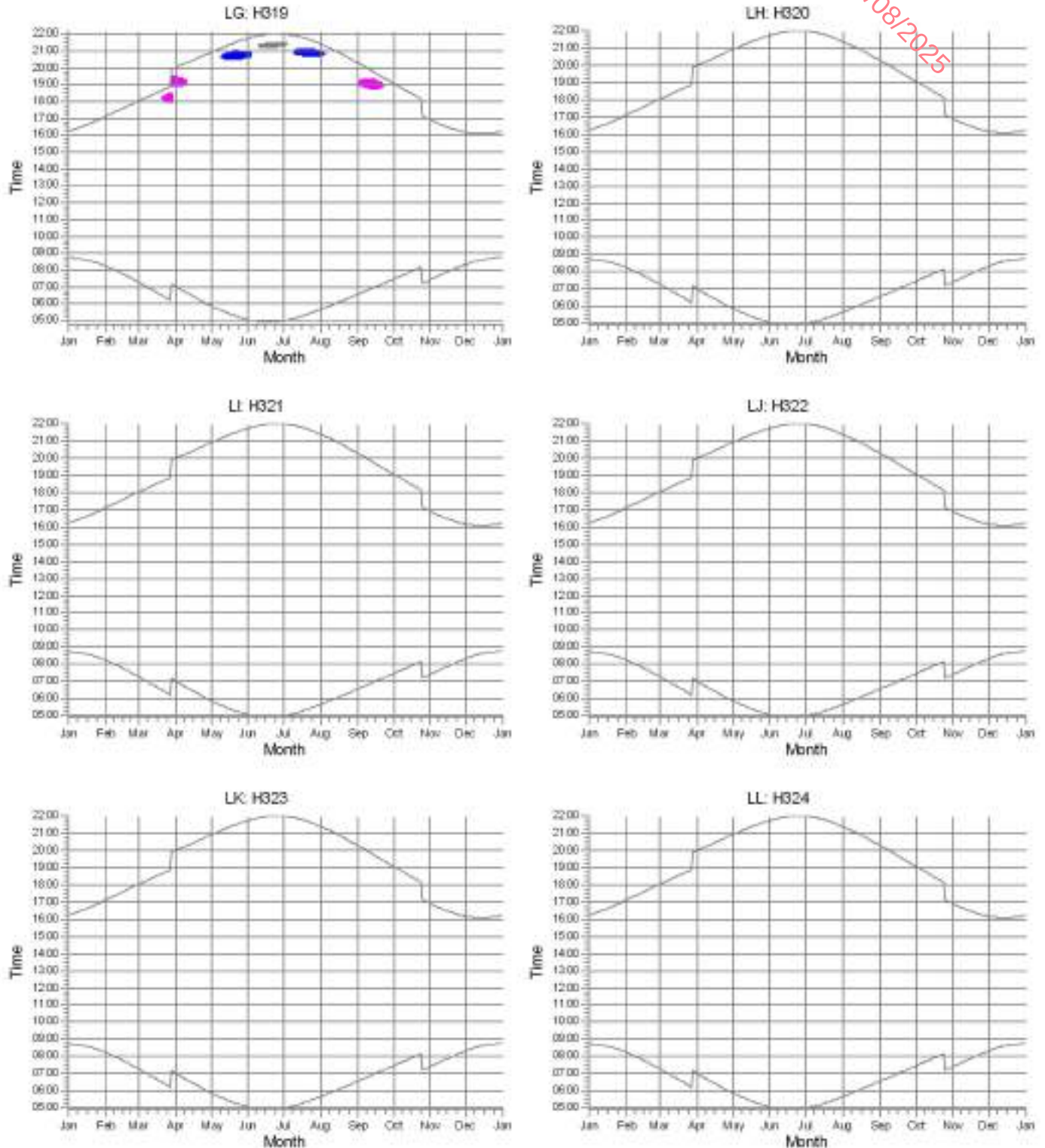


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

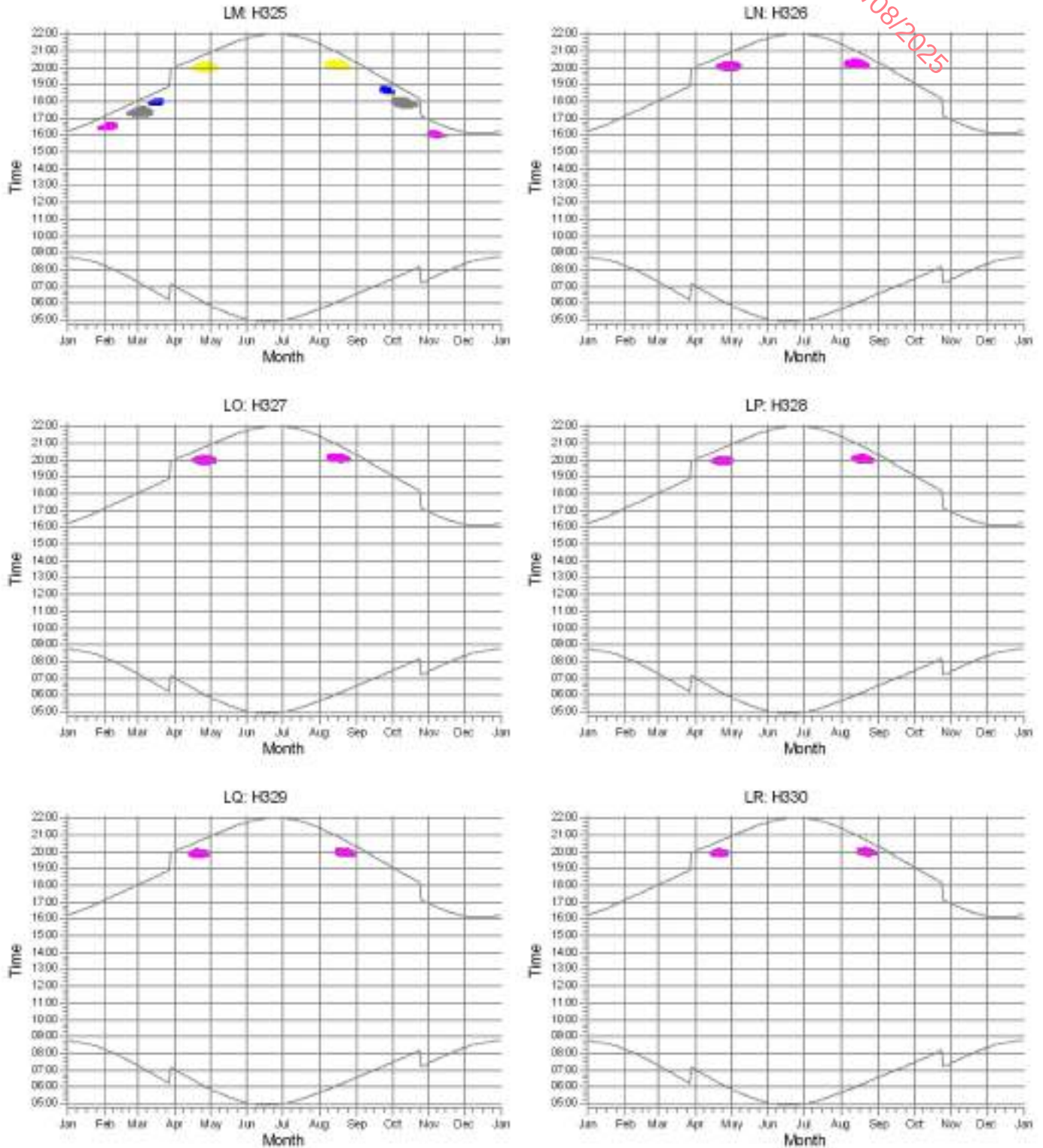


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

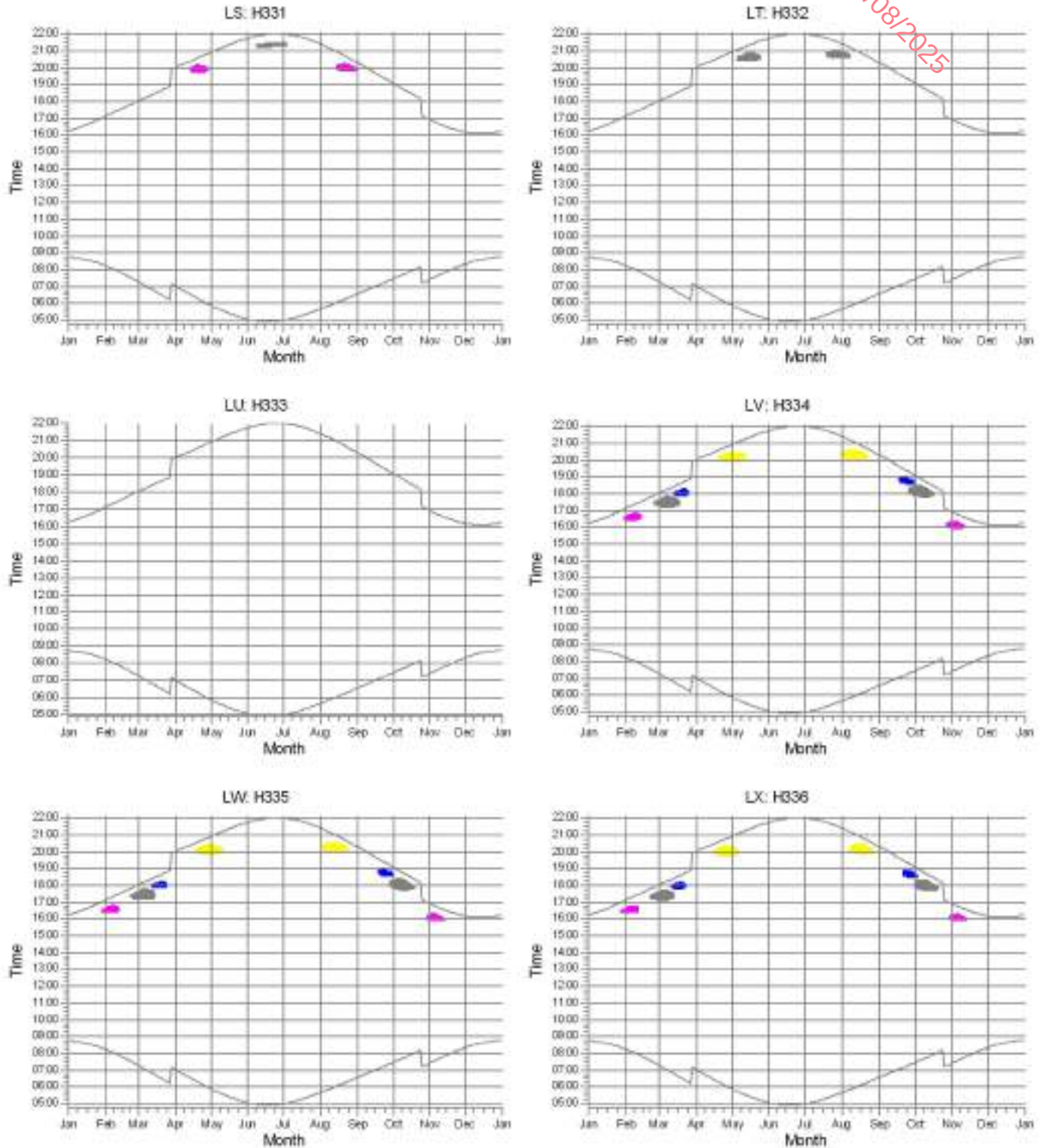


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

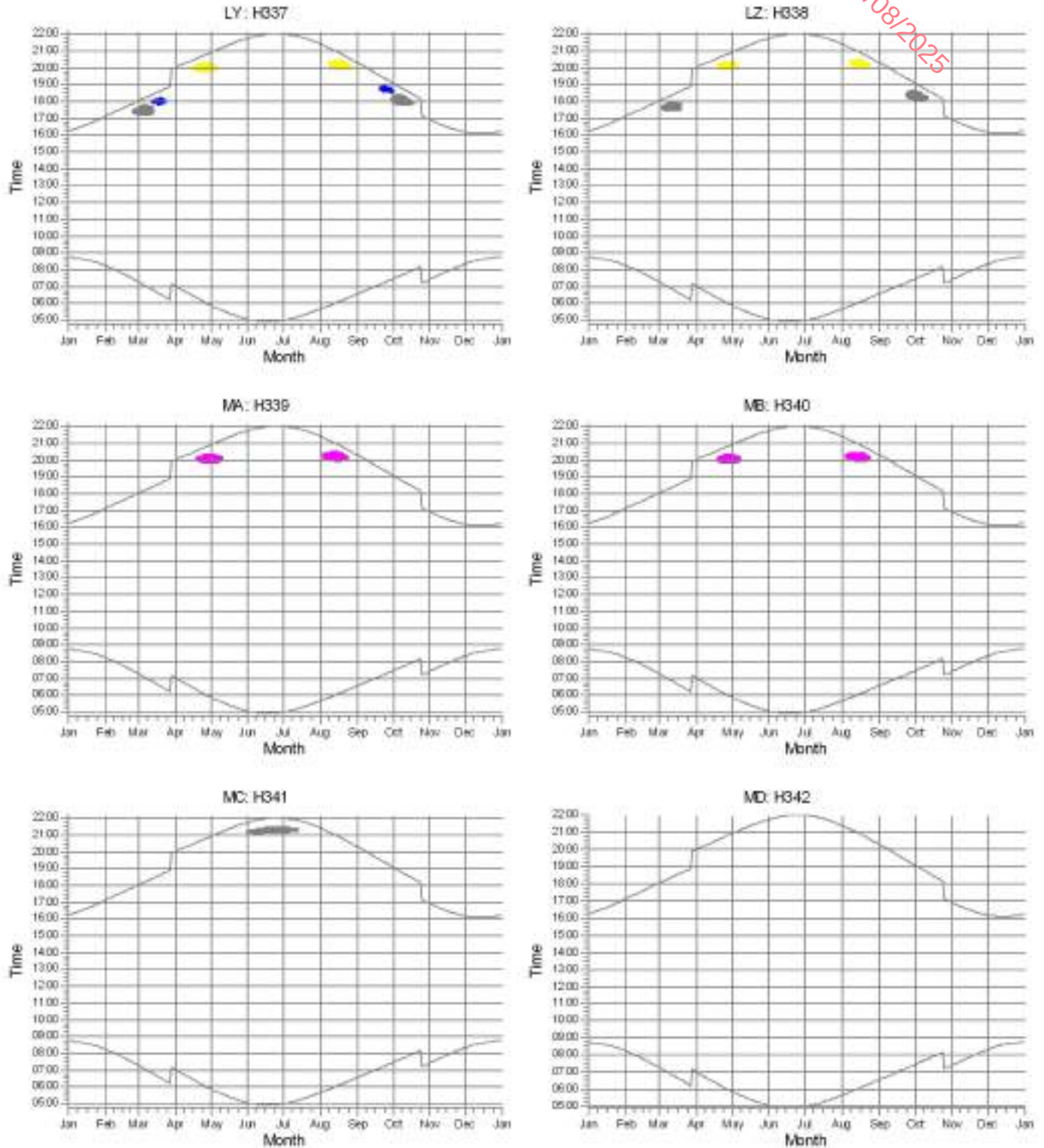


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

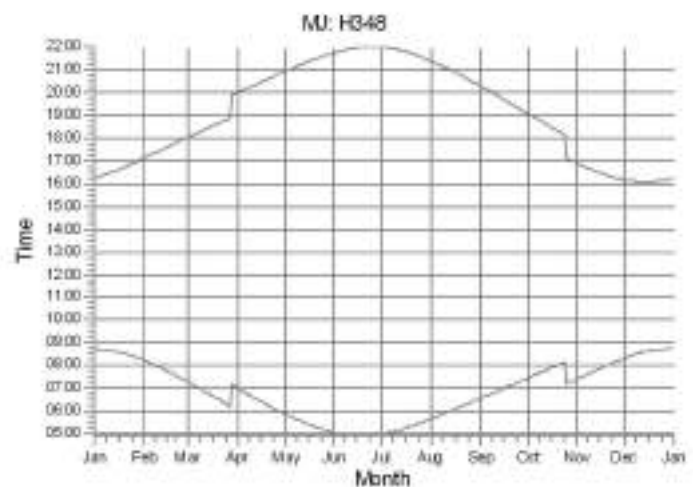
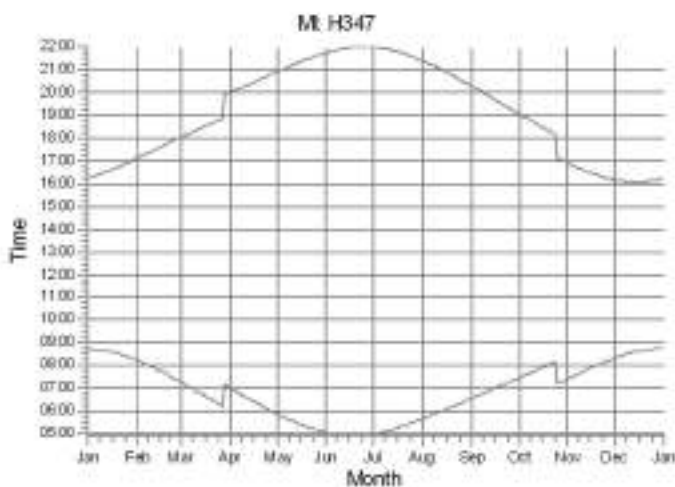
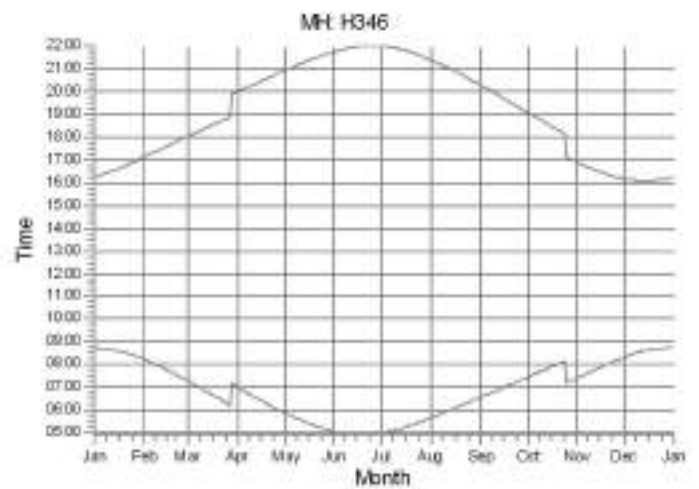
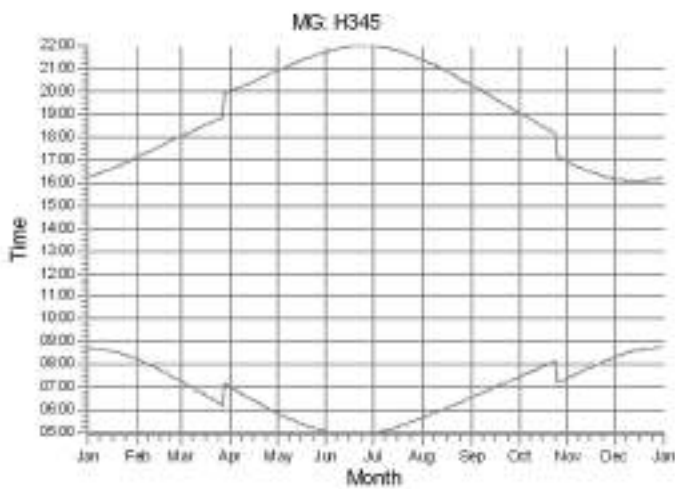
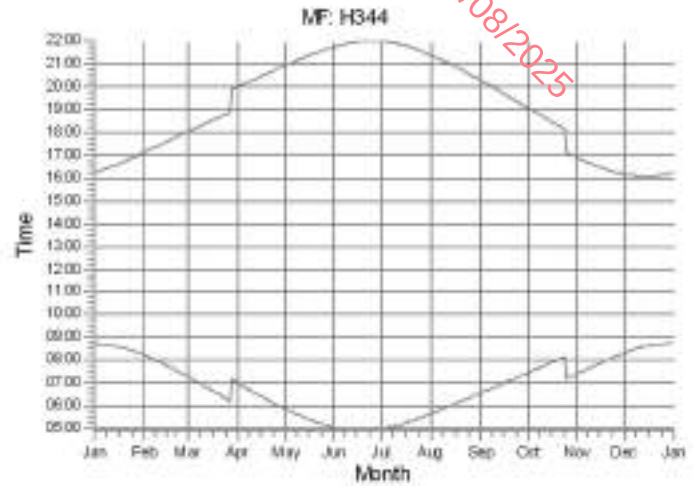
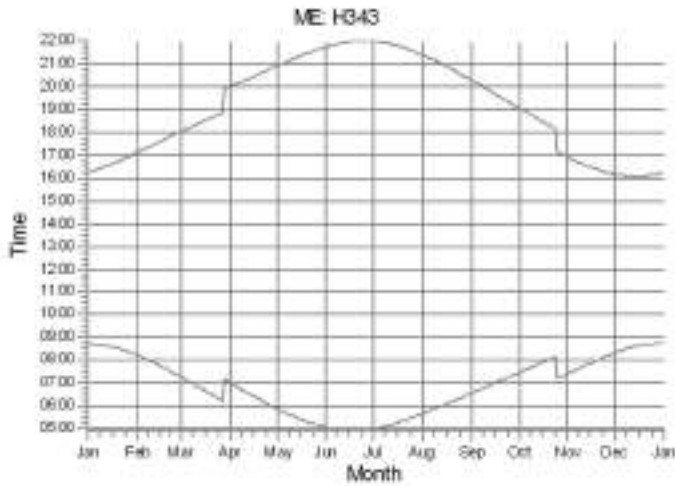


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

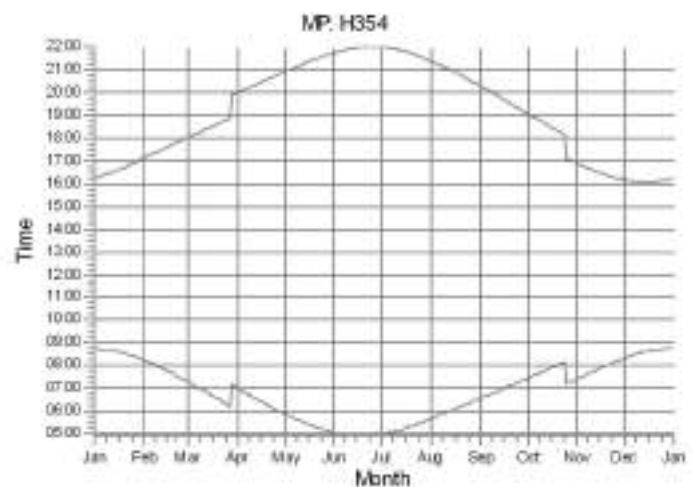
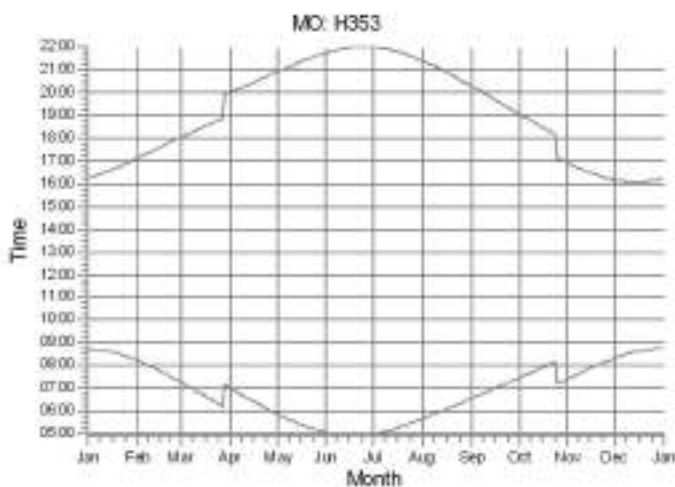
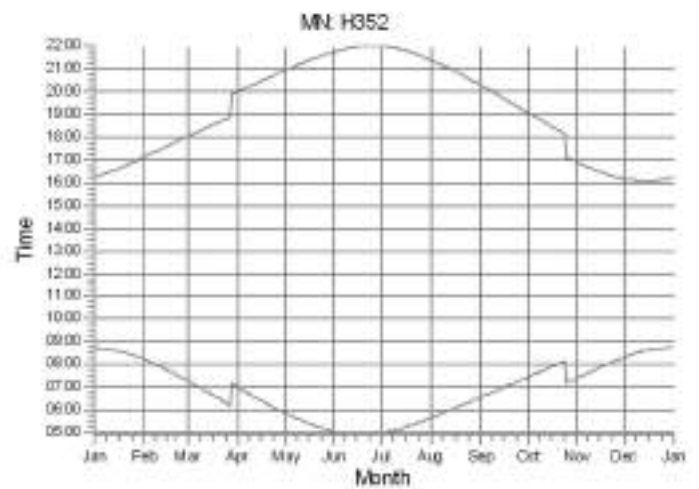
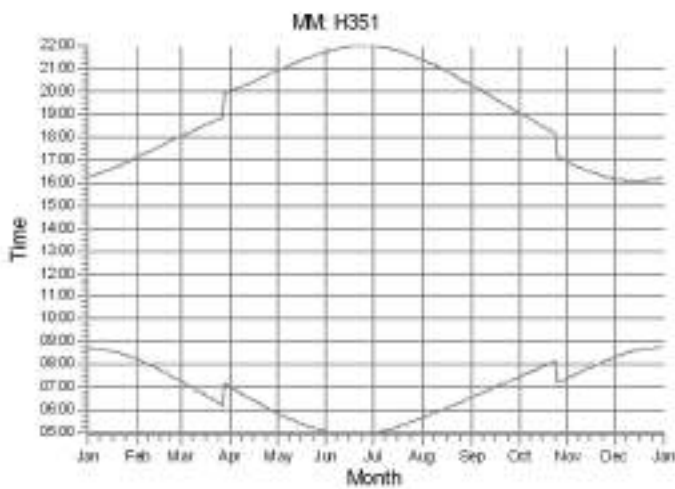
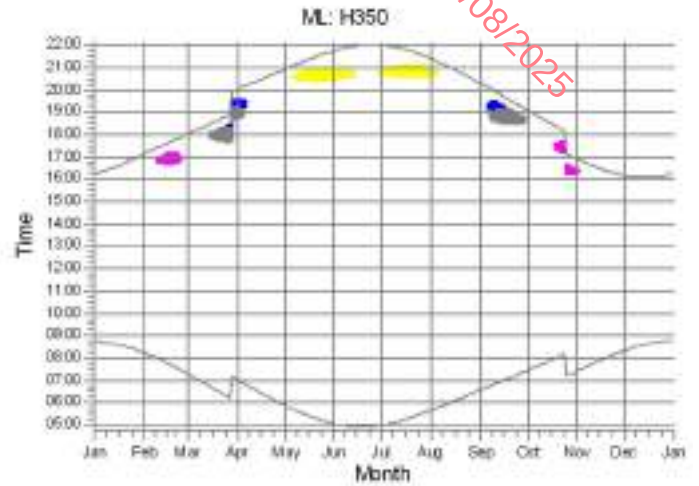
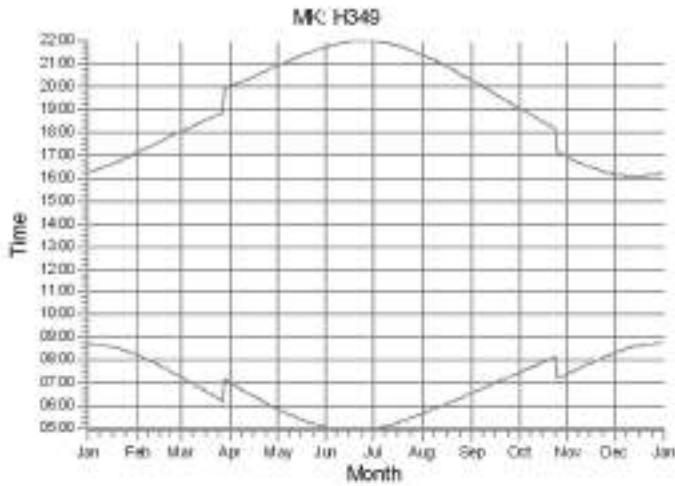
Calculation: Kellystown N149 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

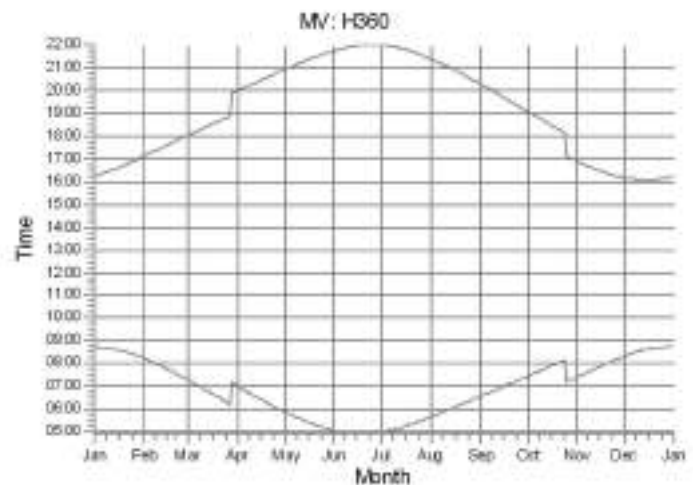
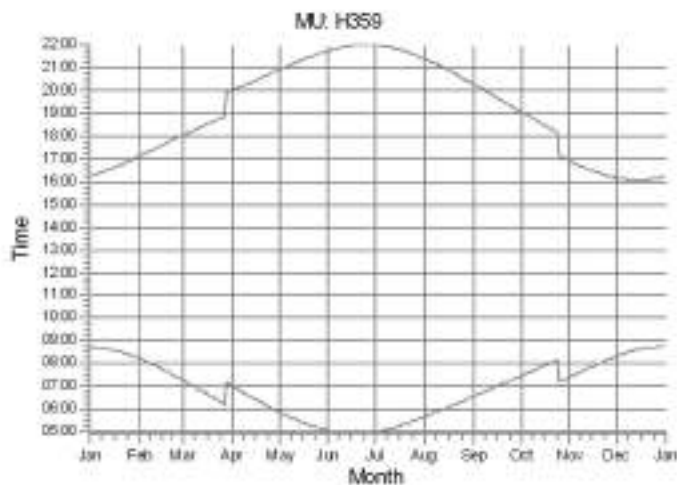
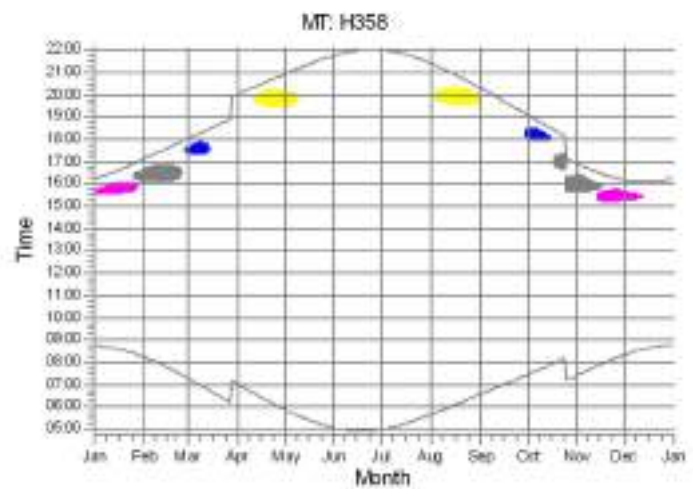
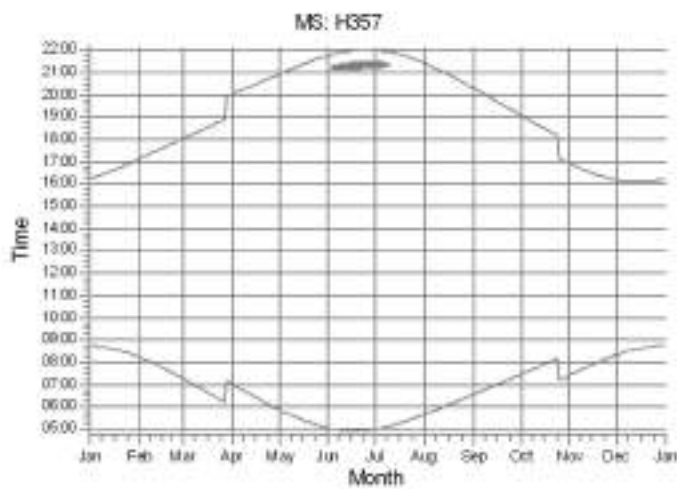
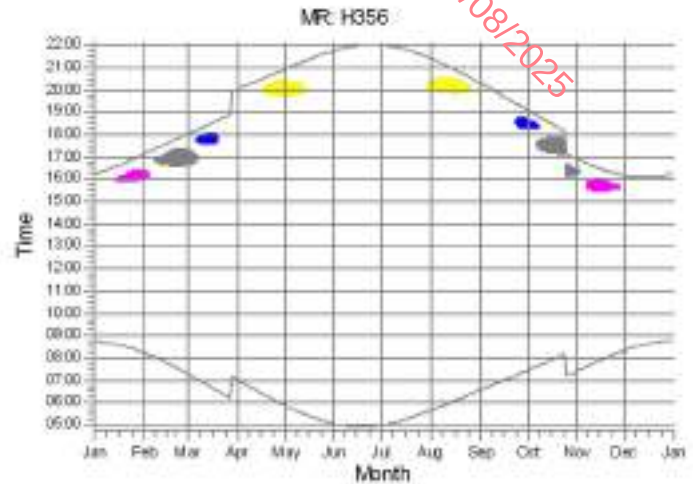
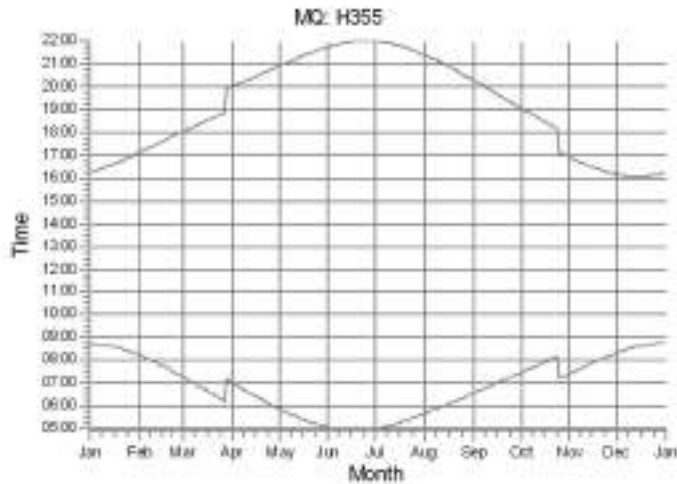


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

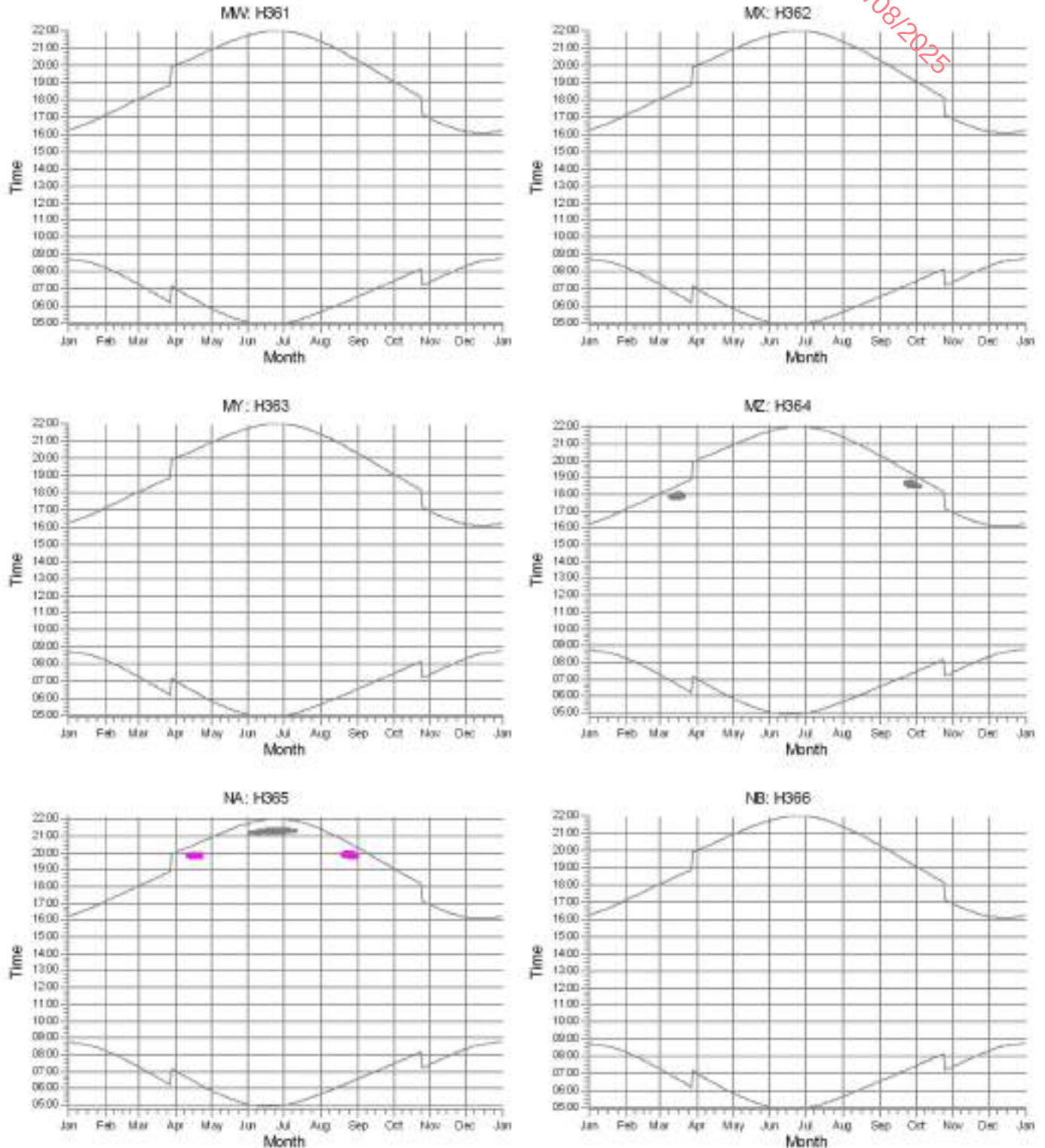


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

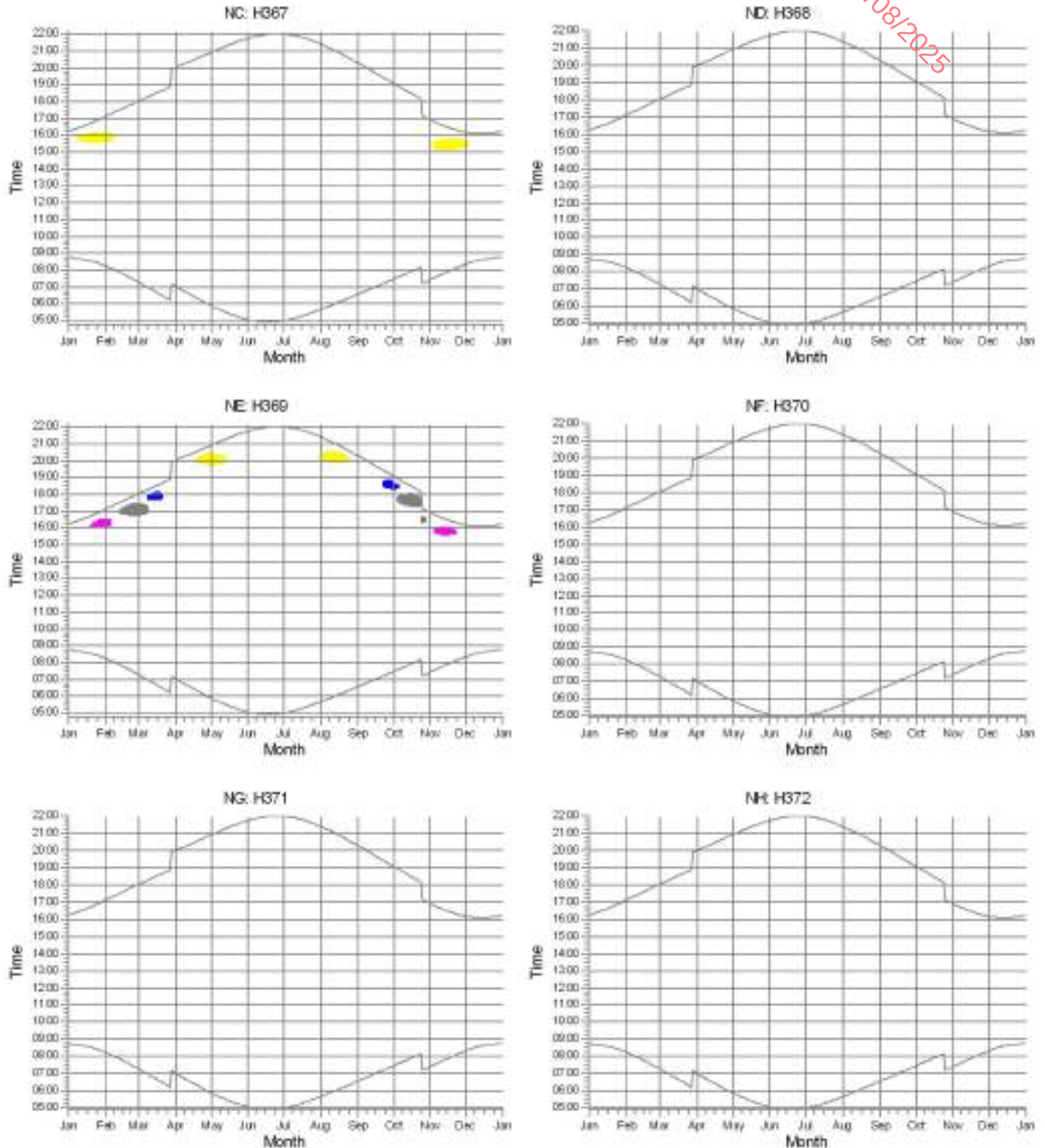


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case

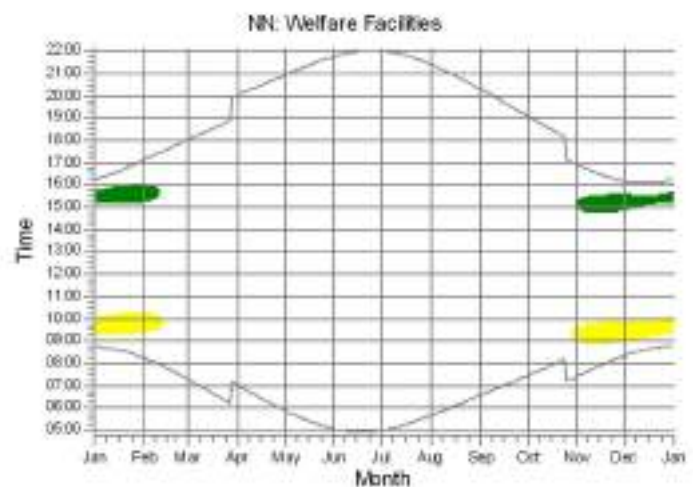
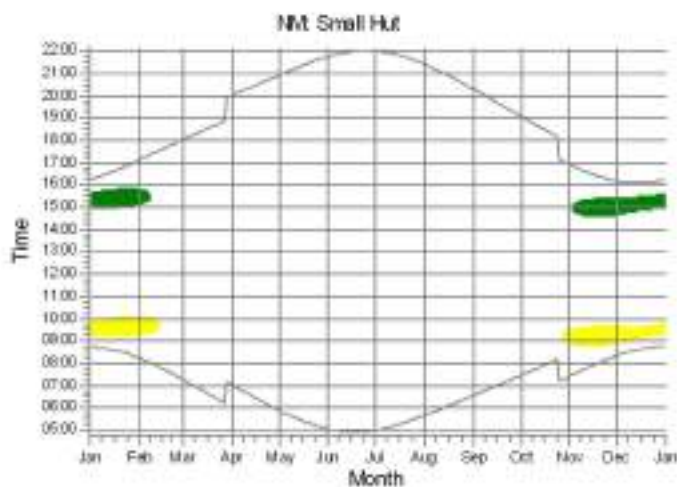
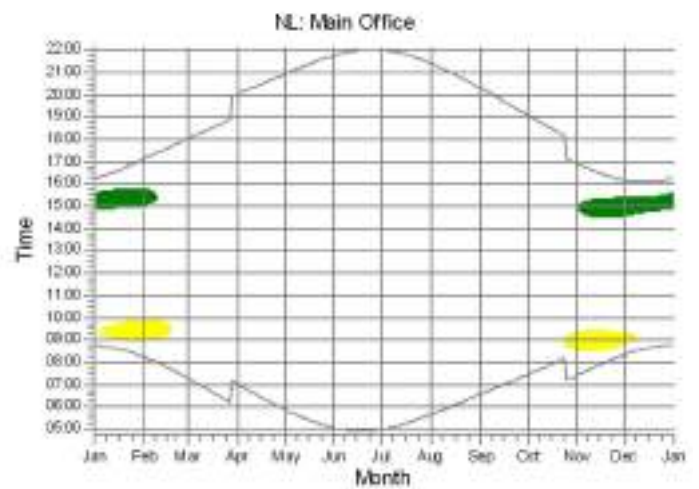
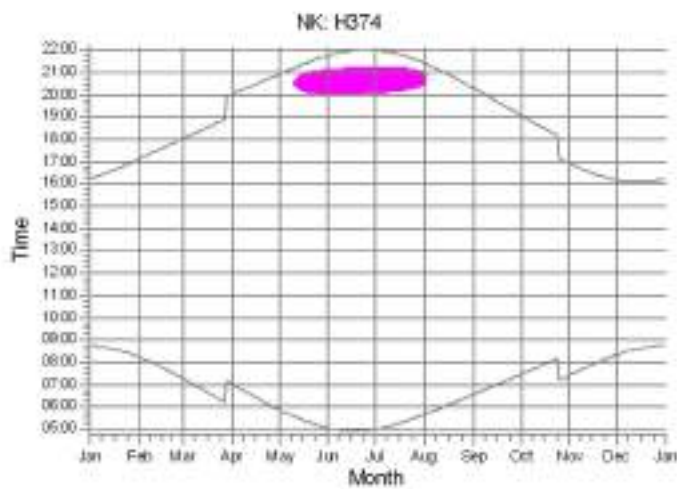
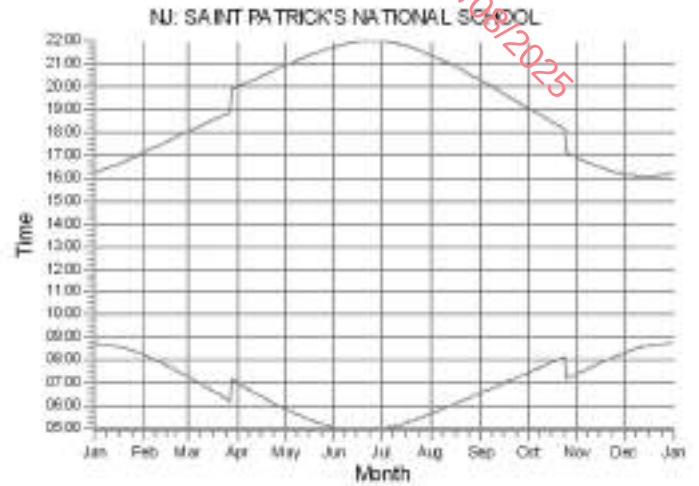
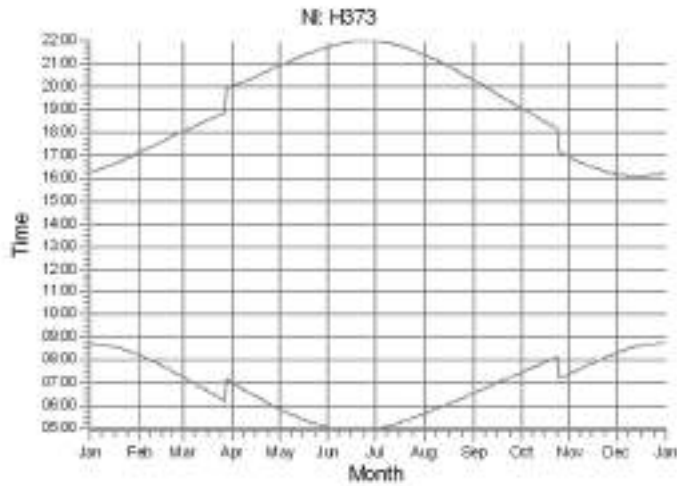


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



WTGs

1: T01 2: T02 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N149 Worst Case



WTGs

1: T01

2: T02

6918 Kellystown

5 no. turbine Wind Farm, Co. Louth

Jennings O'Donovan

F91 RHH9 Sligo

+353719161416

Kathlyn Feeney / kfeeney@jodireland.com

Calculated

28/03/2025 11:16/4.0.552

Calculation: Kellystown N149 Worst Case **WTG:** 1 - T01
Assumptions for shadow calculations

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 14:05-15:37/92 13:11-13:43/32 16:15 10:31-12:53/142	08:14 15:06-16:13/67 16:25-16:34/9 17:06 08:48-09:00/12	07:16 08:33-09:08/35 08:12-08:17/5 18:01 14:01-08:01/20	07:01 07:25-07:30/5 20:00	05:52 06:18-06:45/27 20:55 07:04-07:39/35	05:03 05:34-05:49/15 21:45 05:51-05:56/5
2	08:44 14:06-15:38/92 13:12-13:44/32 16:16 10:32-12:54/142	08:12 15:07-16:12/65 16:24-16:37/13 17:08 08:45-09:03/18	07:14 08:36-09:06/30 18:04 07:39-08:02/23	06:59 07:23-07:36/13 20:02	05:50 06:16-06:44/28 20:57 07:05-07:37/32	05:02 05:33-05:49/16 21:47
3	08:44 14:06-15:39/93 13:12-13:43/31 16:17 10:32-12:53/141	08:10 15:08-16:11/63 16:23-16:39/16 17:10 08:38-09:05/27	07:12 08:37-09:03/26 18:06 07:36-08:02/26	06:56 07:20-07:38/18 20:04	05:48 06:14-06:42/28 20:59 07:06-07:35/29	05:01 05:32-05:49/17 21:48
4	08:43 14:07-15:41/94 13:14-13:43/29 16:18 10:33-12:53/140	08:09 15:09-16:10/61 16:22-16:41/19 17:12 08:36-09:07/31	07:09 08:41-08:59/18 18:08 07:34-08:02/28	06:54 07:18-07:40/22 20:07	05:46 06:12-06:40/28 21:01 07:07-07:33/26	05:00 05:31-05:48/17 21:45
5	08:43 14:08-15:42/94 13:14-13:43/29 16:20 10:33-12:52/139	08:07 15:11-16:09/58 16:21-16:43/22 17:14 08:34-09:09/35	07:07 07:31-08:02/31 18:10	06:52 07:15-07:41/26 20:08	05:44 06:10-06:34/24 21:03 07:09-07:31/22	04:59 05:31-05:48/18 21:50
6	08:43 14:09-15:44/95 13:16-13:43/27 16:21 10:34-12:52/138	08:05 15:13-16:07/54 16:21-16:45/24 17:16 08:32-09:10/38	07:05 07:29-08:02/33 18:11	06:49 07:13-07:42/29 20:09	05:42 06:09-06:34/25 21:04 07:12-07:29/17	04:59 05:30-05:48/19 21:51
7	08:42 14:09-15:45/96 13:17-13:42/25 16:22 10:35-12:51/136	08:03 15:16-15:49/33 15:51-16:04/13 17:18 08:30-09:12/42 16:20-16:47/27	07:02 07:27-08:02/35 18:13	06:47 07:11-07:44/33 20:11	05:40 06:07-06:34/27 21:06 07:16-07:25/9	04:58 05:30-05:49/19 21:52
8	08:42 14:10-15:46/96 13:19-13:41/22 16:24 10:35-12:50/135	08:01 15:21-15:47/26 16:20-16:50/30 17:20 08:28-09:13/45	07:00 07:24-08:01/37 18:15	06:44 07:08-07:44/36 20:13	05:38 06:05-06:33/28 21:08	04:57 05:29-05:48/19 21:53
9	08:41 14:12-15:49/97 13:22-13:41/19 16:25 10:37-12:49/132	07:59 15:32-15:44/12 16:20-16:52/32 17:22 08:26-09:14/48	06:57 07:22-08:00/38 18:17	06:42 07:06-07:45/39 20:15	05:36 06:03-06:31/28 21:10	04:57 05:29-05:49/20 21:54
10	08:40 14:12-15:50/98 13:24-13:39/15 16:27 10:37-12:46/129	07:57 08:24-09:15/51 17:24 16:20-16:52/32	06:55 07:19-07:59/40 18:19	06:40 07:04-07:46/42 20:17	05:34 06:02-06:31/29 21:12	05:28-05:48/20 21:55
11	08:40 14:43-15:52/69 13:28-13:36/8 16:28 10:38-12:42/124 14:13-14:42/29	07:55 08:22-09:16/54 17:26 16:21-16:53/32	06:53 07:17-07:57/40 18:21	06:37 07:01-07:47/46 20:19	05:33 06:00-06:29/29 21:13	04:56 05:28-05:48/20 21:56
12	08:39 14:43-15:54/71 12:19-12:32/13 16:30 10:39-12:17/98 14:14-14:41/27	07:53 08:20-09:16/56 16:21-16:53/32 17:28 16:58-16:59/1	06:50 07:14-07:55/41 18:23	06:35 06:59-07:47/48 20:21	05:31 05:58-06:27/29 21:15	04:55 05:28-05:49/21 21:56
13	08:38 14:44-15:55/71 12:03-12:15/12 16:31 10:40-12:01/81 14:16-14:41/25	07:51 08:18-09:17/59 16:21-16:52/31 17:30 16:53-17:00/7	06:48 07:12-07:52/40 18:25	06:32 06:57-07:48/51 20:22	05:29 05:57-06:24/27 21:17	04:55 05:27-05:48/21 21:57
14	08:37 14:44-15:57/73 14:17-14:40/23 16:33 10:41-11:59/78	07:49 08:15-09:16/61 17:32 16:21-17:02/41	06:45 07:09-07:47/38 18:27	06:30 06:54-07:48/54 20:24	05:27 05:55-06:22/27 21:18	04:55 05:27-05:48/21 21:58
15	08:36 14:44-15:59/74 10:43-11:25/42 16:35 11:28-11:58/30 14:19-14:40/21	07:47 08:13-09:17/64 17:34 16:23-17:05/42	06:43 07:07-07:38/31 18:29	06:28 06:52-07:48/56 20:26	05:26 05:54-06:22/28 21:20	04:55 05:27-05:48/21 21:58
16	08:35 14:46-16:01/75 11:46-11:54/8 14:21-14:39/18 16:36 11:32-11:39/7 10:44-11:24/40	07:45 08:11-09:17/66 17:36 16:24-17:07/43	06:40 07:06-07:36/30 18:30	06:25 06:50-07:48/58 20:28	05:24 05:52-06:21/29 21:22	04:54 05:27-05:48/21 21:59
17	08:34 14:46-16:02/76 14:22-14:37/15 16:38 10:45-11:22/37	07:43 08:09-09:18/69 17:38 16:26-17:09/43	06:38 07:07-07:34/27 18:32	06:23 06:47-07:48/61 20:30	05:22 05:51-06:20/29 21:23	04:54 05:27-05:48/21 21:59
18	08:33 14:47-16:05/78 14:25-14:35/10 16:40 10:47-11:20/33	07:41 08:07-09:18/71 17:40 16:28-17:11/43	06:36 07:08-07:31/23 18:34	06:21 06:45-07:48/63 20:32	05:21 05:49-06:18/29 21:25	04:54 05:27-05:48/21 22:00
19	08:32 14:48-16:07/79 16:41 10:49-11:17/28	07:39 08:04-09:17/73 17:42 16:33-17:11/38	06:33 07:10-07:20/10 18:36	06:18 06:43-07:48/65 20:36	05:19 05:48-06:16/28 21:27	04:54 05:27-05:48/21 22:00
20	08:31 14:48-16:08/80 16:42 10:51-11:09/18	07:37 08:02-09:17/75 16:36-16:45/9 17:44 16:48-17:11/23	06:31 07:11-07:21/11 18:38	06:16 06:41-07:48/67 20:38	05:18 05:46-06:08/22 21:28	04:54 05:27-05:48/21 22:00
21	08:30 14:49-16:10/81 16:45 10:55-11:07/12	07:34 08:00-09:17/77 17:46 16:48-17:11/23	06:28 07:12-07:22/12 18:40	06:14 06:39-07:47/68 20:37	05:16 05:45-06:07/22 21:30	04:55 05:28-05:49/21 22:01
22	08:29 14:50-16:10/80 16:47	07:32 07:59-09:16/77 17:48 16:48-17:10/22	06:26 07:13-07:23/13 18:42	06:12 06:36-07:46/70 20:39	05:15 05:44-06:06/22 21:31	04:55 05:28-05:49/21 22:01
23	08:27 14:51-16:11/80 16:49	07:30 07:59-09:15/76 17:50 16:48-17:10/22	06:23 07:14-07:24/14 18:43	06:09 06:34-07:46/72 20:41	05:13 05:43-06:02/19 21:33	04:55 05:28-05:49/21 22:01
24	08:26 14:52-16:11/79 16:51	07:28 08:00-09:15/75 16:49-17:10/21 17:52 07:53-07:57/4	06:21 07:15-07:25/15 18:45	06:07 06:32-07:45/73 20:43	05:12 05:41-06:01/20 21:34	04:55 05:28-05:49/21 22:01
25	08:25 14:54-16:12/78 16:52	07:25 08:01-09:13/72 16:50-17:08/18 17:54 07:51-07:59/8	06:18 07:16-07:26/16 18:47	05:05 06:30-07:45/75 20:46	05:11 05:40-06:01/21 21:36	04:56 05:29-05:50/21 22:01
26	08:23 14:55-16:12/77 16:54	07:23 08:01-09:12/71 16:51-17:07/16 17:56 07:48-07:59/11	06:16 07:17-07:27/17 18:49	06:03 06:28-06:58/30 20:47	05:09 05:39-06:01/22 21:37	04:56 05:29-05:50/21 22:01
27	08:22 14:58-16:12/74 16:56	07:21 08:29-09:12/43 07:46-08:00/14 17:58 08:03-08:25/22 16:54-17:05/11	06:14 07:18-07:28/18 18:51	06:01 06:26-06:53/27 20:48	05:08 05:38-06:00/22 21:39	04:56 05:30-05:51/21 22:01
28	08:20 15:00-16:13/73 16:58	07:19 08:32-09:09/37 08:04-08:21/17 18:00 07:43-08:00/17	06:11 07:19-07:29/19 18:53	05:58 06:24-06:51/27 20:50	05:07 05:37-06:00/23 21:40	04:57 05:30-05:51/21 22:01
29	08:19 15:03-16:13/70 17:00		07:09 07:20-07:30/10 19:55	05:56 06:22-06:49/27 20:52	05:06 05:36-05:59/23 21:42	04:58 05:31-05:52/21 22:01
30	08:17 15:03-16:12/69 17:02		07:06 07:21-07:31/11 19:56	05:54 06:20-06:46/26 20:54	05:05 05:35-05:58/23 21:43	04:58 05:31-05:52/21 22:00
31	08:15 15:04-16:12/68 17:04 16:27-16:31/4		07:04 07:22-07:32/12 19:58	07:27-07:28/1	05:04 05:34-05:57/23 21:44	
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	4998	2810	706	1528	959	603

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 1 - T01 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59 05:32-05:52/20	05:39 06:09-06:38/29	06:33 07:00-07:46/46	07:26 07:53-08:34/41	07:24 07:54-08:44/50	07:24 07:54-08:44/50	07:24 07:54-08:44/50	07:24 07:54-08:44/50	07:24 07:54-08:44/50	07:24 07:54-08:44/50	07:24 07:54-08:44/50
2	05:00 05:33-05:53/20	05:40 06:11-06:40/29	06:35 07:02-07:45/43	07:28 07:54-08:35/41	07:26 15:01-15:14/13	15:50-16:22/32	15:50-16:22/32	15:50-16:22/32	15:50-16:22/32	15:50-16:22/32	15:50-16:22/32
3	05:00 05:34-05:54/20	05:42 06:12-06:41/29	06:36 07:04-07:43/39	07:30 07:56-08:36/40	16:52 07:56-08:43/47	16:52 07:56-08:43/47	16:52 07:56-08:43/47	16:52 07:56-08:43/47	16:52 07:56-08:43/47	16:52 07:56-08:43/47	16:52 07:56-08:43/47
4	05:01 05:34-05:53/19	05:44 06:14-06:42/28	06:38 07:05-07:41/36	07:32 07:58-08:37/39	16:50 07:58-08:42/44	16:50 07:58-08:42/44	16:50 07:58-08:42/44	16:50 07:58-08:42/44	16:50 07:58-08:42/44	16:50 07:58-08:42/44	16:50 07:58-08:42/44
5	05:02 05:35-05:54/19	05:45 06:16-06:43/27	06:40 07:07-07:40/33	07:33 08:00-08:37/37	16:48 08:00-08:41/41	15:50-16:17/27	15:50-16:17/27	15:50-16:17/27	15:50-16:17/27	15:50-16:17/27	15:50-16:17/27
6	05:03 05:36-05:55/19	05:47 06:17-06:43/26	06:42 07:09-07:38/29	07:35 08:02-08:38/36	16:46 08:02-08:40/38	16:46 08:02-08:40/38	16:46 08:02-08:40/38	16:46 08:02-08:40/38	16:46 08:02-08:40/38	16:46 08:02-08:40/38	16:46 08:02-08:40/38
7	05:04 05:37-05:55/18	05:49 06:19-06:44/25	06:44 07:10-07:36/26	07:37 08:04-08:38/34	16:45 08:04-08:39/35	16:45 08:04-08:39/35	16:45 08:04-08:39/35	16:45 08:04-08:39/35	16:45 08:04-08:39/35	16:45 08:04-08:39/35	16:45 08:04-08:39/35
8	05:05 05:38-05:55/17	05:51 06:20-06:46/26	06:45 07:12-07:35/23	07:39 08:06-08:38/32	16:43 14:38-15:41/63	15:53-16:08/15	15:53-16:08/15	15:53-16:08/15	15:53-16:08/15	15:53-16:08/15	15:53-16:08/15
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16	05:14 05:47-06:10/23	06:05 06:34-07:00/26	06:59 07:24-07:25/1	07:54 08:33-09:45/72	16:34 14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70
17	05:16 05:48-06:10/22	06:06 06:35-07:05/30	07:01 07:25-07:26/1	07:56 08:32-09:46/74	16:33 14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70
18	05:17 05:49-06:11/22	06:08 06:37-07:51/74	07:03 07:26-07:27/1	07:57 08:31-09:46/75	16:32 14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70
19	05:19 05:51-06:12/21	06:10 06:39-07:51/72	07:05 07:27-07:28/1	07:59 08:30-09:47/77	16:31 14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70
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23	05:24 05:56-06:18/22	06:17 06:45-07:51/66	07:12 07:31-07:32/1	08:07 08:35-09:47/72	16:27 14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70
24	05:26 05:57-06:19/22	06:19 06:47-07:51/64	07:14 07:55-08:03/8	08:09 08:37-09:47/70	16:26 14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70
25	05:27 05:59-06:27/28	06:21 06:49-07:50/61	07:15 08:07-08:13/6	07:11 07:39-08:47/68	16:25 14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70
26	05:29 06:00-06:29/29	06:22 06:50-07:50/60	07:17 07:50-08:15/25	07:13 07:41-08:47/66	16:24 14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70
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31	05:37 06:08-06:37/29	06:31 06:59-07:47/48	07:25 07:52-08:29/39	07:22 07:52-08:45/53	16:19 14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70	14:35-15:45/70
Potential sun hours	512	460	382	328	259	3202	8197				
Sum of minutes with flicker	689	1722	500	2362							

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 11:16/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case **WTG:** 2 - T02**Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 09:18-10:42/84 10:50-12:05/75 16:15 15:00-15:36/36 12:24-14:33/129	08:14 08:42-10:11/89 13:54-14:37/43 17:06 15:17-16:34/77	07:16 16:33-17:34/61 18:02	07:01 18:32-19:33/61 20:00	05:52 19:18-20:26/68 20:55	05:03 20:29-21:10/41 21:45
2	08:44 09:18-10:43/85 10:51-12:06/75 16:16 15:01-15:38/37 12:25-14:34/129	08:12 08:40-10:11/91 13:56-14:35/39 17:08 15:18-16:37/79	07:14 16:36-17:36/60 18:04	06:59 18:31-19:35/64 20:02	05:50 19:19-20:27/68 20:57	05:02 20:31-21:12/41 21:47
3	08:44 09:17-10:43/86 10:52-12:05/73 16:17 15:01-15:39/38 12:25-14:34/129	08:10 08:38-10:10/92 13:58-14:34/36 17:10 15:20-16:39/79	07:12 16:46-17:38/52 18:06	06:56 18:32-19:37/65 20:04	05:48 19:20-20:29/69 20:59	05:01 20:32-21:13/41 21:48
4	08:43 09:17-10:43/86 10:53-12:05/72 16:18 15:02-15:40/38 12:26-14:35/129	08:08 08:36-10:10/94 14:00-14:32/32 17:12 15:21-16:41/80	07:09 16:49-17:41/52 18:08	06:54 18:33-19:39/66 20:06	05:46 19:21-20:30/69 21:01	05:00 20:33-21:14/41 21:49
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17	08:34 09:05-10:11/66 11:20-11:33/13 12:38-14:40/122 16:38 15:06-16:02/56 10:15-10:42/27	07:43 09:25-09:29/4 16:11-17:08/57 17:38 08:09-08:50/41 15:49-16:04/15	06:38 07:12-07:23/11 17:11-17:35/24 18:32 17:47-18:06/19	06:23 18:59-20:01/62 20:30	05:22 19:50-20:51/61 21:23	04:54 20:42-21:18/36 21:59
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21	08:30 09:00-10:12/72 10:22-10:38/16 12:47-13:06/19 16:45 15:07-16:05/58 13:44-14:40/56 13:11-13:42/31	07:34 08:00-08:40/40 17:46 16:17-17:18/61	06:28 17:39-18:13/34 18:40	06:14 19:13-20:08/55 20:37	05:16 19:53-20:57/64 21:30	04:54 20:43-21:19/36 22:01
22	08:29 08:58-10:12/74 10:25-10:35/10 12:51-13:02/11 16:47 15:07-16:06/59 13:44-14:40/56 13:12-13:40/28	07:32 07:57-08:36/39 17:48 16:19-17:19/60	06:26 17:37-18:15/38 18:42	06:12 19:13-20:10/57 20:39	05:15 19:54-20:59/65 21:31	04:55 20:44-21:20/36 22:01
23	08:27 08:57-10:12/75 13:45-14:40/55 16:49 15:08-16:14/66 13:15-13:38/23	07:30 07:55-08:33/38 17:50 16:21-17:22/61	06:23 17:36-18:16/40 18:43	06:09 19:14-20:12/58 20:41	05:13 19:54-20:59/65 21:33	04:55 20:44-21:20/36 22:01
24	08:26 08:55-10:12/77 13:45-14:40/55 16:51 15:08-16:16/68 13:18-13:36/18	07:28 07:55-08:29/34 17:52 16:23-17:24/61	06:21 17:35-18:18/43 18:45	06:07 19:14-20:14/60 20:43	05:12 19:55-21:01/66 21:34	04:55 20:44-21:20/36 22:01
25	08:25 08:54-10:12/78 13:47-14:40/53 16:52 15:09-16:19/70 13:24-13:32/8	07:25 07:55-08:24/29 17:54 16:25-17:26/61	06:18 17:34-18:21/47 18:47	06:05 19:14-20:15/61 20:44	05:11 19:56-21:02/66 21:36	04:56 20:44-21:20/36 22:01
26	08:23 08:52-10:12/80 13:47-14:40/53 16:54 15:10-16:21/71	07:23 07:56-08:21/25 17:56 16:28-17:28/60	06:16 17:34-18:23/49 18:49	06:03 19:15-20:17/62 20:46	05:09 19:58-21:04/66 21:37	04:56 20:44-21:20/36 22:01
27	08:22 08:51-10:12/81 13:48-14:39/51 16:56 15:10-16:22/72	07:21 16:29-17:31/62 17:58 07:58-08:14/16	06:13 17:33-18:24/51 18:51	06:01 19:15-20:19/64 20:48	05:08 19:59-21:05/66 21:39	04:56 20:43-21:20/37 22:01
28	08:20 08:49-10:12/82 13:49-14:39/50 16:58 15:12-16:24/72	07:19 16:30-17:32/62 18:00 07:59-08:10/11	06:11 17:33-18:26/53 18:53	05:58 19:16-20:21/65 20:50	05:07 20:23-21:06/43 21:40	04:57 20:44-21:21/37 22:01
29	08:19 08:47-10:12/85 13:50-14:38/48 17:00 15:12-16:27/75		07:09 18:32-19:28/56 19:55	05:56 19:16-20:22/66 20:52	05:06 20:24-21:07/43 21:41	04:57 20:44-21:21/37 22:01
30	08:17 08:45-10:11/86 13:51-14:38/47 17:02 15:13-16:29/76		07:06 18:32-19:30/58 19:56	05:54 19:17-20:24/67 20:54	05:05 20:28-21:08/40 21:43	04:58 20:43-21:21/38 22:00
31	08:15 08:44-10:11/87 13:52-14:37/45 17:04 15:14-16:31/77		07:04 18:31-19:31/60 19:58		05:04 20:29-21:09/40 21:44	
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	8454	4039	1610	1908	1920	1155

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 2 - T02 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59 20:43-21:21/38	05:39 19:59-20:53/54	06:33 18:40-19:50/70	07:26 17:52-08:07/15	07:24 17:54-09:32/98	07:26 17:52-08:07/15	07:24 17:54-09:32/98	07:26 17:52-08:07/15	07:24 17:54-09:32/98	07:26 17:52-08:07/15	07:24 17:54-09:32/98
2	05:00 20:43-21:22/39	05:40 19:59-20:52/53	06:35 18:37-19:48/71	07:28 17:54-08:07/13	07:26 17:54-08:07/13	07:28 17:54-08:07/13	07:26 17:54-08:07/13	07:28 17:54-08:07/13	07:26 17:54-08:07/13	07:28 17:54-08:07/13	07:26 17:54-08:07/13
3	05:00 20:42-21:21/39	05:42 19:58-20:50/52	06:36 18:35-19:46/71	07:30 17:56-08:07/11	07:28 17:56-08:07/11	07:30 17:56-08:07/11	07:28 17:56-08:07/11	07:30 17:56-08:07/11	07:28 17:56-08:07/11	07:30 17:56-08:07/11	07:28 17:56-08:07/11
4	05:01 20:42-21:22/40	05:44 19:58-20:48/50	06:38 18:33-19:43/70	07:32 17:58-08:06/8	07:30 17:58-08:06/8	07:32 17:58-08:06/8	07:30 17:58-08:06/8	07:32 17:58-08:06/8	07:30 17:58-08:06/8	07:32 17:58-08:06/8	07:30 17:58-08:06/8
5	05:02 20:42-21:22/40	05:45 19:52-20:46/54	06:40 18:31-19:41/70	07:33 18:00-08:05/5	07:32 18:00-08:05/5	07:33 18:00-08:05/5	07:32 18:00-08:05/5	07:33 18:00-08:05/5	07:32 18:00-08:05/5	07:33 18:00-08:05/5	07:32 18:00-08:05/5
6	05:03 20:41-21:22/41	05:47 19:36-20:45/69	06:42 18:30-19:39/69	07:35 18:02-08:04/2	07:34 18:04-09:39/95	07:35 18:02-08:04/2	07:34 18:04-09:39/95	07:35 18:02-08:04/2	07:34 18:04-09:39/95	07:35 18:02-08:04/2	07:34 18:04-09:39/95
7	05:04 20:41-21:22/41	05:49 19:34-20:43/69	06:43 18:28-19:35/67	07:37 17:25-18:20/55	07:36 18:06-09:39/93	07:37 17:25-18:20/55	07:36 18:06-09:39/93	07:37 17:25-18:20/55	07:36 18:06-09:39/93	07:37 17:25-18:20/55	07:36 18:06-09:39/93
8	05:05 20:41-21:21/40	05:51 19:31-20:41/70	06:45 18:27-19:33/66	07:39 17:24-18:18/54	07:38 18:09-09:40/91	07:39 17:24-18:18/54	07:38 18:09-09:40/91	07:39 17:24-18:18/54	07:38 18:09-09:40/91	07:39 17:24-18:18/54	07:38 18:09-09:40/91
9	05:06 20:40-21:21/41	05:52 19:30-20:39/69	06:47 18:26-19:31/65	07:41 17:23-18:16/53	07:40 18:11-09:42/91	07:41 17:23-18:16/53	07:40 18:11-09:42/91	07:41 17:23-18:16/53	07:40 18:11-09:42/91	07:41 17:23-18:16/53	07:40 18:11-09:42/91
10	05:07 20:39-21:20/41	05:54 19:28-20:37/69	06:49 18:25-19:28/63	07:42 17:22-18:14/52	07:42 18:13-09:42/89	07:42 17:22-18:14/52	07:42 18:13-09:42/89	07:42 17:22-18:14/52	07:42 18:13-09:42/89	07:42 17:22-18:14/52	07:42 18:13-09:42/89
11	05:08 20:38-21:19/41	05:56 19:27-20:35/68	06:51 18:24-19:26/62	07:44 17:18-18:11/53	07:44 18:15-09:43/88	07:44 17:18-18:11/53	07:44 18:15-09:43/88	07:44 17:18-18:11/53	07:44 18:15-09:43/88	07:44 17:18-18:11/53	07:44 18:15-09:43/88
12	05:09 20:37-21:18/41	05:58 19:26-20:34/68	06:52 18:24-19:24/60	07:46 17:08-18:09/61	07:46 18:17-09:43/86	07:46 17:08-18:09/61	07:46 18:17-09:43/86	07:46 17:08-18:09/61	07:46 18:17-09:43/86	07:46 17:08-18:09/61	07:46 18:17-09:43/86
13	05:11 20:37-21:17/40	05:59 19:24-20:31/67	06:54 18:23-19:22/59	07:48 17:05-18:07/62	07:47 18:19-09:44/85	07:48 17:05-18:07/62	07:47 18:19-09:44/85	07:48 17:05-18:07/62	07:47 18:19-09:44/85	07:48 17:05-18:07/62	07:47 18:19-09:44/85
14	05:12 20:34-21:16/42	06:01 19:23-20:29/66	06:56 18:22-19:18/56	07:50 17:03-18:04/61	07:49 18:21-09:44/83	07:50 17:03-18:04/61	07:49 18:21-09:44/83	07:50 17:03-18:04/61	07:49 18:21-09:44/83	07:50 17:03-18:04/61	07:49 18:21-09:44/83
15	05:13 20:32-21:15/43	06:03 19:23-20:28/65	06:58 18:22-19:16/54	07:52 17:01-18:02/61	07:51 18:23-09:44/81	07:52 17:01-18:02/61	07:51 18:23-09:44/81	07:52 17:01-18:02/61	07:51 18:23-09:44/81	07:52 17:01-18:02/61	07:51 18:23-09:44/81
16	05:14 20:30-20:29/20	06:05 19:21-20:25/64	06:59 18:22-19:14/52	07:54 18:28-08:54/26	07:53 18:25-09:45/80	06:59 18:22-19:14/52	07:53 18:25-09:45/80	07:54 18:28-08:54/26	07:53 18:25-09:45/80	07:54 18:28-08:54/26	07:53 18:25-09:45/80
17	05:16 20:08-21:14/66	06:06 19:21-20:23/62	07:01 18:21-19:11/50	07:56 18:27-08:57/30	07:55 18:27-08:57/30	07:56 18:27-08:57/30	07:55 18:27-08:57/30	07:56 18:27-08:57/30	07:55 18:27-08:57/30	07:56 18:27-08:57/30	07:55 18:27-08:57/30
18	05:17 20:06-21:12/66	06:08 19:21-20:22/61	07:03 18:22-19:08/46	07:57 18:26-09:01/35	07:57 18:29-09:46/77	07:57 18:26-09:01/35	07:57 18:29-09:46/77	07:57 18:26-09:01/35	07:57 18:29-09:46/77	07:57 18:26-09:01/35	07:57 18:29-09:46/77
19	05:18 20:05-21:11/66	06:10 19:20-20:19/59	07:05 18:22-19:06/44	07:59 18:27-09:06/39	07:59 18:31-09:46/75	07:59 18:27-09:06/39	07:59 18:31-09:46/75	07:59 18:27-09:06/39	07:59 18:31-09:46/75	07:59 18:27-09:06/39	07:59 18:31-09:46/75
20	05:20 20:05-21:10/65	06:12 19:19-20:17/58	07:06 18:23-19:03/40	08:01 18:29-09:08/39	08:00 18:33-09:12/41	08:01 18:29-09:08/39	08:00 18:33-09:12/41	08:01 18:29-09:08/39	08:00 18:33-09:12/41	08:01 18:29-09:08/39	08:00 18:33-09:12/41
21	05:21 20:04-21:09/65	06:13 19:19-20:15/56	07:08 18:22-19:01/39	08:03 18:31-09:12/41	08:02 18:35-09:47/72	08:03 18:31-09:12/41	08:02 18:35-09:47/72	08:03 18:31-09:12/41	08:02 18:35-09:47/72	08:03 18:31-09:12/41	08:02 18:35-09:47/72
22	05:23 20:03-21:07/64	06:15 19:17-20:12/55	07:10 18:23-18:58/35	08:05 18:33-09:14/41	08:04 18:37-09:48/71	08:05 18:33-09:14/41	08:04 18:37-09:48/71	08:05 18:33-09:14/41	08:04 18:37-09:48/71	08:05 18:33-09:14/41	08:04 18:37-09:48/71
23	05:24 20:03-21:07/64	06:17 19:16-20:10/54	07:12 18:24-18:56/32	08:07 18:35-09:17/42	08:06 18:39-09:48/69	08:07 18:35-09:17/42	08:06 18:39-09:48/69	08:07 18:35-09:17/42	08:06 18:39-09:48/69	08:07 18:35-09:17/42	08:06 18:39-09:48/69
24	05:26 20:02-21:05/63	06:19 19:10-20:09/59	07:14 18:26-18:54/28	08:09 18:37-09:18/41	08:08 18:41-09:49/68	08:09 18:37-09:18/41	08:08 18:41-09:49/68	08:09 18:37-09:18/41	08:08 18:41-09:49/68	08:09 18:37-09:18/41	08:08 18:41-09:49/68
25	05:27 20:02-21:04/62	06:20 19:05-20:06/61	07:15 18:26-18:51/25	08:11 18:41-17:41/60	08:10 18:45-15:30/53	08:11 18:41-17:41/60	08:10 18:45-15:30/53	08:11 18:41-17:41/60	08:10 18:45-15:30/53	08:11 18:41-17:41/60	08:10 18:45-15:30/53
26	05:29 20:01-21:02/61	06:22 19:02-20:04/62	07:17 18:28-18:48/20	08:13 18:43-15:40/51	08:12 18:47-09:05/58	08:13 18:43-15:40/51	08:12 18:47-09:05/58	08:13 18:43-15:40/51	08:12 18:47-09:05/58	08:13 18:43-15:40/51	08:12 18:47-09:05/58
27	05:30 20:01-21:00/59	06:24 19:00-20:02/62	07:19 18:28-18:48/20	08:15 18:45-15:38/53	08:14 18:49-09:51/62	08:15 18:45-15:38/53	08:14 18:49-09:51/62	08:15 18:45-15:38/53	08:14 18:49-09:51/62	08:15 18:45-15:38/53	08:14 18:49-09:51/62
28	05:32 20:00-20:59/59	06:26 18:57-19:59/62	07:21 18:36-18:43/37	08:17 18:47-08:21/40	08:16 18:51-15:35/50	08:17 18:47-08:21/40	08:16 18:51-15:35/50	08:17 18:47-08:21/40	08:16 18:51-15:35/50	08:17 18:47-08:21/40	08:16 18:51-15:35/50
29	05:34 19:59-20:57/58	06:28 18:55-19:57/62	07:22 18:36-18:43/37	08:19 18:49-09:51/62	08:18 18:53-15:35/50	08:19 18:49-09:51/62	08:18 18:53-15:35/50	08:19 18:49-09:51/62	08:18 18:53-15:35/50	08:19 18:49-09:51/62	08:18 18:53-15:35/50
30	05:35 19:59-20:56/57	06:29 18:54-19:55/61	07:24 18:37-18:44/38	08:21 18:51-15:37/57	08:20 18:55-15:39/59	08:21 18:51-15:37/57	08:20 18:55-15:39/59	08:21 18:51-15:37/57	08:20 18:55-15:39/59	08:21 18:51-15:37/57	08:20 18:55-15:39/59
31	05:37 20:00-20:55/55	06:31 18:43-19:52/69	07:26 18:38-18:45/39	08:23 18:53-15:39/59	08:22 18:57-15:43/41	08:23 18:53-15:39/59	08:22 18:57-15:43/41	08:23 18:53-15:39/59	08:22 18:57-15:43/41	08:23 18:53-15:39/59	08:22 18:57-15:43/41
Potential sun hours	512	460	382	328	259	512	460	382	328	259	512
Sum of minutes with flicker	1663	1919	1662	2880	6875	1663	1919	1662	2880	6875	1663

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 3 - T03
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44	09:21-09:59/38		08:14	08:42-08:54/12		07:16	17:04-17:34/30		07:01	19:09-19:33/24		05:52	20:02-20:26/24		05:03	20:33-21:06/33	
	16:15	15:04-15:37/33		17:06	16:04-16:34/30		18:02	07:41-07:49/8		20:00			20:55			21:45	05:33-05:51/18	
2	08:44	09:22-09:59/37		08:12	08:40-08:55/15		07:14	17:05-17:36/31		06:59	19:10-19:35/25		05:50	20:02-20:27/25		05:02	20:34-21:07/33	
	16:16	15:05-15:39/34		17:08	16:10-16:37/27		18:04	07:39-07:50/11		20:02			20:57			21:47	05:33-05:50/17	
3	08:44	09:22-09:58/36		08:10	08:38-08:55/17		07:12	17:06-17:38/32		06:56	19:12-19:37/25		05:48	20:02-20:29/27		05:01	20:35-21:07/32	
	16:17	15:05-15:39/34		17:10	16:12-16:39/27		18:06	07:36-07:49/13		20:04			20:59			21:48	05:32-05:49/17	
4	08:43	09:23-09:58/35		08:08	08:36-08:55/19		07:09	17:07-17:41/34		06:54	19:14-19:39/25		05:46	20:03-20:30/27		05:00	05:31-05:49/18	
	16:18	15:06-15:41/35		17:12	16:14-16:41/27		18:08	07:34-07:50/16		20:06			21:01			21:49	05:31-05:49/18	
5	08:43	09:24-09:54/30		08:07	08:34-08:55/21		07:07	17:08-17:42/34		06:52	19:15-19:40/25		05:44	20:03-20:32/29		04:59	05:31-05:49/18	
	16:20	15:06-15:42/36		17:14	16:15-16:43/28		18:09	07:31-07:49/18		20:08			21:03			21:50	05:31-05:49/18	
6	08:43	09:25-09:54/29		08:05	08:32-08:54/22		07:05	17:10-17:45/35		06:49	19:17-19:42/25		05:42	20:04-20:33/29		04:59	05:30-05:48/18	
	16:21	15:08-15:43/35		17:16	16:16-16:45/29		18:11	07:29-07:49/20		20:09			21:04			21:51	05:30-05:47/28	
7	08:42	09:50-09:51/1	09:25-09:49/24	08:03	08:32-08:54/22		07:02	17:14-17:46/32		06:47	19:18-19:43/25		05:40	20:06-20:36/30		04:58	05:30-05:49/19	
	16:22	15:09-15:45/36		17:18	16:18-16:47/29		18:13	07:26-07:48/22		20:11			21:06			21:52	05:30-05:49/19	
8	08:42	15:09-15:46/37		08:01	08:33-08:53/20		07:00	17:24-17:48/24		06:44	19:20-19:46/26		05:38	20:08-20:37/29		04:57	05:29-05:48/19	
	16:24	09:26-09:48/22		17:20	16:20-16:50/30		18:15	07:24-07:47/23		20:13			21:08			21:53	05:29-05:48/19	
9	08:41	15:11-15:49/38		07:59	08:34-08:52/18		06:57	17:24-17:50/26		06:42	19:22-19:47/25		05:36	20:10-20:39/29		04:57	05:29-05:48/19	
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10	08:40	15:13-15:50/37		07:57	08:35-08:51/16		06:55	17:25-17:52/27		06:39	19:23-19:46/23		05:34	20:11-20:40/29		04:56	05:28-05:48/20	
	16:27	09:29-09:47/18		17:24	16:24-16:54/30		18:19	07:19-07:44/25		20:17			21:12			21:55	05:28-05:48/20	
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13	08:38	15:17-15:55/38		07:51	16:34-17:00/26		06:48	17:27-17:58/31		06:32	19:27-19:42/15		05:29	20:14-20:44/30		04:55	05:27-05:47/20	
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17	08:34	15:26-16:02/36		07:43	16:39-17:09/30		06:38	17:36-18:06/30		06:23	19:41-20:01/20		05:22	20:16-20:51/35		04:54	05:27-05:47/20	
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19	08:32	15:45-16:07/22		07:39	16:40-17:13/33		06:33	17:43-18:10/27		06:18	19:42-20:04/22		05:19	20:18-20:54/36		04:54	05:27-05:47/20	
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	16:47			17:48			18:42			20:39	19:43-20:00/17		21:31	05:44-05:55/11		22:01	05:29-05:48/19	
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	16:52			17:54			18:47			20:44	19:49-19:54/5		21:36	05:40-05:54/14		22:01	05:29-05:49/20	
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	16:58	15:56-16:26/30		18:00	07:43-07:48/5		18:53			20:50			21:40	05:37-05:53/16		22:01	05:31-05:51/20	
29	08:19	08:47-08:52/5					07:09	19:03-19:28/25		05:56	20:02-20:22/20		05:06	20:31-21:07/36		04:58	05:31-05:51/20	
	17:00	15:58-16:28/30					19:55			20:52			21:41	05:36-05:52/16		22:01	05:31-05:51/20	
30	08:17	08:45-08:52/7					07:06	19:04-19:30/26		05:54	20:02-20:24/22		05:05	20:31-21:07/36		04:58	05:31-05:51/20	
	17:02	16:00-16:29/29					19:56			20:54			21:43	05:35-05:51/16		22:00	05:31-05:51/20	
31	08:15	08:44-08:54/10					07:04	19:05-19:31/26					05:04	20:32-21:07/35				
	17:04	16:01-16:31/30					19:58						21:44	05:34-05:51/17				
Potential sun hours	250			273			367			420			494			510		
Sum of minutes with flicker	1405			1023			1119			652								

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 3 - T03
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 05:32-05:52/20	05:39 20:24-20:53/29	06:33 19:24-19:44/20	07:26 18:05-18:36/31	07:24 08:04-08:21/17	08:19 14:56-15:34/38
2	22:00 20:49-21:11/22	21:25 20:23-20:52/29	20:18 19:47-19:50/3	19:05 07:59-08:13/14	16:54 15:53-16:23/30	16:10 09:12-09:28/16
3	05:00 05:33-05:53/20	05:40 20:21-20:50/29	06:36 19:19-19:44/25	07:30 18:03-18:31/28	07:28 08:02-08:23/21	08:22 14:55-15:32/37
4	21:59 20:49-21:11/22	21:21 20:19-20:48/29	20:13 19:17-19:43/26	19:00 07:56-08:21/25	16:50 15:49-16:19/30	16:08 09:11-09:31/20
5	05:01 05:34-05:53/19	05:44 20:16-20:46/30	06:38 19:15-19:41/26	07:32 18:02-18:29/27	07:30 08:01-08:24/23	08:24 14:55-15:32/37
6	21:59 20:49-21:12/23	21:19 20:15-20:45/30	20:11 19:13-19:39/26	18:57 07:58-08:23/25	16:48 15:47-16:17/30	16:08 09:11-09:33/22
7	05:02 05:35-05:54/19	05:45 20:14-20:43/29	06:40 19:10-19:35/25	07:33 18:01-18:26/25	07:32 08:02-08:24/22	08:25 14:54-15:30/36
8	21:58 20:49-21:12/23	21:17 20:12-20:41/29	20:09 19:09-19:33/24	18:55 08:00-08:24/24	16:46 15:46-16:15/29	16:07 09:11-09:34/23
9	05:03 05:36-05:55/19	05:47 20:11-20:37/26	06:42 19:04-19:28/24	07:35 17:54-18:24/30	07:34 08:04-08:24/20	08:26 09:11-09:40/29
10	21:58 20:47-21:13/26	21:06 20:10-20:35/25	06:51 19:02-19:26/24	18:52 08:02-08:25/23	16:44 15:45-16:12/27	16:07 14:54-15:29/35
11	05:04 05:37-05:55/18	05:49 20:10-20:34/24	06:52 18:58-19:24/26	07:37 17:47-18:21/34	07:36 08:06-08:24/18	08:28 09:11-09:41/30
12	21:57 20:45-21:13/28	21:03 20:10-20:31/21	06:54 18:56-19:22/26	18:50 08:04-08:25/21	16:43 15:44-16:10/26	16:06 14:54-15:29/35
13	05:05 05:38-05:56/18	05:51 20:10-20:31/21	06:54 18:56-19:22/26	07:39 17:44-18:18/34	07:38 08:09-08:25/16	08:29 09:12-09:46/34
14	21:56 20:44-21:14/30	21:12 20:10-20:29/19	06:56 18:53-19:18/25	18:48 08:05-08:24/19	16:41 15:41-16:08/27	16:06 14:53-15:28/35
15	05:06 05:39-05:57/18	05:52 20:10-20:28/18	06:58 18:52-19:16/24	07:41 17:42-18:16/34	07:40 08:11-08:25/14	08:30 09:11-09:47/36
16	21:55 20:43-21:14/31	21:10 20:10-20:25/15	06:59 18:50-19:14/24	18:45 08:07-08:24/17	16:39 15:41-16:07/26	16:05 14:54-15:28/34
17	05:07 20:42-21:15/33	05:54 20:10-20:25/15	06:59 18:50-19:14/24	07:43 17:40-18:14/34	07:42 08:13-08:25/12	08:32 09:11-09:48/37
18	21:55 20:40-05:57/17	21:08 20:10-20:25/15	06:59 18:50-19:14/24	18:43 08:09-08:24/15	16:37 15:35-16:05/30	16:05 14:54-15:28/34
19	05:08 20:42-21:15/33	05:56 20:10-20:25/15	06:59 18:50-19:14/24	07:44 17:39-18:11/32	07:44 08:15-08:25/10	08:33 09:12-09:49/37
20	21:54 05:41-05:58/17	21:06 20:10-20:25/15	06:59 18:50-19:14/24	18:41 08:11-08:23/12	16:36 15:33-16:03/30	16:05 14:54-15:27/33
21	05:09 20:41-21:15/34	05:58 20:10-20:25/15	06:59 18:50-19:14/24	07:46 17:38-18:09/31	07:46 08:17-08:24/7	08:34 09:13-09:51/38
22	21:53 05:42-05:59/17	21:03 20:10-20:25/15	06:59 18:50-19:14/24	18:38 08:13-08:23/10	16:34 15:32-16:01/29	16:05 14:54-15:27/33
23	05:11 20:40-21:13/28	05:59 20:10-20:31/21	06:54 18:56-19:22/26	07:48 17:36-18:07/31	07:47 08:19-08:24/5	08:35 09:14-09:52/39
24	05:12 20:39-21:15/36	06:01 20:10-20:29/19	06:56 18:53-19:18/25	18:36 08:15-08:22/7	16:32 15:29-15:59/30	16:05 14:54-15:26/32
25	21:51 05:44-06:00/16	20:59 20:10-20:28/18	06:58 18:52-19:16/24	07:50 17:33-18:04/31	07:49 08:21-08:23/2	08:36 09:13-09:53/40
26	05:13 20:39-21:15/36	06:03 20:10-20:28/18	06:58 18:52-19:16/24	18:33 08:17-08:20/3	16:31 15:28-15:57/29	16:05 14:55-15:26/31
27	21:50 05:45-06:01/16	20:57 20:10-20:25/15	06:59 18:50-19:14/24	07:52 17:30-18:02/32	07:51 15:25-15:56/31	08:37 09:14-09:54/40
28	05:14 20:39-21:15/36	06:05 20:10-20:25/15	06:59 18:50-19:14/24	18:31 08:17-08:20/3	16:29 15:24-15:54/30	16:05 14:55-15:26/31
29	21:49 05:47-06:02/15	20:55 20:10-20:25/15	06:59 18:50-19:14/24	07:54 17:29-17:59/30	07:53 15:24-15:54/30	08:38 09:13-09:56/43
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51	21:33 06:02-06:05/3	20:30 19:44-20:02/18	07:19 18:14-18:46/32	17:07 16:07-16:34/27	16:15 15:02-15:38/36	08:44 09:19-10:03/44
52	05:32 20:26-20:59/33	06:26 19:32-19:38/6	07:21 18:11-18:44/33	17:07 16:07-16:31/24	16:14 15:00-15:37/37	16:10 15:01-15:32/31
53	21:32 06:03-06:05/2	20:28 19:44-19:59/15	07:22 18:09-18:41/32	17:02 16:02-16:29/27	16:13 09:16-09:21/5	08:44 09:19-10:00/41
54	05:34 20:26-20:58/32	06:28 19:29-19:41/12	07:22 18:09-18:41/32	17:02 16:02-16:29/27	16:13 09:16-09:21/5	16:11 15:02-15:33/31
55	21:30 20:25-20:56/31	06:29 19:28-19:43/15	07:24 18:06-18:38/32	17:00 16:02-16:29/27	16:12 09:13-09:23/10	08:44 09:20-10:00/40
56	05:35 20:25-20:56/31	06:29 19:28-19:43/15	07:24 18:06-18:38/32	17:00 16:02-16:29/27	16:12 09:13-09:23/10	16:12 15:02-15:34/32
57	21:28 20:26-20:55/29	06:31 19:25-19:43/18	07:24 18:06-18:38/32	17:00 16:02-16:29/27	16:12 09:13-09:23/10	08:44 09:21-10:00/39
58	05:37 20:26-20:55/29	06:31 19:25-19:43/18	07:24 18:06-18:38/32	17:00 16:02-16:29/27	16:12 09:13-09:23/10	16:12 15:03-15:35/32
59	21:27 20:26-20:55/29	06:31 19:25-19:43/18	07:24 18:06-18:38/32	17:00 16:02-16:29/27	16:12 09:13-09:23/10	08:44 09:20-09:59/39
60	05:37 20:26-20:55/29	06:31 19:25-19:43/18	07:24 18:06-18:38/32	17:00 16:02-16:29/27	16:12 09:13-09:23/10	16:13 15:03-15:35/32

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 4 - T04
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June	
1	08:44 14:39-15:37/58	08:14 15:26-16:35/69	07:16 16:35-17:34/59	07:01 18:44-19:33/49	05:52 20:22-20:26/4	19:30-20:03/33	05:03 20:08-21:10/62					
2	16:15	17:06	18:02	20:00	20:55 06:18-06:31/13		21:45 05:33-05:46/13					
	08:44 14:41-15:39/58	08:12 15:26-16:37/71	07:14 16:36-17:36/60	06:59 18:44-19:35/51	05:50 20:18-20:27/9	19:30-20:02/32	05:02 20:10-21:12/62					
3	16:16	17:08	18:04	20:02	20:57 06:16-06:30/14		21:46 05:33-05:46/13					
	08:44 14:41-15:39/58	08:10 15:27-16:39/72	07:12 16:40-17:38/58	06:56 18:46-19:37/51	05:48 20:15-20:29/14	19:31-20:01/30	05:01 20:10-21:13/63					
4	16:17	17:10	18:06	20:04	20:59 06:14-06:29/15		21:48 05:32-05:45/13					
	08:43 14:43-15:41/58	08:08 15:28-16:41/73	07:09 16:45-17:41/56	06:54 18:48-19:38/50	05:46 20:13-20:30/17	19:32-19:59/27	05:00 20:10-21:14/64					
5	16:18	17:12	18:08	20:06	21:01 06:12-06:28/16		21:49 05:31-05:44/13					
	08:43 14:43-15:42/59	08:07 15:29-16:43/74	07:07 16:47-17:42/55	06:51 18:50-19:38/48	05:44 20:11-20:32/21	19:33-19:58/25	04:59 20:11-21:15/64					
6	16:20	17:14	18:09	20:07	21:03 06:10-06:27/17		21:50 05:31-05:44/13					
	08:43 14:44-15:44/60	08:05 15:31-16:45/74	07:04 16:52-17:45/53	06:49 18:51-19:38/47	05:42 20:10-20:33/23	19:34-19:56/22	04:59 20:11-21:16/65					
7	16:21	17:16	18:11	20:09	21:04 06:09-06:27/18		21:51 05:30-05:44/14					
	08:42 14:44-15:45/61	08:03 15:32-16:47/75	07:02 16:53-17:46/53	06:47 18:52-19:37/45	05:40 20:10-20:36/26	19:37-19:55/18	04:58 20:12-21:16/64					
8	16:22	17:18	18:13	20:11	21:06 06:07-06:25/18		21:52 05:30-05:44/14					
	08:42 14:45-15:46/61	08:01 15:34-16:50/76	07:00 16:54-17:48/54	06:44 18:54-19:37/43	05:38 20:08-20:37/29	19:39-19:53/14	04:57 20:13-21:18/65					
9	16:24	17:20	18:15	20:13	21:08 06:05-06:22/17		21:53 05:29-05:42/13					
	08:41 14:46-15:49/63	07:59 15:37-16:52/75	06:57 16:54-17:50/56	06:42 18:56-19:37/41	05:36 20:07-20:39/32	19:43-19:48/5	04:57 20:13-21:19/66					
10	16:25	17:22	18:17	20:15	21:10 06:03-06:11/8	06:13-06:19/6	21:54 05:29-05:42/13					
	08:40 14:47-15:50/63	07:57 15:41-16:54/73	06:55 16:56-17:52/56	06:39 18:56-19:36/40	05:34 20:06-20:40/34		04:56 20:14-21:19/65					
11	16:27	17:24	18:19	20:17	21:11 06:02-06:11/9		21:55 05:28-05:40/12					
	08:40 14:47-15:52/65	07:55 15:53-16:56/63	06:53 16:57-17:55/58	06:37 18:58-19:36/38	05:33 20:06-20:42/36		04:56 20:14-21:20/66					
12	16:28	17:26	18:21	20:19	21:13 06:00-06:10/10		21:55 05:28-05:41/13					
	08:39 14:48-15:54/66	07:53 15:55-16:58/63	06:50 16:58-17:56/58	06:35 19:00-19:35/35	05:31 20:06-20:43/37		04:55 20:15-21:21/66					
13	16:30	17:28	18:23	20:20	21:15 05:58-06:09/11		21:56 05:28-05:41/13					
	08:38 14:49-15:55/66	07:51 15:56-17:00/64	06:48 17:00-17:58/58	06:32 19:01-19:34/33	05:29 20:05-20:44/39		04:55 20:15-21:21/66					
14	16:31	17:30	18:25	20:22	21:17 05:57-06:09/12		21:57 05:27-05:40/13					
	08:37 14:50-15:57/67	07:49 15:56-17:02/66	06:45 17:02-18:00/58	06:30 19:02-19:33/31	05:27 20:05-20:47/42		04:55 20:16-21:22/66					
15	16:33	17:32	18:27	20:24	21:18 05:55-06:07/12		21:58 05:27-05:40/13					
	08:36 14:51-15:59/68	07:47 15:57-17:05/68	06:43 17:07-18:02/55	06:28 19:03-19:32/29	05:26 20:04-20:48/44		04:55 20:16-21:22/66					
16	16:34	17:34	18:28	20:26	21:20 05:54-06:06/8		21:58 05:27-05:41/14					
	08:35 14:51-16:00/69	07:45 15:58-17:07/69	06:40 17:10-18:04/54	06:25 19:04-19:31/27	05:24 20:05-20:50/45		04:54 20:17-21:23/66					
17	16:36	17:36	18:30	20:28	21:22 05:53-06:05/9		21:59 05:27-05:41/14					
	08:34 14:53-16:02/69	07:43 15:59-17:09/70	06:38 17:14-18:06/52	06:23 19:05-19:28/23	05:22 20:04-20:51/47		04:54 20:17-21:23/66					
18	16:38	17:38	18:32	20:30	21:23 05:52-06:04/9		21:59 05:27-05:41/14					
	08:33 14:54-16:05/71	07:41 15:59-17:11/72	06:36 17:17-18:07/50	06:21 19:07-19:26/19	05:21 20:05-20:53/48		04:54 20:17-21:24/67					
19	16:40	17:40	18:34	20:31	21:25 05:51-06:03/9		22:00 05:27-05:41/14					
	08:32 14:56-16:07/71	07:39 16:00-17:13/73	06:33 17:21-18:10/49	06:18 19:09-19:24/15	05:19 20:05-20:54/49		04:54 20:18-21:24/66					
20	16:41	17:42	18:36	20:33	21:27 05:50-06:02/9		22:00 05:27-05:41/14					
	08:31 14:57-16:08/71	07:36 16:01-17:16/75	06:31 17:24-18:11/47	06:16 19:14-19:19/5	05:18 20:04-20:55/51		04:54 20:18-21:24/66					
21	16:43	17:44	18:38	20:35	21:28 05:49-06:01/9		22:00 05:27-05:41/14					
	08:30 14:59-15:18/19	07:34 16:03-17:18/75	06:28 17:25-18:13/48	06:14 19:28-20:06/38	05:16 20:05-20:57/52		04:54 20:18-21:24/66					
22	16:45	17:46	18:40	20:37	21:30 05:45-05:46/1		22:01 05:27-05:41/14					
	08:29 15:01-15:16/15	07:32 16:04-17:19/75	06:26 17:25-18:15/50	06:12 19:28-20:06/38	05:15 20:05-20:59/54		04:55 20:19-21:25/66					
23	16:47	17:48	18:42	20:39	21:31 05:44-05:47/3		22:01 05:28-05:42/14					
	08:27 15:05-15:13/8	07:30 16:06-17:22/76	06:23 17:26-18:17/51	06:09 19:28-20:06/38	05:13 20:05-20:59/54		04:55 20:19-21:25/66					
24	16:49	17:50	18:43	20:41	21:33 05:43-05:47/4		22:01 05:28-05:42/14					
	08:26 15:20-16:17/57	07:28 16:09-17:24/75	06:21 17:27-18:18/51	06:07 19:28-20:06/38	05:12 20:05-21:01/56		04:55 20:19-21:25/66					
25	16:51	17:52	18:45	20:43	21:34 05:41-05:46/5		22:01 05:28-05:42/14					
	08:24 15:22-16:19/57	07:25 16:12-17:26/74	06:18 17:29-18:21/52	06:05 19:30-20:06/38	05:11 20:06-21:02/56		04:56 20:19-21:25/66					
26	16:52	17:54	18:47	20:44	21:36 05:40-05:46/6		22:01 05:29-05:43/14					
	08:23 15:22-16:21/59	07:23 16:21-17:28/67	06:16 17:30-18:22/52	06:03 19:28-20:06/38	05:09 20:06-21:04/58		04:56 20:19-21:25/66					
27	16:54	17:56	18:49	20:46	21:37 05:39-05:47/8		22:01 05:29-05:43/14					
	08:22 15:22-16:23/61	07:21 16:25-17:31/66	06:13 17:34-18:24/50	06:01 19:28-20:06/38	05:08 20:07-21:05/58		04:56 20:18-21:24/66					
28	16:56	17:58	18:51	20:48	21:39 05:38-05:46/8		22:01 05:30-05:44/14					
	08:20 15:23-16:26/63	07:19 16:33-17:32/59	06:11 17:39-18:26/47	05:58 19:28-20:05/37	05:07 20:07-21:06/59		04:57 20:19-21:25/66					
29	16:58	18:00	18:53	20:50	21:40 05:37-05:46/9		22:01 05:30-05:43/13					
	08:19 15:23-16:28/65		07:09 18:39-19:28/49	05:56 19:28-20:05/37	05:06 20:07-21:07/60		04:58 20:19-21:25/66					
30	17:00		19:55	20:52	21:41 05:36-05:46/10		22:01 05:31-05:44/13					
	08:17 15:24-16:30/66		07:06 18:41-19:30/49	05:54 19:29-20:04/35	05:05 20:08-21:08/60		04:58 20:19-21:25/66					
31	17:02		19:56	20:54	21:43 05:35-05:46/11		22:00 05:31-05:44/13					
	08:15 15:24-16:32/68		07:04 18:42-19:31/49		05:04 20:08-21:09/61							
	17:04		19:58		21:44 05:34-05:46/12							
Potential sun hours	250	273	367	420	494	510						
Sum of minutes with flicker	1980	1982	1647	1381	1762	2364						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 4 - T04
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 20:19-21:24/65	05:39 20:16-20:53/37	06:33 18:57-19:35/38	07:26 17:38-18:36/58	07:24 15:09-16:23/74	08:19 14:30-15:34/64
2	05:00 20:19-21:24/65	05:40 20:17-20:52/35	06:35 18:55-19:35/40	07:28 17:36-18:33/57	07:26 15:06-16:21/75	08:21 14:29-15:33/64
3	05:00 20:18-21:23/65	05:42 20:17-20:50/33	06:36 18:53-19:34/41	07:30 17:34-18:31/57	07:28 15:04-16:19/75	08:22 14:29-15:32/63
4	05:01 20:18-21:23/65	05:44 20:18-20:48/30	06:38 18:51-19:34/43	07:31 17:33-18:29/56	07:30 15:02-16:17/75	08:24 14:30-15:32/62
5	05:02 20:18-21:23/65	05:45 20:18-20:46/28	06:40 18:49-19:34/45	07:33 17:32-18:26/54	07:32 15:00-16:15/75	08:25 14:30-15:30/60
6	05:03 20:18-21:22/64	05:47 20:19-20:45/26	06:42 18:47-19:34/47	07:35 17:31-18:24/53	07:34 14:59-16:12/73	08:26 14:30-15:30/60
7	05:04 20:18-21:22/64	05:49 20:21-20:43/22	06:43 18:45-19:33/48	07:37 17:29-18:21/52	07:36 14:58-16:10/72	08:28 14:30-15:29/59
8	05:05 20:18-21:21/63	05:51 20:21-20:41/20	06:45 18:42-19:33/51	07:39 17:24-18:18/54	07:38 14:57-16:08/71	08:29 14:30-15:28/58
9	05:06 20:17-21:21/64	05:52 20:23-20:39/16	06:47 18:40-19:31/51	07:41 17:21-18:16/55	07:40 14:56-16:06/70	08:30 14:30-15:28/58
10	05:07 20:17-21:20/63	05:54 20:24-20:37/13	06:49 18:38-19:28/50	07:42 17:17-18:14/57	07:42 14:56-16:05/69	08:31 14:30-15:28/58
11	05:08 20:17-21:19/62	05:56 20:27-20:35/8	06:51 18:36-19:26/50	07:44 17:12-18:11/59	07:44 14:56-16:03/67	08:33 14:30-15:27/57
12	05:09 20:17-21:18/61	05:58 20:33-20:34/1	06:52 18:34-19:24/50	07:46 17:09-18:09/60	07:45 14:55-16:01/66	08:34 14:29-15:27/58
13	05:11 20:16-21:17/61	05:59 06:28-06:41/13	06:54 18:32-19:22/50	07:48 17:07-18:07/60	07:47 14:55-15:59/64	08:35 14:29-15:27/58
14	05:12 20:16-21:16/60	06:01 06:30-06:41/11	06:56 18:30-19:18/48	07:50 17:01-18:04/63	07:49 14:55-15:58/63	08:36 14:29-15:26/57
15	05:13 20:16-21:15/59	06:03 06:32-06:41/9	06:58 18:28-19:16/48	07:52 16:56-18:02/66	07:51 14:55-15:56/61	08:37 14:30-15:26/56
16	05:14 20:16-21:15/59	06:05 06:33-06:40/7	06:59 18:24-19:14/50	07:54 16:48-17:59/71	07:53 14:55-15:54/59	08:38 14:30-15:26/56
17	05:16 20:16-21:14/58	06:06 06:35-06:41/6	07:01 18:19-19:11/52	07:55 16:42-17:57/75	07:55 14:55-15:52/57	08:38 14:31-15:27/56
18	05:17 20:15-21:12/57	06:08 06:37-06:41/4	07:03 18:16-19:08/52	07:57 16:39-17:55/76	07:57 14:54-15:51/57	08:39 14:31-15:27/56
19	05:18 20:15-21:11/56	06:10 06:38-06:39/1	07:05 18:14-19:06/52	07:59 16:37-17:52/75	07:59 14:39-14:47/8	08:40 14:32-15:28/56
20	05:20 20:16-21:10/54	06:12 06:38-06:39/1	07:06 18:13-19:04/51	08:01 16:35-17:50/75	08:00 14:36-14:51/15	08:41 14:31-15:27/56
21	05:21 20:15-21:09/54	06:13 06:34-20:12/38	07:08 18:11-19:01/50	08:03 16:33-17:48/75	08:02 14:34-14:53/19	08:41 14:32-15:28/56
22	05:23 20:15-21:07/52	06:15 06:33-20:11/38	07:10 18:10-18:58/48	08:05 16:31-17:45/74	08:04 14:33-15:44/71	08:42 14:32-15:28/56
23	05:24 20:15-21:07/52	06:17 06:33-20:10/36	07:12 18:09-18:56/47	08:07 16:30-17:43/73	08:06 14:32-15:43/71	08:42 14:33-15:29/56
24	05:26 20:15-21:05/50	06:19 06:33-20:09/35	07:14 18:06-18:54/48	08:09 16:29-17:41/72	08:08 14:31-15:42/71	08:43 14:34-15:30/56
25	05:27 20:15-21:04/49	06:20 06:33-20:09/35	07:15 18:01-18:51/50	08:11 15:28-16:38/70	08:09 14:31-15:41/70	08:43 14:34-15:30/56
26	05:29 20:15-21:02/47	06:22 06:33-20:09/35	07:17 17:57-18:48/51	08:13 15:27-16:36/69	08:11 14:30-15:39/69	08:43 14:34-15:30/56
27	05:31 20:16-21:01/45	06:24 06:33-20:09/35	07:19 17:53-18:46/53	08:15 15:26-16:34/68	08:13 14:30-15:38/68	08:44 14:36-15:32/56
28	05:32 20:15-20:59/44	06:26 06:33-20:09/35	07:21 17:49-18:44/55	08:16 15:26-16:31/65	08:14 14:30-15:37/67	08:44 14:36-15:33/57
29	05:34 20:16-20:58/42	06:28 06:33-20:09/35	07:22 17:44-18:41/57	08:18 15:25-16:29/64	08:16 14:29-15:36/67	08:44 14:37-15:34/57
30	05:35 20:16-20:56/40	06:29 06:33-20:09/35	07:24 17:40-18:38/58	08:20 15:23-16:27/64	08:18 14:29-15:35/66	08:44 14:37-15:34/57
31	05:37 20:16-20:55/39	06:31 06:33-20:09/35	07:26 17:38-18:36/58	08:22 15:22-16:25/63	08:20 14:29-15:34/66	08:44 14:38-15:35/57
Potential sun hours	512	460	382	328	259	233
Sum of minutes with flicker	2009	1538	1481	1990	2045	1792

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 5 - T05
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 15:07-15:37/30 16:15	08:14 16:03-16:35/32 17:06	07:16 16:59-17:34/35 18:02	07:01 18:39-19:33/54 20:00	05:52 19:48-20:26/38 20:55 06:18-06:56/38	05:03 20:03-21:03/60 21:45 05:33-05:57/24
2	08:44 15:07-15:39/32 16:16	08:12 16:05-16:37/32 17:08	07:14 17:00-17:36/36 18:04	06:59 18:44-19:33/49 20:02 07:23-07:51/28	05:50 19:49-20:27/38 20:57 06:16-06:54/38	05:02 20:04-21:12/68 21:46 05:33-05:58/25
3	08:44 15:07-15:39/32 16:17	08:10 16:08-16:39/31 17:10	07:12 17:03-17:10/7 18:06 17:11-17:36/25	06:56 18:45-19:34/49 20:04 07:20-07:49/29	05:48 19:49-20:29/40 20:59 06:16-06:53/37	05:01 20:04-21:13/69 21:48 05:32-05:58/26
4	08:43 15:09-15:41/32 16:18	08:08 16:10-16:41/31 17:12	07:09 17:11-17:36/25 18:08	06:54 18:45-19:34/49 20:06 07:18-07:48/30	05:46 19:50-20:30/40 21:01 06:16-06:52/36	05:00 20:03-21:14/71 21:49 05:31-05:58/27
5	08:43 15:09-15:42/33 16:20	08:07 16:11-16:43/32 17:14	07:07 17:37-17:41/4 18:09 17:11-17:35/24	06:52 18:45-19:33/48 20:07 07:15-07:46/31	05:44 19:50-20:32/42 21:03 06:16-06:50/34	04:59 20:04-21:15/71 21:50 05:31-05:59/28
6	08:43 15:10-15:44/34 16:21	08:05 16:12-16:45/33 17:16	07:05 17:11-17:45/34 18:11	06:49 18:47-19:33/46 20:09 07:13-07:44/31	05:42 19:51-20:32/41 21:04 06:17-06:49/32	04:59 20:03-21:16/73 21:51 05:30-05:59/29
7	08:42 15:10-15:45/35 16:22	08:03 16:13-16:47/34 17:18	07:02 17:11-17:46/35 18:13	06:47 18:47-19:32/45 20:11 07:11-07:40/29	05:40 19:52-20:33/41 21:06 06:17-06:48/31	04:58 20:03-21:16/73 21:52 05:30-06:00/30
8	08:42 15:11-15:46/35 16:24	08:01 16:16-16:50/34 17:20	07:00 17:12-17:48/36 18:15	06:44 18:49-19:31/42 20:13 07:08-07:34/26	05:38 19:53-20:37/44 21:08 06:18-06:47/29	04:57 20:03-21:17/74 21:53 05:29-06:00/31
9	08:41 15:12-15:49/37 16:25	07:59 16:19-16:52/33 17:22	06:57 17:12-17:50/38 18:17	06:42 18:51-19:31/40 20:15 07:06-07:34/28	05:36 19:54-20:38/44 21:10 06:18-06:46/28	04:57 20:04-21:19/75 21:54 05:29-06:01/32
10	08:40 15:13-15:50/37 16:27	07:57 16:22-16:54/32 17:24	06:55 17:14-17:52/38 18:19	06:39 07:04-07:32/28 20:17 18:54-19:29/35	05:34 06:20-06:45/25 21:11 19:55-20:40/45	04:56 20:03-21:19/76 21:55 05:28-06:01/33
11	08:40 15:14-15:52/38 16:28	07:55 16:25-16:56/31 17:26	06:53 17:17-17:55/38 18:21	06:37 19:48-19:51/3 19:06-19:28/22 20:19 07:05-07:32/27	05:33 19:58-20:42/44 21:13 06:21-06:44/23	04:56 20:04-21:20/76 21:55 05:28-06:01/33
12	08:39 15:15-15:54/39 16:30	07:53 16:27-16:58/31 17:28	06:50 17:22-17:56/34 18:23	06:35 19:46-19:53/7 19:07-19:26/19 20:20 07:06-07:31/25	05:31 20:02-20:43/41 21:15 06:21-06:42/21	04:55 20:04-21:21/77 21:56 05:28-06:02/34
13	08:38 15:17-15:55/38 16:31	07:51 16:30-17:00/30 17:30	06:48 17:21-17:58/37 18:25	06:32 19:44-19:54/10 19:09-19:23/14 20:22 07:07-07:30/23	05:29 20:02-20:45/43 21:17 06:24-06:41/17	04:55 20:03-21:21/78 21:57 05:27-06:01/34
14	08:37 15:18-15:57/39 16:33	07:49 16:32-17:02/30 17:32	06:45 17:20-18:00/40 18:27	06:30 19:43-19:56/13 07:07-07:27/20 20:24 19:13-19:19/6	05:27 20:04-20:47/43 21:18 06:25-06:38/13	04:55 20:04-21:21/77 21:58 05:27-06:02/35
15	08:36 15:21-15:59/38 16:35	07:47 16:34-17:05/31 17:34	06:43 17:20-18:02/42 18:28	06:28 19:42-19:58/16 07:09-07:25/16 20:26 06:52-06:54/2	05:26 20:04-20:48/44 21:20 06:28-06:35/7	04:55 20:04-21:22/78 21:58 05:27-06:02/35
16	08:35 15:27-16:00/33 16:36	07:45 16:35-17:07/32 17:36	06:40 17:19-18:04/45 18:30	06:25 19:41-20:00/19 07:11-07:23/12 20:28 06:50-06:56/6	05:24 20:05-20:50/45 21:22	04:54 20:04-21:23/79 21:59 05:27-06:02/35
17	08:34 15:28-16:03/35 16:38	07:43 16:37-17:09/32 17:38	06:38 17:20-18:06/46 18:32	06:23 19:41-20:01/20 20:30 06:47-06:56/9	05:22 20:06-20:51/45 21:23	04:54 20:04-21:23/79 21:59 05:27-06:03/36
18	08:33 15:30-16:05/35 16:40	07:41 16:38-17:11/33 17:40	06:36 17:19-18:07/48 18:34	06:21 19:41-20:03/22 20:31 06:45-06:57/12	05:21 20:08-20:52/44 21:25	04:54 20:05-21:24/79 22:00 05:27-06:03/36
19	08:32 15:31-16:07/36 16:41	07:39 16:44-17:13/29 17:42	06:33 17:20-18:10/50 18:36	06:18 19:41-20:05/24 20:33 06:43-06:58/15	05:19 20:10-20:54/44 21:27	04:54 20:05-21:24/79 22:00 05:27-06:03/36
20	08:31 15:32-16:08/36 16:43	07:36 16:45-17:16/31 17:44	06:31 17:20-18:11/51 18:38	06:16 19:42-20:07/25 20:35 06:41-06:59/18	05:18 20:09-20:55/46 21:28	04:54 20:05-21:24/79 22:00 05:27-06:03/36
21	08:30 15:33-16:11/38 16:45	07:34 16:46-17:18/32 17:46	06:28 17:21-18:13/52 18:40	06:14 19:42-20:08/26 20:37 06:39-06:59/20	05:16 20:09-20:57/48 21:30 05:45-05:48/3	04:55 20:05-21:24/79 22:01 05:27-06:03/36
22	08:29 15:34-16:12/38 16:47	07:32 16:48-17:19/31 17:48	06:26 17:21-18:15/54 18:42	06:12 19:42-20:10/28 20:39 06:36-06:59/23	05:15 20:08-20:58/50 21:31 05:44-05:50/6	04:55 20:06-21:25/79 22:01 05:28-06:04/36
23	08:27 15:36-16:15/39 16:49	07:30 16:49-17:20/31 17:50	06:23 17:23-18:17/54 18:43	06:09 19:43-20:12/29 20:41 06:34-06:59/25	05:13 20:07-20:58/51 21:33 05:43-05:51/8	04:55 20:06-21:25/79 22:01 05:28-06:04/36
24	08:26 15:38-16:17/39 16:51	07:28 16:52-17:20/28 17:52	06:21 17:24-18:18/54 18:45	06:07 19:43-20:13/30 20:43 06:32-06:59/27	05:12 20:06-20:59/53 21:34 05:41-05:51/10	04:55 20:06-21:25/79 22:01 05:28-06:04/36
25	08:24 15:42-16:19/37 16:52	07:25 16:53-17:26/33 17:54	06:18 17:27-18:21/54 18:47	06:05 19:44-20:15/31 20:44 06:30-06:59/29	05:11 20:06-20:59/53 21:36 05:40-05:53/13	04:56 20:06-21:25/79 22:01 05:29-06:05/36
26	08:23 15:45-16:21/36 16:54	07:23 16:55-17:28/33 17:56	06:16 17:30-18:23/53 18:49	06:03 19:45-20:17/32 20:46 06:28-06:59/31	05:09 20:06-21:00/54 21:37 05:39-05:53/14	04:56 20:06-21:25/79 22:01 05:29-06:05/36
27	08:22 15:47-16:23/36 16:56	07:21 16:56-17:31/35 17:58	06:13 17:30-18:24/54 18:51	06:01 19:46-20:19/33 20:48 06:26-06:58/32	05:08 20:05-21:01/56 21:39 05:38-05:54/16	04:56 20:07-21:25/78 22:01 05:30-06:05/35
28	08:20 15:53-16:26/33 16:58	07:19 16:57-17:32/35 18:00	06:11 17:31-18:26/55 18:53	05:58 19:48-20:21/33 20:50 06:24-06:58/34	05:07 20:05-21:01/56 21:40 05:37-05:55/18	04:57 20:07-21:25/78 22:01 05:30-06:05/35
29	08:19 15:55-16:28/33 17:00	07:09 18:32-19:28/56 19:55	07:09 18:32-19:28/56 19:55	05:56 19:48-20:22/34 20:52 06:22-06:57/35	05:06 20:04-21:02/58 21:41 05:36-05:56/20	04:58 20:07-21:25/78 22:01 05:31-06:05/34
30	08:17 15:56-16:30/34 17:02	07:06 18:34-19:30/56 19:56	07:06 18:34-19:30/56 19:56	05:54 19:48-20:24/36 20:54 06:20-06:56/36	05:05 20:04-21:02/58 21:43 05:35-05:56/21	04:58 20:07-21:24/77 22:00 05:31-06:05/34
31	08:15 15:58-16:32/34 17:04	07:04 18:35-19:31/56 19:58	07:04 18:35-19:31/56 19:58		05:04 20:04-21:03/59 21:06-21:09/3 21:44 05:34-05:56/22	
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	1101	895	2028	1775	2011	3271

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 11:16/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N149 Worst Case WTG: 5 - T05
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

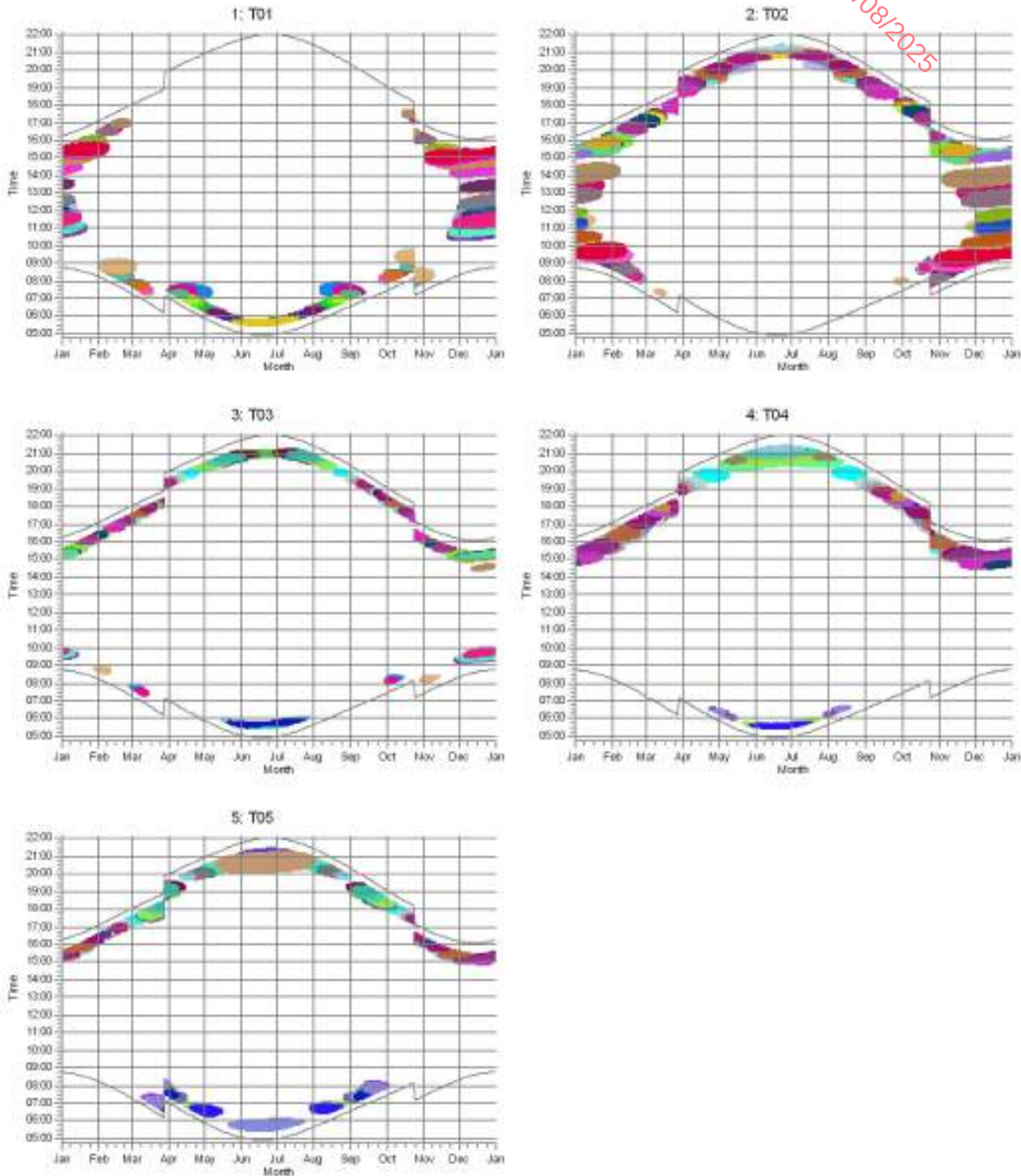
July		August		September		October		November		December	
1	04:59 20:08-21:24/76	05:39 20:10-20:53/43	05:39 20:10-20:53/43	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
2	05:00 20:08-21:24/76	05:40 20:10-20:53/43	05:40 20:10-20:53/43	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
3	05:00 20:08-21:24/76	05:40 20:10-20:53/43	05:40 20:10-20:53/43	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
4	05:01 20:09-21:23/74	05:41 20:11-20:52/41	05:41 20:11-20:52/41	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
5	05:02 20:09-21:23/74	05:42 20:12-20:51/40	05:42 20:12-20:51/40	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
6	05:03 20:10-21:22/72	05:43 20:13-20:50/39	05:43 20:13-20:50/39	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
7	05:04 20:10-21:22/72	05:44 20:14-20:49/38	05:44 20:14-20:49/38	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
8	05:05 20:10-21:21/71	05:45 20:15-20:48/37	05:45 20:15-20:48/37	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
9	05:06 20:11-21:21/70	05:46 20:16-20:47/36	05:46 20:16-20:47/36	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
10	05:07 20:11-21:20/69	05:47 20:17-20:46/35	05:47 20:17-20:46/35	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
11	05:08 20:12-21:19/67	05:48 20:18-20:44/34	05:48 20:18-20:44/34	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
12	05:09 20:12-21:11/59	05:49 20:19-20:36/33	05:49 20:19-20:36/33	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
13	05:11 20:12-21:11/59	05:51 20:21-20:34/32	05:51 20:21-20:34/32	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
14	05:12 20:13-21:11/58	05:52 20:22-20:33/31	05:52 20:22-20:33/31	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
15	05:13 20:13-21:10/57	05:53 20:23-20:32/30	05:53 20:23-20:32/30	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
16	05:14 20:14-21:11/57	05:54 20:24-20:31/29	05:54 20:24-20:31/29	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
17	05:16 20:15-21:10/55	05:56 20:26-20:29/28	05:56 20:26-20:29/28	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
18	05:17 20:15-21:09/54	05:57 20:27-20:28/27	05:57 20:27-20:28/27	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
19	05:19 20:16-21:08/52	05:59 20:28-20:26/26	05:59 20:28-20:26/26	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
20	05:20 20:17-21:09/52	06:00 20:29-20:25/25	06:00 20:29-20:25/25	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
21	05:21 20:17-21:08/51	06:01 20:30-20:24/24	06:01 20:30-20:24/24	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
22	05:23 20:18-21:07/49	06:03 20:32-20:23/23	06:03 20:32-20:23/23	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
23	05:24 20:19-21:07/48	06:04 20:33-20:22/22	06:04 20:33-20:22/22	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
24	05:26 20:20-21:05/45	06:06 20:35-20:21/21	06:06 20:35-20:21/21	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
25	05:27 20:19-21:04/45	06:07 20:36-20:20/20	06:07 20:36-20:20/20	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
26	05:29 20:18-21:02/44	06:09 20:38-20:19/19	06:09 20:38-20:19/19	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
27	05:31 20:17-21:01/44	06:11 20:40-20:18/18	06:11 20:40-20:18/18	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
28	05:32 20:15-20:59/44	06:13 20:42-20:17/17	06:13 20:42-20:17/17	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
29	05:34 20:15-20:58/43	06:15 20:44-20:16/16	06:15 20:44-20:16/16	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
30	05:35 20:14-20:56/42	06:17 20:46-20:15/15	06:17 20:46-20:15/15	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
31	05:37 20:13-20:55/42	06:19 20:48-20:14/14	06:19 20:48-20:14/14	06:33 19:47-19:50/3	19:05-19:26/21	07:26 18:00-18:36/36	07:24 15:51-16:23/32	08:19 14:56-15:34/38			
Potential sun hours	512	460	1820	382	2428	1040	1048	1016			
Sum of minutes with flicker	2336	460	1820	382	2428	1040	1048	1016			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

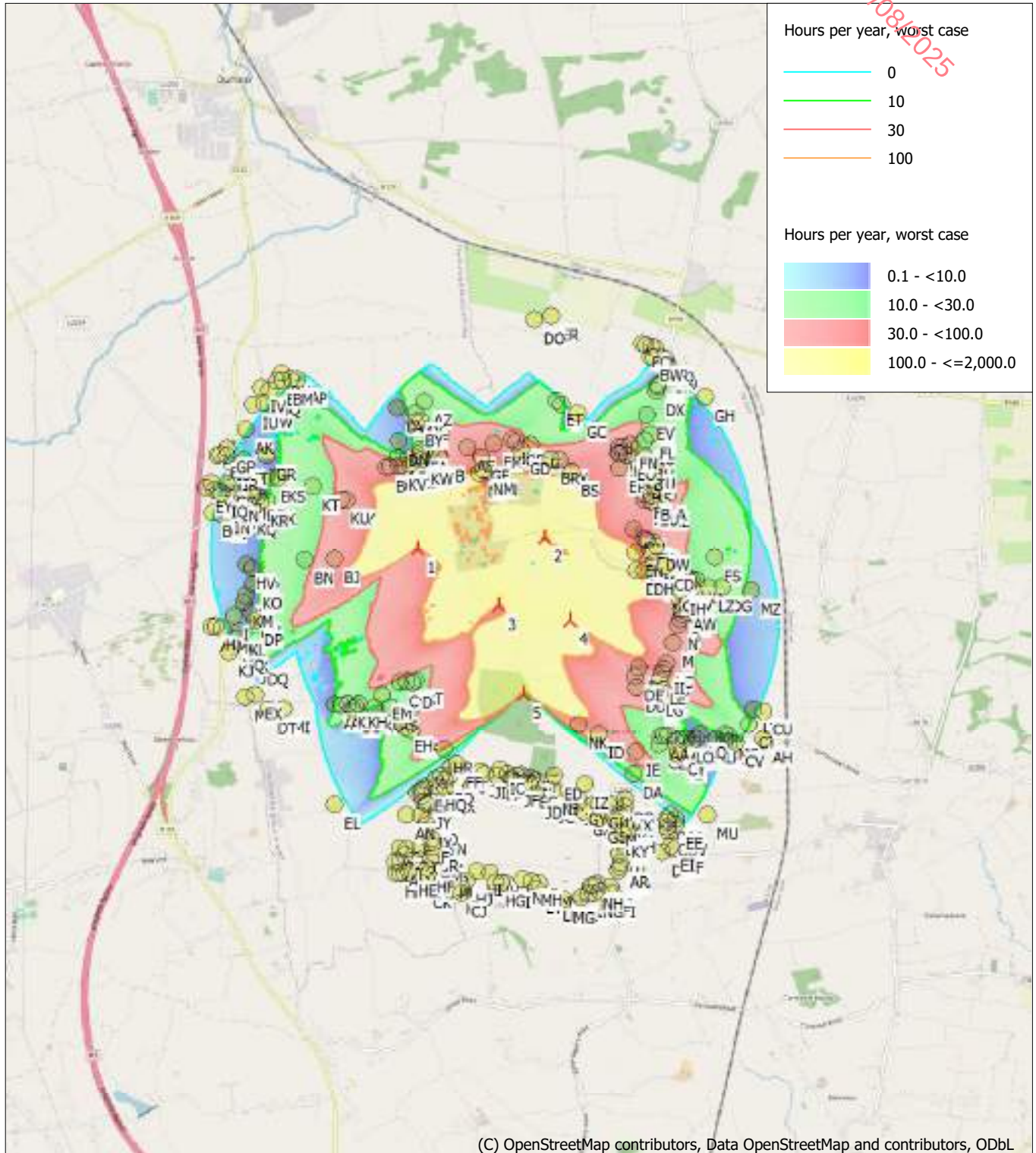
SHADOW - Calendar per WTG, graphical

Calculation: Kellystown N149 Worst Case



SHADOW - Map

Calculation: Kellystown N149 Worst Case



Map: EMD OpenStreetMap , Print scale 1:50,000, Map center Irish ITM-IRENET95 (IE), geocentric, GRS80 East: 708,030 North: 783,620
 New WTG Shadow receptor
 Flicker map level: Height Contours: CONTOURLINE_6918 Kellystown_3.wpo (3)
 Time step: 2 minutes, Day step: 3 days, Map resolution: 10 m, Visibility resolution: 5 m, Eye height: 1.5 m

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time
N NNE NE ENE E ESE SE SSE S SSW SW WSW
160 97 158 383 373 261 461 767 532 825 1,031 1,215

W WNW NW NNW Sum
766 673 581 477 8,760

Monthly aggregation of real case reduction
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_6918 Kellystown_3.w
Receptor grid resolution: 1.0 m

All coordinates are in
Irish ITM-IRENET95 (IE), geocentric, GRS80

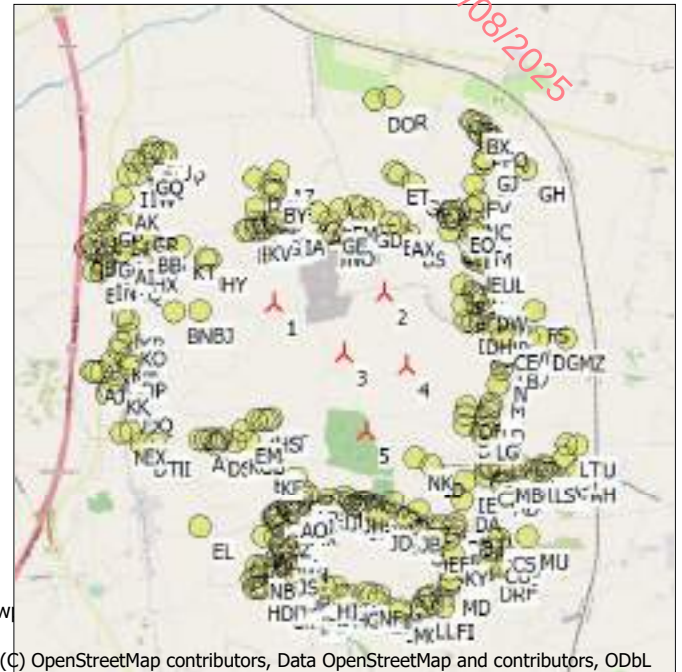
WTGs

Easting	Northing	Z	Row data/Description	WTG type		Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
				Valid	Manufact.	Type-generator			Calculation distance [m]	RPM [RPM]
1	707,338	784,036	115.1 T01	Yes	NORDEX	N163/6.X-7,000	7,000	163.0	98.0	1,789 10.7
2	708,442	784,163	104.9 T02	Yes	NORDEX	N163/6.X-7,000	7,000	163.0	98.0	1,789 10.7
3	708,057	783,557	98.1 T03	Yes	NORDEX	N163/6.X-7,000	7,000	163.0	98.0	1,789 10.7
4	708,686	783,447	90.3 T04	Yes	NORDEX	N163/6.X-7,000	7,000	163.0	98.0	1,789 10.7
5	708,289	782,794	112.2 T05	Yes	NORDEX	N163/6.X-7,000	7,000	163.0	98.0	1,789 10.7

Shadow receptor-Input

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	H1	709,505	784,550	91.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
B	H2	709,367	784,550	93.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
C	H3	707,206	782,871	130.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
D	H4	707,318	782,870	131.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
E	H5	707,444	781,961	140.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
F	H6	707,513	781,507	158.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
G	H7	707,383	781,906	145.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
H	H8	705,584	783,319	107.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
I	H9	705,744	783,414	104.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
J	H10	705,902	783,048	123.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
K	H11	708,134	781,146	127.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
L	H12	706,829	782,648	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
M	H13	709,591	783,271	84.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
N	H14	709,625	783,428	81.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
O	H15	709,647	783,479	84.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
P	H16	709,657	783,517	86.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Q	H17	709,551	783,895	97.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
R	H18	709,459	783,967	94.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
S	H19	709,386	784,693	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
T	H20	709,354	784,771	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
U	H21	709,398	784,820	73.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
V	H22	709,114	784,973	73.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...



SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
W H23		709,077	784,968	73.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
X H24		708,564	785,327	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Y H25		709,371	785,841	63.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Z H26		709,336	785,853	64.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AA H27		709,496	782,453	88.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AB H28		709,526	782,458	88.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AC H29		709,557	782,461	87.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AD H30		709,649	782,293	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AE H31		707,754	784,932	85.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AF H32		707,338	785,150	88.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AG H33		707,139	784,828	105.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AH H34		710,397	782,450	63.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AI H35		705,824	784,510	80.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AJ H36		705,550	783,314	106.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AK H37		705,812	785,050	78.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AL H38		707,240	781,305	179.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AM H39		707,528	781,402	160.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AN H40		707,291	781,712	158.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AO H41		707,540	782,027	136.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AP H42		707,674	782,146	133.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AQ H43		708,690	781,931	116.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AR H44		709,175	781,337	87.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AS H45		707,126	782,653	129.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AT H46		707,344	782,894	131.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AU H47		706,698	782,663	128.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AV H48		706,639	782,666	128.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AW H49		709,674	783,593	86.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AX H50		708,565	784,842	79.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AY H51		707,289	785,222	92.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AZ H52		707,364	785,326	87.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BA H53		706,194	785,494	90.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BB H54		706,039	784,628	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BC H55		707,042	784,741	105.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BD H56		707,077	784,751	104.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BE H57		705,927	784,462	79.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BF H58		705,705	784,510	85.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BG H59		705,521	784,573	88.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BH H60		705,656	784,393	92.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BI H61		705,616	784,300	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BJ H62		706,612	783,934	103.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BK H63		705,816	783,140	110.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BL H64		706,071	785,473	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BM H65		706,123	785,479	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BN H66		706,349	783,922	93.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BO H67		705,540	784,312	102.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BP H68		705,596	784,822	78.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BQ H69		708,136	785,009	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BR H70		708,483	784,848	80.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BS H71		708,669	784,739	80.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BT H72		709,294	784,805	78.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BU H73		709,311	784,893	73.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BV H74		709,363	785,756	61.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BW H75		709,335	785,767	61.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BX H76		709,291	785,868	64.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BY H77		707,293	785,144	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BZ H78		707,340	784,844	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CA H79		707,301	784,792	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CB H80		707,252	784,779	97.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CC H81		709,390	784,492	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CD H82		709,503	783,935	96.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CE H83		709,610	783,743	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CF H84		709,573	783,753	94.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CG H85		709,535	783,765	95.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CH H86		709,484	783,778	96.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation	Slope of	Direction mode	Eye height
				[m]	[m]	[m]	a.g.l.	window		(ZVI) a.g.l.
							[m]	[°]		[m]
CI	H87	708,177	781,136	125.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CJ	H88	707,792	781,047	132.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CK	H89	707,456	781,117	152.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CL	H90	707,203	781,303	180.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CM	H91	707,245	781,206	170.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CN	H92	707,415	781,706	152.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CO	H93	709,577	781,624	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CP	H94	709,574	781,659	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CQ	H95	709,571	781,704	81.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CR	H96	709,565	781,730	82.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CS	H97	709,652	781,734	79.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CT	H98	710,271	782,572	67.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CU	H99	710,392	782,695	67.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CV	H100	710,154	782,410	71.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CW	H101	710,096	782,415	72.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CX	H102	709,782	782,400	81.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CY	H103	709,653	782,327	85.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CZ	H104	709,486	782,375	89.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DA	H105	709,265	782,119	91.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DB	H106	709,201	781,889	100.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DC	H107	709,196	781,773	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DD	H108	709,275	782,875	91.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DE	H109	709,266	782,972	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DF	H110	709,289	783,047	90.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DG	H111	710,003	783,760	89.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DH	H112	709,324	783,893	105.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DI	H113	709,411	783,875	103.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DJ	H114	709,463	783,861	102.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DK	H115	709,255	783,893	105.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DL	H116	709,467	784,495	94.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DM	H117	709,282	784,741	84.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DN	H118	707,145	784,976	107.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DO	H119	708,308	786,067	65.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DP	H120	705,922	783,376	107.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DQ	H121	705,963	783,037	123.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DR	H122	709,536	781,439	81.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DS	H123	706,804	782,632	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DT	H124	706,066	782,611	127.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DU	H125	706,111	785,544	88.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DV	H126	707,126	785,263	97.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DW	H127	709,426	784,111	91.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DX	H128	709,392	785,462	69.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DY	H129	708,305	782,018	122.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DZ	H130	708,330	782,064	124.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EA	H131	708,379	782,060	124.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EB	H132	708,418	782,035	123.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EC	H133	708,356	782,014	122.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ED	H134	708,578	782,087	121.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EE	H135	709,648	781,687	77.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EF	H136	709,004	781,720	103.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EG	H137	709,126	781,613	94.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EH	H138	707,259	782,476	128.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EI	H139	709,611	781,494	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EJ	H140	707,668	782,062	132.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EK	H141	707,304	781,411	179.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EL	H142	706,657	781,789	159.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EM	H143	707,054	782,762	127.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EN	H144	709,238	784,049	99.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EO	H145	709,146	784,894	74.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EP	H146	709,081	784,786	78.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EQ	H147	707,624	782,023	133.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ER	H148	708,458	786,104	60.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ES	H149	709,179	781,738	99.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ET	H150	708,515	785,357	78.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5

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SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Eastings	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
EU	H151	709,357	784,502	92.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EV	H152	709,311	785,254	65.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EW	H153	708,444	781,087	111.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EX	H154	705,947	782,729	126.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EY	H155	705,470	784,531	91.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EZ	H156	707,342	784,881	98.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FA	H157	707,342	784,908	100.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FB	H158	707,196	784,755	100.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FC	H159	709,256	785,879	64.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FD	H160	708,205	782,041	121.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FE	H161	708,510	781,960	119.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FF	H162	707,719	782,168	133.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FG	H163	707,234	784,825	101.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FH	H164	709,237	781,637	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FI	H165	709,111	781,063	90.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FJ	H166	709,367	784,069	93.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FK	H167	709,307	784,515	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FL	H168	709,352	785,081	70.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FM	H169	707,979	784,969	85.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FN	H170	709,169	784,987	73.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FO	H171	709,496	785,693	59.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FP	H172	709,460	785,707	60.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FQ	H173	709,467	785,745	60.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FR	H174	709,433	785,761	62.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FS	H175	709,934	784,019	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FT	H176	709,387	784,150	92.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FU	H177	709,340	784,163	94.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FV	H178	709,318	784,178	94.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FW	H179	709,215	784,252	97.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FX	H180	709,312	784,556	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FY	H181	709,279	784,682	86.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FZ	H182	709,116	784,922	74.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GA	H183	709,082	784,914	74.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GB	H184	709,070	784,913	74.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GC	H185	708,707	785,255	80.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GD	H186	708,216	784,924	80.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GE	H187	707,874	784,854	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GF	H188	708,178	784,996	82.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GG	H189	708,305	784,969	81.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GH	H190	709,818	785,414	62.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GI	H191	709,402	785,500	69.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GJ	H192	709,405	785,517	69.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GK	H193	709,453	785,665	59.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GL	H194	709,456	785,693	59.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GM	H195	705,544	784,509	90.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GN	H196	705,680	784,453	88.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GO	H197	705,657	784,572	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GP	H198	705,651	784,873	80.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GQ	H199	706,010	785,393	90.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GR	H200	705,999	784,823	97.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GS	H201	708,974	781,721	104.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GT	H202	708,947	781,729	104.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GU	H203	708,977	781,847	107.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GV	H204	708,935	781,765	106.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GW	H205	708,905	781,831	109.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GX	H206	708,838	781,781	109.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GY	H207	708,796	781,872	111.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GZ	H208	708,636	781,939	116.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HA	H209	708,397	782,002	121.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HB	H210	708,267	782,013	120.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HC	H211	708,078	782,066	123.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HD	H212	707,212	781,200	170.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HE	H213	707,323	781,217	168.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HF	H214	707,484	781,251	162.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation	Slope of	Direction mode	Eye height
				[m]	[m]	[m]	a.g.l.	window		(ZVI) a.g.l.
							[m]	[°]		[m]
HG	H215	708,081	781,151	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HH	H216	708,031	781,228	128.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HI	H217	707,920	781,237	134.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HJ	H218	707,831	781,155	137.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HK	H219	707,748	781,065	135.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HL	H220	707,681	781,206	148.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HM	H221	707,513	781,338	162.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HN	H222	707,561	781,590	149.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HO	H223	707,469	781,664	152.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HP	H224	707,425	781,885	142.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HQ	H225	707,542	781,969	136.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HR	H226	707,609	782,297	132.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HS	H227	707,268	782,879	130.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HT	H228	706,805	782,611	128.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HU	H229	705,896	783,448	103.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HV	H230	705,841	783,863	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HW	H231	705,887	784,475	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HX	H232	706,014	784,437	79.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HY	H233	706,701	784,453	96.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HZ	H234	707,338	784,807	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IA	H235	707,506	784,843	97.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IB	H236	707,514	784,845	97.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IC	H237	708,102	782,128	123.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ID	H238	708,956	782,454	108.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IE	H239	709,290	782,312	91.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IF	H240	709,136	781,735	101.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IG	H241	709,182	781,682	97.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IH	H242	709,642	783,733	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
II	H243	709,515	783,040	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IJ	H244	709,454	782,822	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IK	H245	709,444	782,792	92.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IL	H246	705,567	784,809	77.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IM	H247	705,638	783,305	105.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IN	H248	705,640	784,350	95.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IO	H249	705,650	784,374	93.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IP	H250	705,583	784,500	89.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IQ	H251	705,613	784,489	89.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IR	H252	705,712	784,727	77.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IS	H253	705,654	784,815	78.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IT	H254	705,800	784,781	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IU	H255	705,868	785,262	73.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IV	H256	705,937	785,412	86.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IW	H257	705,962	785,280	81.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IX	H258	709,053	781,852	105.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IY	H259	709,046	781,725	102.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IZ	H260	708,843	782,018	113.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JA	H261	708,760	781,877	112.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JB	H262	708,726	781,912	114.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JC	H263	708,535	781,883	115.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JD	H264	708,421	781,927	118.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JE	H265	708,252	782,077	123.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JF	H266	708,233	782,021	120.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JG	H267	708,187	782,044	121.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JH	H268	708,163	782,093	122.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JI	H269	707,974	782,092	127.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JJ	H270	707,933	782,103	128.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JK	H271	707,283	781,361	179.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JL	H272	707,284	781,205	168.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JM	H273	707,360	781,320	173.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JN	H274	707,423	781,321	169.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JO	H275	707,786	781,092	135.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JP	H276	707,640	781,305	151.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JQ	H277	707,609	781,309	153.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JR	H278	707,530	781,439	159.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result**Calculation:** Kellystown N163 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
JS H279		707,518	781,467	159.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JT H280		707,417	781,420	170.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JU H281		707,445	781,545	160.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JV H282		707,503	781,557	155.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JW H283		707,479	781,570	157.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JX H284		707,471	781,630	157.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JY H285		707,466	781,810	141.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JZ H286		707,440	781,835	140.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KA H287		707,401	781,915	144.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KB H288		707,430	781,935	142.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KC H289		707,570	781,956	135.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KD H290		707,588	782,057	134.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KE H291		707,733	782,121	133.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KF H292		707,320	782,445	128.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KG H293		706,989	782,647	130.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KH H294		706,850	782,679	126.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KI H295		706,756	782,676	128.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KJ H296		705,706	783,101	120.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KK H297		705,767	783,216	110.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KL H298		705,798	783,285	108.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KM H299		705,822	783,531	100.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KN H300		705,842	783,600	106.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KO H301		705,902	783,694	102.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KP H302		705,896	783,830	98.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KQ H303		705,844	784,342	88.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KR H304		705,959	784,420	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KS H305		706,102	784,637	91.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KT H306		706,407	784,566	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KU H307		706,661	784,461	96.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KV H308		707,151	784,761	103.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KW H309		707,353	784,818	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KX H310		709,200	781,828	99.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KY H311		709,179	781,595	93.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KZ H312		709,659	783,758	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LA H313		709,633	783,663	85.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LB H314		709,653	783,554	87.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LC H315		709,531	783,091	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LD H316		709,503	783,005	87.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LE H317		709,478	782,944	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LF H318		709,508	782,861	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LG H319		709,450	782,849	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LH H320		708,598	781,027	105.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LI H321		709,088	781,130	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LJ H322		709,157	781,278	85.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LK H323		708,833	781,031	96.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LL H324		708,900	781,062	94.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LM H325		709,704	783,834	98.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LN H326		709,694	782,393	84.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LO H327		709,723	782,432	83.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LP H328		709,807	782,438	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LQ H329		709,837	782,477	78.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LR H330		709,987	782,433	75.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LS H331		710,055	782,422	73.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LT H332		710,299	782,705	69.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LU H333		709,157	781,422	89.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LV H334		709,700	783,772	96.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LW H335		709,700	783,800	98.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LX H336		709,734	783,831	97.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LY H337		709,777	783,823	96.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LZ H338		709,888	783,758	91.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MA H339		709,626	782,417	86.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MB H340		709,655	782,420	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MC H341		710,093	782,469	72.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MD H342		709,164	781,301	86.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
ME H343		709,597	781,764	80.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MF H344		709,643	781,469	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MG H345		708,679	781,011	102.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MH H346		708,399	781,162	113.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MI H347		706,194	782,621	124.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MJ H348		707,491	781,202	157.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MK H349		709,000	781,085	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ML H350		709,665	783,563	87.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MM H351		708,461	781,151	111.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MN H352		708,290	782,083	124.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MO H353		705,858	782,712	125.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MP H354		706,252	785,486	90.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MQ H355		705,733	783,152	113.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MR H356		709,492	783,870	102.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MS H357		710,128	782,412	71.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MT H358		709,404	783,965	96.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MU H359		709,923	781,772	70.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MV H360		709,659	781,632	75.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MW H361		709,031	781,787	106.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MX H362		707,629	781,952	131.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MY H363		709,130	781,697	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MZ H364		710,258	783,747	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NA H365		710,059	782,479	72.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NB H366		707,240	781,420	179.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NC H367		709,301	785,032	71.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ND H368		708,915	781,135	92.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NE H369		709,539	783,850	102.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NF H370		708,323	781,177	117.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NG H371		708,949	781,069	93.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NH H372		708,942	781,142	92.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NI H373		708,972	781,153	91.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NJ SAINT PATRICK'S NATIONAL SCHOOL		708,565	781,951	118.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NK H374		708,783	782,534	110.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NL Main Office		707,855	784,710	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NM Small Hut		707,894	784,741	94.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NN Welfare Facilities		707,940	784,735	94.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NO Shipping Office		707,925	784,734	94.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

Calculation Results

Shadow receptor

Shadow receptor

		Shadow, worst case			Shadow, expected values	
No.	Name	Shadow hours	Shadow days	Max shadow	Shadow hours	
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]	
	A H1	44:04	123	0:34	7:11	
	B H2	40:44	117	0:38	6:51	
	C H3	26:58	111	0:33	5:37	
	D H4	22:43	78	0:37	4:44	
	E H5	0:00	0	0:00	0:00	
	F H6	0:00	0	0:00	0:00	
	G H7	0:00	0	0:00	0:00	
	H H8	0:00	0	0:00	0:00	
	I H9	7:03	32	0:21	1:41	
	J H10	14:57	64	0:20	3:12	
	K H11	0:00	0	0:00	0:00	
	L H12	17:42	83	0:21	3:50	
	M H13	42:23	115	0:42	9:12	
	N H14	61:37	152	0:48	12:49	
	O H15	65:01	160	0:49	13:28	
	P H16	65:04	166	0:49	13:28	
	Q H17	55:18	165	0:39	10:47	
	R H18	69:16	187	0:42	13:12	
	S H19	28:09	86	0:36	4:52	

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
	T H20	30:51	92	0:36	5:13
	U H21	20:13	50	0:34	3:25
	V H22	48:50	92	0:39	7:35
	W H23	50:34	90	0:40	7:48
	X H24	12:48	54	0:23	2:05
	Y H25	0:00	0	0:00	0:00
	Z H26	0:00	0	0:00	0:00
	AA H27	17:45	48	0:31	4:04
	AB H28	16:38	46	0:31	3:48
	AC H29	15:32	45	0:30	3:32
	AD H30	14:29	46	0:28	3:20
	AE H31	78:47	88	1:13	11:15
	AF H32	15:16	54	0:27	2:20
	AG H33	26:33	69	0:45	3:41
	AH H34	0:00	0	0:00	0:00
	AI H35	8:20	30	0:24	1:29
	AJ H36	0:00	0	0:00	0:00
	AK H37	0:00	0	0:00	0:00
	AL H38	0:00	0	0:00	0:00
	AM H39	0:00	0	0:00	0:00
	AN H40	0:00	0	0:00	0:00
	AO H41	0:00	0	0:00	0:00
	AP H42	0:00	0	0:00	0:00
	AQ H43	0:00	0	0:00	0:00
	AR H44	0:00	0	0:00	0:00
	AS H45	14:50	61	0:29	3:25
	AT H46	24:25	86	0:38	5:02
	AU H47	14:08	75	0:18	3:07
	AV H48	10:58	63	0:17	2:28
	AW H49	55:43	146	0:49	11:29
	AX H50	66:49	109	0:57	9:52
	AY H51	13:38	54	0:26	2:04
	AZ H52	20:54	64	0:26	2:53
	BA H53	0:00	0	0:00	0:00
	BB H54	10:54	36	0:27	1:49
	BC H55	66:43	91	1:14	9:08
	BD H56	60:55	89	1:14	8:19
	BE H57	9:59	33	0:26	1:48
	BF H58	6:32	27	0:22	1:10
	BG H59	0:00	0	0:00	0:00
	BH H60	5:49	25	0:21	1:04
	BI H61	5:08	24	0:20	0:59
	BJ H62	55:28	103	0:52	12:37
	BK H63	9:28	44	0:20	2:11
	BL H64	0:00	0	0:00	0:00
	BM H65	0:00	0	0:00	0:00
	BN H66	29:18	75	0:38	6:32
	BO H67	0:00	0	0:00	0:00
	BP H68	0:00	0	0:00	0:00
	BQ H69	56:12	80	1:00	8:08
	BR H70	61:52	105	0:55	9:07
	BS H71	104:18	129	1:11	16:05
	BT H72	35:26	96	0:37	5:57
	BU H73	24:11	58	0:35	4:03
	BV H74	0:00	0	0:00	0:00
	BW H75	0:00	0	0:00	0:00
	BX H76	0:00	0	0:00	0:00
	BY H77	13:21	48	0:26	2:03
	BZ H78	27:26	75	0:31	3:59
	CA H79	37:38	84	0:42	5:24
	CB H80	39:40	83	0:51	5:36
	CC H81	48:45	127	0:38	8:07
	CD H82	61:58	176	0:41	11:55

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
	CE H83	54:28	151	0:39	11:01
	CF H84	58:42	157	0:41	11:50
	CG H85	63:25	167	0:42	12:45
	CH H86	71:16	179	0:44	14:17
	CI H87	0:00	0	0:00	0:00
	CJ H88	0:00	0	0:00	0:00
	CK H89	0:00	0	0:00	0:00
	CL H90	0:00	0	0:00	0:00
	CM H91	0:00	0	0:00	0:00
	CN H92	0:00	0	0:00	0:00
	CO H93	0:00	0	0:00	0:00
	CP H94	0:00	0	0:00	0:00
	CQ H95	0:00	0	0:00	0:00
	CR H96	0:00	0	0:00	0:00
	CS H97	0:07	7	0:01	0:01
	CT H98	0:00	0	0:00	0:00
	CU H99	0:00	0	0:00	0:00
	CV H100	0:00	0	0:00	0:00
	CW H101	4:07	35	0:11	0:48
	CX H102	10:27	36	0:25	2:22
	CY H103	13:52	45	0:28	3:12
	CZ H104	19:27	53	0:31	4:28
	DA H105	14:43	50	0:25	2:52
	DB H106	0:00	0	0:00	0:00
	DC H107	0:00	0	0:00	0:00
	DD H108	50:23	127	0:39	10:34
	DE H109	45:50	139	0:38	9:33
	DF H110	71:33	153	0:44	14:42
	DG H111	16:53	64	0:26	3:32
	DH H112	97:21	237	0:50	18:40
	DI H113	76:15	199	0:46	14:51
	DJ H114	67:07	184	0:43	13:10
	DK H115	124:59	255	0:54	23:49
	DL H116	48:34	129	0:35	8:00
	DM H117	35:19	98	0:38	5:57
	DN H118	8:00	32	0:23	1:14
	DO H119	0:00	0	0:00	0:00
	DP H120	10:25	41	0:24	2:30
	DQ H121	12:55	56	0:19	2:45
	DR H122	0:00	0	0:00	0:00
	DS H123	17:03	81	0:21	3:42
	DT H124	0:00	0	0:00	0:00
	DU H125	0:00	0	0:00	0:00
	DV H126	8:39	40	0:22	1:20
	DW H127	77:31	190	0:40	14:15
	DX H128	19:34	54	0:26	2:48
	DY H129	0:00	0	0:00	0:00
	DZ H130	0:00	0	0:00	0:00
	EA H131	0:00	0	0:00	0:00
	EB H132	0:00	0	0:00	0:00
	EC H133	0:00	0	0:00	0:00
	ED H134	0:00	0	0:00	0:00
	EE H135	0:00	0	0:00	0:00
	EF H136	0:00	0	0:00	0:00
	EG H137	0:00	0	0:00	0:00
	EH H138	24:18	94	0:34	5:39
	EI H139	0:00	0	0:00	0:00
	EJ H140	0:00	0	0:00	0:00
	EK H141	0:00	0	0:00	0:00
	EL H142	0:00	0	0:00	0:00
	EM H143	21:14	102	0:27	4:35
	EN H144	113:50	209	0:50	21:06
	EO H145	51:40	106	0:39	8:14

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
EP	H146	61:41	118	0:44	9:59
EQ	H147	0:00	0	0:00	0:00
ER	H148	0:00	0	0:00	0:00
ES	H149	0:00	0	0:00	0:00
ET	H150	16:42	68	0:23	2:36
EU	H151	47:06	125	0:39	7:54
EV	H152	30:51	72	0:30	4:39
EW	H153	0:00	0	0:00	0:00
EX	H154	0:00	0	0:00	0:00
EY	H155	0:00	0	0:00	0:00
EZ	H156	17:34	61	0:30	2:37
FA	H157	13:16	43	0:29	2:02
FB	H158	49:51	87	1:06	6:51
FC	H159	0:00	0	0:00	0:00
FD	H160	0:00	0	0:00	0:00
FE	H161	0:00	0	0:00	0:00
FF	H162	0:00	0	0:00	0:00
FG	H163	24:45	71	0:31	3:33
FH	H164	0:00	0	0:00	0:00
FI	H165	0:00	0	0:00	0:00
FJ	H166	89:48	200	0:43	16:35
FK	H167	46:23	124	0:41	7:55
FL	H168	23:19	64	0:31	3:52
FM	H169	77:17	72	1:20	10:49
FN	H170	40:54	94	0:37	6:30
FO	H171	0:00	0	0:00	0:00
FP	H172	0:00	0	0:00	0:00
FQ	H173	0:00	0	0:00	0:00
FR	H174	0:00	0	0:00	0:00
FS	H175	18:19	66	0:27	3:41
FT	H176	81:34	184	0:41	14:47
FU	H177	86:05	181	0:42	15:33
FV	H178	87:32	179	0:43	15:45
FW	H179	86:38	165	0:49	15:18
FX	H180	40:22	112	0:40	6:56
FY	H181	35:27	94	0:40	6:03
FZ	H182	51:57	100	0:40	8:10
GA	H183	54:00	98	0:41	8:27
GB	H184	54:47	98	0:41	8:33
GC	H185	0:00	0	0:00	0:00
GD	H186	59:25	96	0:48	8:44
GE	H187	108:18	90	1:27	15:37
GF	H188	53:05	84	0:51	7:47
GG	H189	39:11	96	0:36	5:48
GH	H190	0:00	0	0:00	0:00
GI	H191	17:12	50	0:25	2:26
GJ	H192	16:10	48	0:24	2:16
GK	H193	0:00	0	0:00	0:00
GL	H194	0:00	0	0:00	0:00
GM	H195	0:00	0	0:00	0:00
GN	H196	6:17	26	0:22	1:08
GO	H197	6:00	26	0:21	1:04
GP	H198	0:00	0	0:00	0:00
GQ	H199	0:00	0	0:00	0:00
GR	H200	9:06	34	0:25	1:27
GS	H201	0:00	0	0:00	0:00
GT	H202	0:00	0	0:00	0:00
GU	H203	0:00	0	0:00	0:00
GV	H204	0:00	0	0:00	0:00
GW	H205	0:00	0	0:00	0:00
GX	H206	0:00	0	0:00	0:00
GY	H207	0:00	0	0:00	0:00
GZ	H208	0:00	0	0:00	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
HA	H209	0:00	0	0:00	0:00
HB	H210	0:00	0	0:00	0:00
HC	H211	0:00	0	0:00	0:00
HD	H212	0:00	0	0:00	0:00
HE	H213	0:00	0	0:00	0:00
HF	H214	0:00	0	0:00	0:00
HG	H215	0:00	0	0:00	0:00
HH	H216	0:00	0	0:00	0:00
HI	H217	0:00	0	0:00	0:00
HJ	H218	0:00	0	0:00	0:00
HK	H219	0:00	0	0:00	0:00
HL	H220	0:00	0	0:00	0:00
HM	H221	0:00	0	0:00	0:00
HN	H222	0:00	0	0:00	0:00
HO	H223	0:00	0	0:00	0:00
HP	H224	0:00	0	0:00	0:00
HQ	H225	0:00	0	0:00	0:00
HR	H226	29:38	68	0:38	6:23
HS	H227	24:43	104	0:35	5:08
HT	H228	14:57	78	0:21	3:15
HU	H229	9:50	38	0:24	2:22
HV	H230	8:13	30	0:24	1:52
HW	H231	9:17	31	0:25	1:40
HX	H232	11:40	35	0:27	2:06
HY	H233	51:22	99	0:51	8:19
HZ	H234	35:19	83	0:39	5:06
IA	H235	40:01	94	0:37	5:46
IB	H236	40:59	96	0:37	5:55
IC	H237	0:00	0	0:00	0:00
ID	H238	69:07	93	0:55	14:38
IE	H239	44:51	93	0:37	9:37
IF	H240	0:00	0	0:00	0:00
IG	H241	0:00	0	0:00	0:00
IH	H242	51:03	146	0:38	10:21
II	H243	77:57	154	0:44	16:34
IJ	H244	30:56	117	0:32	6:42
IK	H245	33:40	113	0:33	7:17
IL	H246	0:00	0	0:00	0:00
IM	H247	0:00	0	0:00	0:00
IN	H248	5:36	25	0:21	1:03
IO	H249	5:45	25	0:21	1:04
IP	H250	0:00	0	0:00	0:00
IQ	H251	5:33	25	0:21	1:00
IR	H252	6:41	28	0:22	1:07
IS	H253	0:00	0	0:00	0:00
IT	H254	7:09	29	0:22	1:11
IU	H255	0:00	0	0:00	0:00
IV	H256	0:00	0	0:00	0:00
IW	H257	0:00	0	0:00	0:00
IX	H258	0:00	0	0:00	0:00
IY	H259	0:00	0	0:00	0:00
IZ	H260	0:00	0	0:00	0:00
JA	H261	0:00	0	0:00	0:00
JB	H262	0:00	0	0:00	0:00
JC	H263	0:00	0	0:00	0:00
JD	H264	0:00	0	0:00	0:00
JE	H265	0:00	0	0:00	0:00
JF	H266	0:00	0	0:00	0:00
JG	H267	0:00	0	0:00	0:00
JH	H268	0:00	0	0:00	0:00
JI	H269	0:00	0	0:00	0:00
JJ	H270	0:00	0	0:00	0:00
JK	H271	0:00	0	0:00	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
	JL H272	0:00	0	0:00	0:00
	JM H273	0:00	0	0:00	0:00
	JN H274	0:00	0	0:00	0:00
	JO H275	0:00	0	0:00	0:00
	JP H276	0:00	0	0:00	0:00
	JQ H277	0:00	0	0:00	0:00
	JR H278	0:00	0	0:00	0:00
	JS H279	0:00	0	0:00	0:00
	JT H280	0:00	0	0:00	0:00
	JU H281	0:00	0	0:00	0:00
	JV H282	0:00	0	0:00	0:00
	JW H283	0:00	0	0:00	0:00
	JX H284	0:00	0	0:00	0:00
	JY H285	0:00	0	0:00	0:00
	JZ H286	0:00	0	0:00	0:00
	KA H287	0:00	0	0:00	0:00
	KB H288	0:00	0	0:00	0:00
	KC H289	0:00	0	0:00	0:00
	KD H290	0:00	0	0:00	0:00
	KE H291	0:00	0	0:00	0:00
	KF H292	30:56	109	0:36	7:11
	KG H293	10:19	60	0:25	2:18
	KH H294	20:14	86	0:22	4:22
	KI H295	19:55	93	0:20	4:19
	KJ H296	0:00	0	0:00	0:00
	KK H297	7:30	36	0:20	1:46
	KL H298	8:01	36	0:21	1:54
	KM H299	8:27	33	0:24	2:00
	KN H300	8:03	32	0:23	1:53
	KO H301	9:16	34	0:25	2:10
	KP H302	9:28	34	0:25	2:10
	KQ H303	8:29	30	0:25	1:35
	KR H304	10:35	34	0:26	1:55
	KS H305	12:02	37	0:28	2:00
	KT H306	22:19	52	0:36	3:37
	KU H307	41:46	71	0:48	6:42
	KV H308	50:08	85	1:07	6:52
	KW H309	33:39	83	0:37	4:52
	KX H310	0:00	0	0:00	0:00
	KY H311	0:00	0	0:00	0:00
	KZ H312	46:51	140	0:37	9:27
	LA H313	58:13	151	0:45	11:53
	LB H314	64:01	172	0:51	13:13
	LC H315	76:56	160	0:44	16:37
	LD H316	74:16	149	0:44	15:36
	LE H317	57:56	142	0:40	11:57
	LF H318	39:14	130	0:31	8:11
	LG H319	33:29	125	0:33	7:09
	LH H320	0:00	0	0:00	0:00
	LI H321	0:00	0	0:00	0:00
	LJ H322	0:00	0	0:00	0:00
	LK H323	0:00	0	0:00	0:00
	LL H324	0:00	0	0:00	0:00
	LM H325	39:37	133	0:34	7:50
	LN H326	12:22	41	0:27	2:49
	LO H327	11:26	39	0:27	2:35
	LP H328	9:57	36	0:25	2:14
	LQ H329	9:21	35	0:24	2:06
	LR H330	7:54	46	0:22	1:45
	LS H331	2:36	28	0:08	0:30
	LT H332	8:58	39	0:21	2:01
	LU H333	0:00	0	0:00	0:00
	LV H334	41:58	133	0:35	8:27

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SHADOW - Main Result

Calculation: Kellystown N163 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
LW	H335	40:32	131	0:34	8:06
LX	H336	37:43	129	0:33	7:28
LY	H337	28:58	94	0:32	5:57
LZ	H338	20:53	73	0:29	4:23
MA	H339	13:51	42	0:28	3:10
MB	H340	13:00	42	0:28	2:58
MC	H341	8:51	45	0:17	1:43
MD	H342	0:00	0	0:00	0:00
ME	H343	0:00	0	0:00	0:00
MF	H344	0:00	0	0:00	0:00
MG	H345	0:00	0	0:00	0:00
MH	H346	0:00	0	0:00	0:00
MI	H347	0:00	0	0:00	0:00
MJ	H348	0:00	0	0:00	0:00
MK	H349	0:00	0	0:00	0:00
ML	H350	59:21	160	0:50	12:16
MM	H351	0:00	0	0:00	0:00
MN	H352	0:00	0	0:00	0:00
MO	H353	0:00	0	0:00	0:00
MP	H354	0:00	0	0:00	0:00
MQ	H355	0:00	0	0:00	0:00
MR	H356	62:08	175	0:42	12:10
MS	H357	5:37	38	0:13	1:05
MT	H358	79:21	203	0:44	15:04
MU	H359	0:00	0	0:00	0:00
MV	H360	0:00	0	0:00	0:00
MW	H361	0:00	0	0:00	0:00
MX	H362	0:00	0	0:00	0:00
MY	H363	0:00	0	0:00	0:00
MZ	H364	5:54	26	0:22	1:09
NA	H365	7:50	43	0:16	1:31
NB	H366	0:00	0	0:00	0:00
NC	H367	26:01	67	0:33	4:19
ND	H368	0:00	0	0:00	0:00
NE	H369	55:29	162	0:40	10:56
NF	H370	0:00	0	0:00	0:00
NG	H371	0:00	0	0:00	0:00
NH	H372	0:00	0	0:00	0:00
NI	H373	0:00	0	0:00	0:00
NJ	SAINT PATRICK'S NATIONAL SCHOOL	0:00	0	0:00	0:00
NK	H374	87:12	92	1:13	18:22
NL	Main Office	123:00	116	1:33	18:50
NM	Small Hut	130:33	108	1:35	19:35
NN	Welfare Facilities	133:28	106	1:36	19:57
NO	Shipping Office	133:15	107	1:36	19:59

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	T01	488:22	82:20
2	T02	755:45	127:32
3	T03	243:12	44:46
4	T04	373:42	71:34
5	T05	357:10	72:25

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

The calculation of the total expected values for a given receptor assumes a weighted average directional reduction for all WTGs contributing to shadow flicker within the same day. In the case where shadow flicker from different WTGs is not concurrent within the day, the total expected time at a given receptor may deviate marginally from the individual flicker time caused by each turbine separately.

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: A - H1

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:02 (4)	08:14	16:30 (3)	07:16	17:08 (2)	07:01	05:52	05:03		
	16:15	29	15:31 (4)	17:06	4	16:34 (3)	18:02	26	17:34 (2)	20:00	21:45
2	08:44	15:03 (4)	08:12	16:30 (3)	07:14	17:07 (2)	06:59		05:02		
	16:16	28	15:31 (4)	17:08	7	16:37 (3)	18:04	29	17:36 (2)	20:02	21:46
3	08:44	15:03 (4)	08:10	16:29 (3)	07:12	17:07 (2)	06:56		05:01		
	16:17	28	15:31 (4)	17:10	10	16:39 (3)	18:06	31	17:38 (2)	20:04	21:48
4	08:43	15:04 (4)	08:08	16:29 (3)	07:09	17:07 (2)	06:54		05:00		
	16:18	28	15:32 (4)	17:12	12	16:41 (3)	18:07	34	17:41 (2)	20:06	21:49
5	08:43	15:05 (4)	08:07	16:29 (3)	07:07	17:06 (2)	06:51		05:44		
	16:19	27	15:32 (4)	17:14	14	16:43 (3)	18:09	34	17:40 (2)	20:07	21:50
6	08:43	15:06 (4)	08:05	16:29 (3)	07:04	17:07 (2)	06:49		05:42		
	16:21	26	15:32 (4)	17:16	16	16:45 (3)	18:11	33	17:40 (2)	20:09	21:51
7	08:42	15:06 (4)	08:03	16:30 (3)	07:02	17:06 (2)	06:47		05:40		
	16:22	26	15:32 (4)	17:18	17	16:47 (3)	18:13	33	17:39 (2)	20:11	21:52
8	08:42	15:07 (4)	08:01	16:30 (3)	07:00	17:07 (2)	06:44		05:38		
	16:24	25	15:32 (4)	17:20	20	16:50 (3)	18:15	32	17:39 (2)	20:13	21:53
9	08:41	15:09 (4)	07:59	16:31 (3)	06:57	17:07 (2)	06:42		05:36		
	16:25	24	15:33 (4)	17:22	20	16:51 (3)	18:17	30	17:37 (2)	20:15	21:54
10	08:40	15:09 (4)	07:57	16:32 (3)	06:55	17:08 (2)	06:39		05:34		
	16:26	23	15:32 (4)	17:24	18	16:50 (3)	18:19	28	17:36 (2)	20:17	21:55
11	08:40	15:10 (4)	07:55	16:33 (3)	06:52	17:10 (2)	06:37		05:33		
	16:28	22	15:32 (4)	17:26	16	16:49 (3)	18:21	25	17:35 (2)	20:19	21:55
12	08:39	15:11 (4)	07:53	16:35 (3)	06:50	17:10 (2)	06:35		05:31		
	16:30	21	15:32 (4)	17:28	12	16:47 (3)	18:23	23	17:33 (2)	20:20	21:56
13	08:38	15:12 (4)	07:51	16:37 (3)	06:48	17:12 (2)	06:32		05:29		
	16:31	19	15:31 (4)	17:30	7	16:44 (3)	18:25	20	17:32 (2)	20:22	21:57
14	08:37	15:14 (4)	07:49	16:45 (3)	06:45	17:14 (2)	06:30		05:27		
	16:33	17	15:31 (4)	17:32		18:27	14	17:28 (2)	20:24	21:18	21:58
15	08:36	15:16 (4)	07:47		06:43		06:28		05:25		
	16:34	14	15:30 (4)	17:34		18:28		20:26	21:20	21:58	
16	08:35	15:17 (4)	07:45		06:40		06:25		05:24		
	16:36	11	15:28 (4)	17:36		18:30		20:28	21:22	21:59	
17	08:34	15:21 (4)	07:43		06:38		06:23		05:22		
	16:38	4	15:25 (4)	17:38		18:32		20:30	21:23	21:59	
18	08:33		07:41		06:35		06:21		05:21		
	16:40		17:40		18:34		20:31		21:25	22:00	
19	08:32		07:39		06:33		06:18		05:19		
	16:41		17:42		18:36		20:33		21:27	22:00	
20	08:31		07:36		06:31		06:16		05:18		
	16:43		17:44		18:38		20:35		21:28	22:00	
21	08:30		07:34		06:28		06:14		05:16		
	16:45		17:46		18:40		20:37		21:30	22:01	
22	08:29		07:32		06:26		06:12		05:15		
	16:47		17:48		18:42		20:39		21:31	22:01	
23	08:27		07:30	17:16 (2)	06:23		06:09		05:13		
	16:49		17:50	6	17:22 (2)	18:43		20:41	21:33	22:01	
24	08:26		07:28	17:14 (2)	06:21		06:07		05:12		
	16:50		17:52	10	17:24 (2)	18:45		20:43	21:34	22:01	
25	08:24		07:25	17:12 (2)	06:18		06:05		05:11		
	16:52		17:54	14	17:26 (2)	18:47		20:44	21:36	22:01	
26	08:23		07:23	17:11 (2)	06:16		06:03		05:09		
	16:54		17:56	17	17:28 (2)	18:49		20:46	21:37	22:01	
27	08:22		07:21	17:10 (2)	06:13		06:00		05:08		
	16:56		17:58	21	17:31 (2)	18:51		20:48	21:39	22:01	
28	08:20		07:18	17:09 (2)	06:11		05:58		05:07		
	16:58		18:00	23	17:32 (2)	18:53		20:50	21:40	22:01	
29	08:19				07:08		05:56		05:06		
	17:00				19:54		20:52		21:41	22:01	
30	08:17				07:06		05:54		05:05		
	17:02				19:56		20:54		21:43	22:00	
31	08:15	16:30 (3)			07:04				05:04		
	17:04	1	16:31 (3)		19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case	373		264		392						
Sun reduction	0.24		0.23		0.27						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.65		0.66		0.68						
Total reduction	0.16		0.15		0.18						
Total, real	59		41		72						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: A - H1

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September		October		November		December
1	04:59	05:39	06:33		07:26	17:50 (2)	07:24	16:01 (3)	08:19
	22:00	21:25	20:18		19:05	21 18:11 (2)	16:54	19 16:20 (3)	16:10
2	04:59	05:40	06:35		07:28	21 17:48 (2)	07:26	19 16:01 (3)	08:21
	22:00	21:23	20:16		19:02	25 18:13 (2)	16:52	19 16:20 (3)	16:09
3	05:00	05:42	06:36		07:30	27 17:47 (2)	07:28	19 16:00 (3)	08:22
	21:59	21:21	20:13		19:00	27 18:14 (2)	16:50	19 16:19 (3)	16:08
4	05:01	05:44	06:38		07:31	30 17:45 (2)	07:30	18 15:59 (3)	08:24
	21:59	21:19	20:11		18:57	30 18:15 (2)	16:48	18 16:17 (3)	16:08
5	05:02	05:45	06:40		07:33	31 17:44 (2)	07:32	16 15:59 (3)	08:25
	21:58	21:17	20:09		18:55	31 18:15 (2)	16:46	16 16:15 (3)	16:07
6	05:03	05:47	06:42		07:35	32 17:44 (2)	07:34	13 15:59 (3)	08:26
	21:58	21:15	20:06		18:52	32 18:16 (2)	16:44	13 16:12 (3)	16:07
7	05:04	05:49	06:43		07:37	33 17:42 (2)	07:36	11 15:59 (3)	08:28
	21:57	21:14	20:04		18:50	33 18:15 (2)	16:43	11 16:10 (3)	16:06
8	05:05	05:50	06:45		07:39	33 17:42 (2)	07:38	9 15:59 (3)	08:29
	21:56	21:12	20:01		18:48	33 18:15 (2)	16:41	9 16:08 (3)	16:06
9	05:06	05:52	06:47		07:41	34 17:41 (2)	07:40	7 16:00 (3)	08:30
	21:55	21:10	19:59		18:45	34 18:15 (2)	16:39	7 16:07 (3)	16:05
10	05:07	05:54	06:49		07:42	33 17:41 (2)	07:42	4 16:01 (3)	08:31
	21:55	21:08	19:56		18:43	33 18:14 (2)	16:37	4 16:05 (3)	16:05
11	05:08	05:56	06:50		07:44	30 17:41 (2)	07:44	1 16:02 (3)	08:33
	21:54	21:05	19:54		18:40	30 18:11 (2)	16:35	1 16:03 (3)	16:05
12	05:09	05:57	06:52		07:46	28 17:41 (2)	07:45		08:34
	21:53	21:03	19:51		18:38	28 18:09 (2)	16:34		16:05
13	05:10	05:59	06:54		07:48	25 17:42 (2)	07:47		08:35
	21:52	21:01	19:49		18:36	25 18:07 (2)	16:32		16:04
14	05:12	06:01	06:56		07:50	22 17:42 (2)	07:49		08:36
	21:51	20:59	19:47		18:33	22 18:04 (2)	16:31		16:04
15	05:13	06:03	06:58		07:52	19 17:43 (2)	07:51		08:37
	21:50	20:57	19:44		18:31	19 18:02 (2)	16:29		16:04
16	05:14	06:04	06:59		07:54	15 17:44 (2)	07:53		08:38
	21:49	20:55	19:42		18:29	15 17:59 (2)	16:27		16:05
17	05:16	06:06	07:01		07:55	12 17:45 (2)	07:55		08:38
	21:47	20:53	19:39		18:26	12 17:57 (2)	16:26		16:05
18	05:17	06:08	07:03		07:57	9 17:46 (2)	07:57		08:39
	21:46	20:51	19:37		18:24	9 17:55 (2)	16:24		16:05
19	05:18	06:10	07:05		07:59	4 17:48 (2)	07:59		08:40
	21:45	20:48	19:34		18:22	4 17:52 (2)	16:23		16:05
20	05:20	06:12	07:06		08:01		08:00		08:41
	21:44	20:46	19:32		18:20		16:22		16:06
21	05:21	06:13	07:08		08:03		08:02		08:41
	21:42	20:44	19:29		18:17		16:20		16:06
22	05:23	06:15	07:10		08:05		08:04		08:42
	21:41	20:42	19:27		18:15		16:19		16:06
23	05:24	06:17	07:12		08:07		08:06		08:42
	21:39	20:39	19:24		18:13		16:18		16:07
24	05:26	06:19	07:13		08:09		08:08		08:43
	21:38	20:37	19:22		18:11		16:17		16:08
25	05:27	06:20	07:15		07:11		08:09	14:59 (4)	08:43
	21:36	20:35	19:19		17:09		16:16	4 15:03 (4)	16:08
26	05:29	06:22	07:17		07:13		08:11	11 14:56 (4)	08:43
	21:35	20:32	19:17		17:06		16:14	11 15:07 (4)	16:09
27	05:30	06:24	07:19		07:15		08:13	14 14:55 (4)	08:44
	21:33	20:30	19:14		17:04		16:13	14 15:09 (4)	16:10
28	05:32	06:26	07:21		07:16		08:14	17 14:54 (4)	08:44
	21:32	20:28	19:12		17:02		16:12	17 15:11 (4)	16:10
29	05:34	06:27	07:22	17:57 (2)	07:18	8 16:06 (3)	08:16	18 14:53 (4)	08:44
	21:30	20:25	19:09	10 18:07 (2)	17:00	8 16:14 (3)	16:11	18 15:11 (4)	16:11
30	05:35	06:29	07:24	17:52 (2)	07:20	13 16:03 (3)	08:18	21 14:52 (4)	08:44
	21:28	20:23	19:07	17 18:09 (2)	16:58	13 16:16 (3)	16:11	21 15:13 (4)	16:12
31	05:37	06:31			07:22	16 16:02 (3)			08:44
	21:27	20:21			16:56	16 16:18 (3)			16:13
Potential sun hours	512	460	382		328		259		233
Total, worst case			27		500		221		867
Sun reduction			0.32		0.29		0.27		0.21
Oper. time red.			1.00		1.00		1.00		1.00
Wind dir. red.			0.68		0.68		0.65		0.65
Total reduction			0.22		0.20		0.17		0.13
Total, real			6		99		38		117

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: B - H2

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		14:46 (4)	08:14		16:18 (3)	07:16		16:55 (2)	07:01		05:52			05:03		
	16:15	21	15:07 (4)	17:06	16	16:34 (3)	18:02	38	17:33 (2)	20:00		20:55			21:45		
2	08:44		14:48 (4)	08:12		16:18 (3)	07:14		16:54 (2)	06:59		05:50			05:02		
	16:16	19	15:07 (4)	17:08	19	16:37 (3)	18:04	38	17:32 (2)	20:02		20:57			21:46		
3	08:44		14:48 (4)	08:10		16:18 (3)	07:12		16:55 (2)	06:56		05:48			05:01		
	16:17	18	15:06 (4)	17:10	21	16:39 (3)	18:06	37	17:32 (2)	20:04		20:59			21:48		
4	08:43		14:50 (4)	08:08		16:19 (3)	07:09		16:55 (2)	06:54		05:46			05:00		
	16:18	16	15:06 (4)	17:12	22	16:41 (3)	18:07	37	17:32 (2)	20:06		21:01			21:49		
5	08:43		14:51 (4)	08:07		16:19 (3)	07:07		16:55 (2)	06:51		05:44			04:59		
	16:19	14	15:05 (4)	17:14	22	16:41 (3)	18:09	36	17:31 (2)	20:07		21:03			21:50		
6	08:43		14:53 (4)	08:05		16:20 (3)	07:04		16:55 (2)	06:49		05:42			04:58		
	16:21	12	15:05 (4)	17:16	20	16:40 (3)	18:11	36	17:31 (2)	20:09		21:04			21:51		
7	08:42		14:54 (4)	08:03		16:21 (3)	07:02		16:55 (2)	06:47		05:40			04:58		
	16:22	10	15:04 (4)	17:18	19	16:40 (3)	18:13	34	17:29 (2)	20:11		21:06			21:52		
8	08:42		14:57 (4)	08:01		16:23 (3)	07:00		16:56 (2)	06:44		05:38			04:57		
	16:24	5	15:02 (4)	17:20	15	16:38 (3)	18:15	33	17:29 (2)	20:13		21:08			21:53		
9	08:41			07:59		16:25 (3)	06:57		16:57 (2)	06:42		05:36			04:57		
	16:25			17:22	12	16:37 (3)	18:17	30	17:27 (2)	20:15		21:10			21:54		
10	08:40			07:57		16:29 (3)	06:55		16:58 (2)	06:39		05:34			04:56		
	16:26			17:24	4	16:33 (3)	18:19	28	17:26 (2)	20:17		21:11			21:55		
11	08:40			07:55			06:53		17:00 (2)	06:37		05:33			04:56		
	16:28			17:26			18:21	24	17:24 (2)	20:19		21:13			21:55		
12	08:39			07:53			06:50		17:02 (2)	06:35		05:31			04:55		
	16:30			17:28			18:23	19	17:21 (2)	20:20		21:15			21:56		
13	08:38			07:51			06:48		17:05 (2)	06:32		05:29			04:55		
	16:31			17:30			18:25	13	17:18 (2)	20:22		21:17			21:57		
14	08:37			07:49			06:45			06:30		05:27			04:55		
	16:33			17:32			18:27			20:24		21:18			21:58		
15	08:36			07:47			06:43			06:28		05:26			04:54		
	16:34			17:34			18:28			20:26		21:20			21:58		
16	08:35			07:45			06:40			06:25		05:24			04:54		
	16:36			17:36			18:30			20:28		21:22			21:59		
17	08:34			07:43			06:38			06:23		05:22			04:54		
	16:38			17:38			18:32			20:30		21:23			21:59		
18	08:33			07:41		17:07 (2)	06:35			06:21		05:21			04:54		
	16:40			17:40	4	17:11 (2)	18:34			20:31		21:25			22:00		
19	08:32			07:39		17:05 (2)	06:33			06:18		05:19			04:54		
	16:41			17:42	8	17:13 (2)	18:36			20:33		21:27			22:00		
20	08:31			07:36		17:03 (2)	06:31			06:16		05:18			04:54		
	16:43			17:44	13	17:16 (2)	18:38			20:35		21:28			22:00		
21	08:30			07:34		17:01 (2)	06:28			06:14		05:16			04:54		
	16:45			17:46	17	17:18 (2)	18:40			20:37		21:30			22:01		
22	08:29			07:32		16:59 (2)	06:26			06:12		05:15			04:55		
	16:47			17:48	20	17:19 (2)	18:42			20:39		21:31			22:01		
23	08:27			07:30		16:59 (2)	06:23			06:09		05:13			04:55		
	16:49			17:50	23	17:22 (2)	18:43			20:41		21:33			22:01		
24	08:26			07:28		16:58 (2)	06:21			06:07		05:12			04:55		
	16:50			17:52	26	17:24 (2)	18:45			20:43		21:34			22:01		
25	08:24			07:25		16:56 (2)	06:18			06:05		05:11			04:55		
	16:52			17:54	30	17:26 (2)	18:47			20:44		21:36			22:01		
26	08:23		16:18 (3)	07:23		16:56 (2)	06:16			06:03		05:09			04:56		
	16:54	3	16:21 (3)	17:56	32	17:28 (2)	18:49			20:46		21:37			22:01		
27	08:22		16:17 (3)	07:21		16:56 (2)	06:13			06:00		05:08			04:56		
	16:56	6	16:23 (3)	17:58	35	17:31 (2)	18:51			20:48		21:39			22:01		
28	08:20		16:18 (3)	07:18		16:55 (2)	06:11			05:58		05:07			04:57		
	16:58	8	16:26 (3)	18:00	37	17:32 (2)	18:53			20:50		21:40			22:01		
29	08:19		16:17 (3)				07:08			05:56		05:06			04:57		
	17:00	11	16:28 (3)				19:54			20:52		21:41			22:01		
30	08:17		16:17 (3)				07:06			05:54		05:05			04:58		
	17:02	12	16:29 (3)				19:56			20:54		21:43			22:00		
31	08:15		16:17 (3)				07:04					05:04					
	17:04	14	16:31 (3)				19:58					21:44					
Potential sun hours		250			273		367			420		494			510		
Total, worst case		169			415		403										
Sun reduction		0.24			0.23		0.27										
Oper. time red.		1.00			1.00		1.00										
Wind dir. red.		0.65			0.67		0.67										
Total reduction		0.16			0.16		0.18										
Total, real		27			65		74										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: B - H2

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:42 (2) 17:59 (2)	07:24 16:04 (3)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:39 (2) 18:01 (2)	07:26 16:07 (3)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:37 (2) 18:03 (2)	07:28 16:50 (3)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:35 (2) 18:04 (2)	07:30 16:48 (3)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:34 (2) 18:05 (2)	07:32 16:46 (3)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:33 (2) 18:06 (2)	07:34 16:44 (3)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:31 (2) 18:05 (2)	07:36 16:43 (3)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:30 (2) 18:06 (2)	07:38 16:41 (3)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:29 (2) 18:06 (2)	07:40 16:39 (3)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:29 (2) 18:06 (2)	07:42 16:37 (3)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:28 (2) 18:06 (2)	07:44 16:35 (3)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:28 (2) 18:06 (2)	07:45 16:34 (3)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:28 (2) 18:06 (2)	07:47 16:32 (3)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:28 (2) 18:04 (2)	07:49 16:31 (3)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:28 (2) 18:02 (2)	07:51 16:29 (3)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:28 (2) 17:59 (2)	07:53 16:27 (3)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:29 (2) 17:57 (2)	07:55 16:26 (3)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:29 (2) 17:55 (2)	07:57 16:24 (3)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:30 (2) 17:52 (2)	07:59 16:23 (3)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:31 (2) 17:50 (2)	08:00 16:22 (3)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:32 (2) 17:48 (2)	08:02 16:20 (3)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:34 (2) 17:45 (2)	08:04 16:19 (3)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:36 (2) 17:43 (2)	08:06 16:18 (3)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:38 (2) 17:41 (2)	08:08 16:17 (3)
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16 (3)	08:43 16:08 (3)
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14 (3)	08:43 16:09 (3)
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13 (3)	08:44 16:10 (3)
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12 (3)	08:44 16:10 (3)
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12 (3)	08:44 16:11 (3)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:46 (2) 17:55 (2)	07:20 16:58 (3)	08:44 16:12 (3)
31	05:37 21:27	06:31 20:21		07:22 16:56 (3)		08:44 16:13 (3)
Potential sun hours	512	460	382	328	259	233
Total, worst case			9	649	223	576
Sun reduction			0.32	0.29	0.27	0.21
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.67	0.66	0.65
Total reduction			0.22	0.20	0.17	0.13
Total, real			2	128	39	77

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: C - H3

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	05:52	06:18 (4)
	16:15	17:06	18:02	20:00	20:55	13 06:31 (4)
2	08:44	08:12	07:14	06:59	05:50	06:16 (4)
	16:16	17:08	18:04	20:02	20:57	14 06:30 (4)
3	08:44	08:10	07:12	06:56	05:48	06:14 (4)
	16:17	17:10	18:06	20:04	20:59	14 06:28 (4)
4	08:43	08:09	07:09	06:54	05:46	06:15 (4)
	16:18	17:12	18:08	20:06	21:01	11 06:26 (4)
5	08:43	08:07	07:07	06:52	05:44	06:19 (4)
	16:20	17:14	18:10	20:08	21:03	3 06:22 (4)
6	08:43	08:05	07:05	06:49	05:42	04:59
	16:21	17:16	18:11	20:09	21:04	11 05:41 (3)
7	08:42	08:03	07:02	06:47	05:40	04:58
	16:22	17:18	18:13	20:11	21:06	12 05:42 (3)
8	08:42	08:01	07:00	06:44	05:38	04:57
	16:24	17:20	18:15	20:13	21:08	13 05:42 (3)
9	08:41	07:59	06:57	06:42	05:36	04:57
	16:25	17:22	18:17	20:15	21:10	14 05:43 (3)
10	08:40	07:57	06:55	06:40	05:35	04:56
	16:27	17:24	18:19	20:17	21:12	14 05:42 (3)
11	08:40	07:55	06:53	06:37	05:33	04:56
	16:28	17:26	18:21	20:19	21:13	15 05:43 (3)
12	08:39	07:53	06:50	06:35	05:31	04:56
	16:30	17:28	18:23	20:20	21:15	15 05:43 (3)
13	08:38	07:51	06:48	07:12 (5) 06:32	05:29	04:55
	16:31	17:30	18:25	3 07:15 (5) 20:22	21:17	16 05:43 (3)
14	08:37	07:49	06:45	07:09 (5) 06:30	05:27	04:55
	16:33	17:32	18:27	6 07:15 (5) 20:24	21:18	16 05:43 (3)
15	08:36	07:47	06:43	07:07 (5) 06:28	05:26	04:55
	16:35	17:34	18:29	10 07:17 (5) 20:26	21:20	17 05:44 (3)
16	08:35	07:45	06:41	07:04 (5) 06:25	05:24	04:55
	16:36	17:36	18:30	13 07:17 (5) 20:28	21:22	17 05:44 (3)
17	08:34	07:43	06:38	07:02 (5) 06:23	05:22	04:54
	16:38	17:38	18:32	16 07:18 (5) 20:30	21:23	17 05:44 (3)
18	08:33	07:41	06:36	06:59 (5) 06:21	05:21	04:54
	16:40	17:40	18:34	18 07:17 (5) 20:32	21:25	18 05:45 (3)
19	08:32	07:39	06:33	06:57 (5) 06:18	05:19	04:54
	16:41	17:42	18:36	21 07:18 (5) 20:33	21:27	18 05:45 (3)
20	08:31	07:37	06:31	06:54 (5) 06:16	05:18	04:54
	16:43	17:44	18:38	23 07:17 (5) 20:35	21:28	18 05:45 (3)
21	08:30	07:34	06:28	06:52 (5) 06:14	05:16	04:55
	16:45	17:46	18:40	25 07:17 (5) 20:37	21:30	18 05:45 (3)
22	08:29	07:32	06:26	06:50 (5) 06:12	05:15	04:55
	16:47	17:48	18:42	27 07:17 (5) 20:39	21:31	18 05:46 (3)
23	08:27	07:30	06:23	06:47 (5) 06:09	05:13	04:55
	16:49	17:50	18:43	29 07:16 (5) 20:41	21:33	18 05:46 (3)
24	08:26	07:28	06:21	06:45 (5) 06:07	05:12	04:55
	16:51	17:52	18:45	31 07:16 (5) 20:43	3 06:35 (4) 21:34	18 05:46 (3)
25	08:25	07:25	06:18	06:42 (5) 06:05	06:30 (4) 05:11	04:56
	16:53	17:54	18:47	33 07:15 (5) 20:44	5 06:35 (4) 21:36	17 05:46 (3)
26	08:23	07:23	06:16	06:43 (5) 06:03	06:28 (4) 05:09	04:56
	16:54	17:56	18:49	31 07:14 (5) 20:46	6 06:34 (4) 21:37	17 05:46 (3)
27	08:22	07:21	06:14	06:43 (5) 06:01	06:26 (4) 05:08	04:57
	16:56	17:58	18:51	29 07:12 (5) 20:48	8 06:34 (4) 21:39	17 05:47 (3)
28	08:20	07:19	06:11	06:45 (5) 05:59	06:24 (4) 05:07	04:57
	16:58	18:00	18:53	26 07:11 (5) 20:50	10 06:34 (4) 21:40	17 05:47 (3)
29	08:19		07:09	07:45 (5) 05:56	06:22 (4) 05:06	05:36 (3) 04:58
	17:00		19:55	24 08:09 (5) 20:52	11 06:33 (4) 21:41	2 05:38 (3) 22:01
30	08:17		07:06	07:47 (5) 05:54	06:20 (4) 05:05	05:35 (3) 04:58
	17:02		19:56	20 08:07 (5) 20:54	12 06:32 (4) 21:43	3 05:38 (3) 22:00
31	08:15		07:04	07:49 (5)	05:04	05:34 (3)
	17:04		19:58	14 08:03 (5)	21:44	5 05:39 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case			399	55	65	443
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.68	0.67	0.66
Total reduction			0.18	0.24	0.26	0.21
Total, real			72	13	17	94

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: C - H3

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July			August			September			October			November			December
1	04:59		05:32 (3)	05:39			06:33			07:26		07:52 (5)	07:24		08:19	
	22:00	15	05:47 (3)	21:25			20:18			19:05	1	07:53 (5)	16:54		16:10	
2	05:00		05:33 (3)	05:40			06:35			07:28			07:26		08:21	
	22:00	15	05:48 (3)	21:23			20:16			19:02			16:52		16:09	
3	05:00		05:33 (3)	05:42			06:36			07:30			07:28		08:22	
	21:59	14	05:47 (3)	21:21			20:14			19:00			16:50		16:09	
4	05:01		05:34 (3)	05:44			06:38			07:32			07:30		08:24	
	21:59	13	05:47 (3)	21:19			20:11			18:57			16:48		16:08	
5	05:02		05:35 (3)	05:46			06:40			07:33			07:32		08:25	
	21:58	12	05:47 (3)	21:17			20:09			18:55			16:46		16:07	
6	05:03		05:36 (3)	05:47			06:42			07:35			07:34		08:26	
	21:58	12	05:48 (3)	21:16			20:06			18:53			16:45		16:07	
7	05:04		05:37 (3)	05:49			06:44			07:37			07:36		08:28	
	21:57	11	05:48 (3)	21:14			20:04			18:50			16:43		16:06	
8	05:05		05:38 (3)	05:51			06:45			07:39			07:38		08:29	
	21:56	10	05:48 (3)	21:12	8	06:26 (4)	20:01			18:48			16:41		16:06	
9	05:06		05:39 (3)	05:52			06:47			07:41			07:40		08:30	
	21:55	9	05:48 (3)	21:10	12	06:36 (4)	19:59			18:45			16:39		16:06	
10	05:07		05:40 (3)	05:54			06:49			07:43			07:42		08:32	
	21:55	8	05:48 (3)	21:08	14	06:38 (4)	19:57			18:43			16:37		16:05	
11	05:08		05:41 (3)	05:56			06:51			07:44			07:44		08:33	
	21:54	6	05:47 (3)	21:06	14	06:39 (4)	19:54			18:41			16:36		16:05	
12	05:09		05:42 (3)	05:58			06:52		07:42 (5)	07:46			07:46		08:34	
	21:53	5	05:47 (3)	21:03	13	06:40 (4)	19:52	13	07:55 (5)	18:38			16:34		16:05	
13	05:11		05:43 (3)	05:59			06:54		07:39 (5)	07:48			07:47		08:35	
	21:52	4	05:47 (3)	21:01	12	06:41 (4)	19:49	19	07:58 (5)	18:36			16:32		16:05	
14	05:12		05:44 (3)	06:01			06:56		07:36 (5)	07:50			07:49		08:36	
	21:51	2	05:46 (3)	20:59	11	06:41 (4)	19:47	23	07:59 (5)	18:34			16:31		16:05	
15	05:13		05:45 (3)	06:03			06:58		07:34 (5)	07:52			07:51		08:37	
	21:50	1	05:46 (3)	20:57	9	06:41 (4)	19:44	26	08:00 (5)	18:31			16:29		16:05	
16	05:14			06:05			06:59		07:33 (5)	07:54			07:53		08:38	
	21:49			20:55	8	06:41 (4)	19:42	28	08:01 (5)	18:29			16:28		16:05	
17	05:16			06:06			06:55 (4)	07:01	07:32 (5)	07:56			07:55		08:39	
	21:47			20:53	6	06:41 (4)	19:39	30	08:02 (5)	18:27			16:26		16:05	
18	05:17			06:08			07:03		07:30 (5)	07:57			07:57		08:39	
	21:46			20:51	4	06:41 (4)	19:37	32	08:02 (5)	18:24			16:25		16:05	
19	05:19			06:10			07:05		07:31 (5)	07:59			07:59		08:40	
	21:45			20:48	2	06:40 (4)	19:34	31	08:02 (5)	18:22			16:23		16:05	
20	05:20			06:12			07:06		07:33 (5)	08:01			08:01		08:41	
	21:44			20:46			19:32	30	08:03 (5)	18:20			16:22		16:06	
21	05:21			06:13			07:08		07:35 (5)	08:03			08:02		08:41	
	21:42			20:44			19:29	28	08:03 (5)	18:18			16:21		16:06	
22	05:23			06:15			07:10		07:36 (5)	08:05			08:04		08:42	
	21:41			20:42			19:27	26	08:02 (5)	18:15			16:19		16:07	
23	05:24			06:17			07:12		07:38 (5)	08:07			08:06		08:42	
	21:39			20:39			19:24	24	08:02 (5)	18:13			16:18		16:07	
24	05:26			06:19			07:14		07:40 (5)	08:09			08:08		08:43	
	21:38			20:37			19:22	22	08:02 (5)	18:11			16:17		16:08	
25	05:27			06:21			07:15		07:42 (5)	07:11			08:09		08:43	
	21:36			20:35			19:19	19	08:01 (5)	17:09			16:16		16:08	
26	05:29			06:22			07:17		07:43 (5)	07:13			08:11		08:43	
	21:35			20:32			19:17	17	08:00 (5)	17:07			16:15		16:09	
27	05:31			06:24			07:19		07:45 (5)	07:15			08:13		08:44	
	21:33			20:30			19:15	14	07:59 (5)	17:05			16:14		16:10	
28	05:32			06:26			07:21		07:47 (5)	07:17			08:14		08:44	
	21:32			20:28			19:12	11	07:58 (5)	17:02			16:13		16:11	
29	05:34			06:28			07:23		07:49 (5)	07:18			08:16		08:44	
	21:30			20:25			19:10	8	07:57 (5)	17:00			16:12		16:12	
30	05:35			06:29			07:24		07:51 (5)	07:20			08:18		08:44	
	21:28			20:23			19:07	4	07:55 (5)	16:58			16:11		16:13	
31	05:37			06:31						07:22					08:44	
	21:27			20:21						16:56					16:14	
Potential sun hours	512			460			382			328			259		233	
Total, worst case		137			113			405			1					
Sun reduction		0.32			0.34			0.32			0.29					
Oper. time red.		1.00			1.00			1.00			1.00					
Wind dir. red.		0.66			0.68			0.67			0.67					
Total reduction		0.21			0.23			0.21			0.20					
Total, real		29			26			87			0					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: D - H4

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	18:02	07:01	20:00	18	07:49 (5)	05:52	06:18 (4)	05:03		
2	08:44	16:16	08:12	17:08	18:04	07:14	18:04	18:04	06:59	20:02	11	07:53 (5)	05:50	06:16 (4)	05:02		
3	08:44	16:17	08:10	17:10	18:06	07:12	18:06	18:06	06:56	20:04		08:04 (5)	05:48	06:14 (4)	05:01		
4	08:43	16:18	08:09	17:12	18:08	07:09	18:08	18:08	06:54	20:06			05:46	06:12 (4)	05:00		
5	08:43	16:20	08:07	17:14	18:10	07:07	18:10	18:10	06:52	20:08			05:44	06:10 (4)	04:59		
6	08:43	16:21	08:05	17:16	18:11	07:05	18:11	18:11	06:49	20:09			05:42	06:09 (4)	04:59		
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	18:13	06:47	20:11			05:40	06:08 (4)	04:58		
8	08:42	16:24	08:01	17:20	18:15	07:00	18:15	18:15	06:44	20:13			05:38	06:09 (4)	04:57		
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	18:17	06:42	20:15			05:36	06:11 (4)	04:57		
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	18:19	06:40	20:17			05:35	06:19 (4)	04:56		
11	08:40	16:28	07:55	17:26	18:21	06:53	18:21	18:21	06:37	20:19			05:33		04:56		
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	18:23	06:35	20:20			05:31		04:56		
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	18:25	06:32	20:22			05:29		04:55		
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	18:27	06:30	20:24			05:27		04:55		
15	08:36	16:35	07:47	17:34	18:29	06:43	18:29	18:29	06:28	20:26			05:26		04:55		
16	08:35	16:36	07:45	17:36	18:30	06:40	18:30	18:30	06:25	20:28			05:24		04:55		
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	18:32	06:23	20:30			05:22		04:54		
18	08:33	16:40	07:41	17:40	18:34	06:36	18:34	18:34	06:21	20:32			05:21		04:54		
19	08:32	16:41	07:39	17:42	18:36	06:33	18:36	18:36	06:18	20:33			05:19		04:54		
20	08:31	16:43	07:37	17:44	18:38	06:31	18:38	18:38	06:16	20:35			05:18		04:54		
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	18:40	06:14	20:37			05:16		04:55		
22	08:29	16:47	07:32	17:48	18:42	06:26	18:42	18:42	06:12	20:39			05:15		04:55		
23	08:27	16:49	07:30	17:50	18:44	06:23	18:44	18:44	06:09	20:41			05:13		04:55		
24	08:26	16:51	07:28	17:52	18:46	06:21	18:46	18:46	06:07	20:43			05:12		04:55		
25	08:25	16:53	07:25	17:54	18:48	06:18	18:48	18:48	06:05	20:44			05:11		04:56		
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	18:49	06:03	20:46			05:10		04:56		
27	08:22	16:56	07:21	17:58	18:51	06:14	18:51	18:51	06:01	20:48			05:08		04:57		
28	08:20	16:58	07:19	18:00	18:53	06:11	18:53	18:53	05:59	20:50			05:07		04:57		
29	08:19	17:00	07:17	18:02	18:55	07:09	18:55	18:55	05:56	20:52			05:06		04:58		
30	08:17	17:02	07:15	18:04	18:57	07:07	18:57	18:57	05:54	20:54			05:05		04:58		
31	08:15	17:04	07:13	18:06	18:59	07:05	18:59	18:59	05:52	20:56			05:04		04:59		
Potential sun hours	250		273		367				420				494		510		
Total, worst case					498				59				123		5		
Sun reduction					0.27				0.35				0.38		0.32		
Oper. time red.					1.00				1.00				1.00		1.00		
Wind dir. red.					0.67				0.67				0.67		0.66		
Total reduction					0.18				0.24				0.26		0.21		
Total, real					90				14				32		1		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: D - H4

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (5) 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (5) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:55 (5) 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:21 (4) 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:46 21:17	06:19 (4) 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:17 (4) 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57	05:49 21:14	06:19 (4) 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:20 (4) 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:22 (4) 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55	05:54 21:08	06:24 (4) 19:57	07:47 (5) 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:25 (4) 19:54	07:42 (5) 18:41	07:44 16:36	08:33 16:05
12	05:09 21:53	05:58 21:03	06:27 (4) 19:52	07:40 (5) 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	06:28 (4) 19:49	07:38 (5) 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:30 (4) 19:47	07:35 (5) 18:34	07:50 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	06:32 (4) 19:44	07:34 (5) 18:31	07:52 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	06:33 (4) 19:42	07:33 (5) 18:29	07:54 16:28	08:38 16:05
17	05:16 21:47	06:06 20:53	06:35 (4) 19:39	07:32 (5) 18:27	07:56 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:30 (5) 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:31 (5) 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	07:33 (5) 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	07:35 (5) 18:18	08:03 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	07:36 (5) 18:15	08:05 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	07:38 (5) 18:13	08:07 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	07:40 (5) 18:11	08:09 16:17	08:43 16:08
25	05:27 21:36	06:21 20:35	07:15 19:19	07:42 (5) 18:09	07:11 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:43 (5) 18:07	17:13 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:45 (5) 18:05	07:15 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:47 (5) 18:02	07:17 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:49 (5) 18:00	07:18 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:51 (5) 17:58	07:20 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		08:00 (5) 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case		149	523	6		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.67	0.67	0.67		
Total reduction		0.23	0.21	0.20		
Total, real		34	112	1		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: E - H5

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: F - H6

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: G - H7

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: H - H8

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: I - H9

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	06:18 (1) 21:45	05:03 22:00	04:59 21:25		06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10	
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	06:16 (1) 21:47	05:02 22:00	05:41 21:23		06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	06:14 (1) 21:48	05:01 21:59	05:42 21:21		06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09	
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	06:14 (1) 21:49	05:00 21:59	05:44 21:19	06:31 (1)	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08	
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	06:15 (1) 21:50	05:02 21:58	05:46 21:18	6 06:37 (1)	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07	
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	06:17 (1) 21:51	05:03 21:58	05:47 21:16	11 06:40 (1)	06:27 (1) 20:06	07:35 18:53	07:34 16:45	08:27 16:07	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	06:18 (1) 21:52	05:04 21:57	05:49 21:14	14 06:41 (1)	06:26 (1) 20:04	07:37 18:50	07:36 16:43	08:28 16:06	
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	06:19 (1) 21:53	05:05 21:56	05:51 21:12	17 06:43 (1)	06:24 (1) 20:02	07:39 18:48	07:38 16:41	08:29 16:06	
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	21 06:25 (1)	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05	
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	19 06:27 (1)	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05	
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	18 06:29 (1)	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05	
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	16 06:45 (1)	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05	
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17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	10 06:44 (1)	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05	
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	5 06:42 (1)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05	
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	2 06:41 (1)	06:12 19:32	07:07 18:20	08:01 16:22	08:41 16:06	
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22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42		06:15 19:27	07:10 18:05	08:04 16:19	08:42 16:07	
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39		06:17 19:24	07:12 18:13	08:07 16:18	08:42 16:07	
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21			07:22 16:56		08:44 16:14	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case					138				212					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.68	0.68				0.68					
Total reduction				0.24	0.26				0.23					
Total, real				17	36				49					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: J - H10

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	[January	[February	[March	[April	[May		[June		[July		[August	[September	[October	[November	[December			
1	08:44	08:14	07:16	07:01	05:52		05:03		05:34 (1)	04:59		05:34 (1)	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:56		21:45	15	05:49 (1)	22:00	18	05:52 (1)	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50		05:02		05:33 (1)	05:00		05:35 (1)	05:41	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57		21:47	16	05:49 (1)	22:00	18	05:53 (1)	21:23	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48		05:01		05:32 (1)	05:01		05:35 (1)	05:42	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59		21:48	17	05:49 (1)	21:59	19	05:54 (1)	21:21	20:14	19:00	16:50	16:09	
4	08:43	08:09	07:09	06:54	05:46		05:00		05:31 (1)	05:01		05:34 (1)	05:44	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01		21:49	17	05:48 (1)	21:59	20	05:54 (1)	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44		04:59		05:31 (1)	05:02		05:35 (1)	05:46	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03		21:50	18	05:49 (1)	21:58	19	05:54 (1)	21:18	20:09	18:55	16:47	16:07	
6	08:43	08:05	07:05	06:49	05:42		04:59		05:30 (1)	05:03		05:36 (1)	05:47	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:09	21:05		21:51	18	05:48 (1)	21:58	19	05:55 (1)	21:16	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40		04:58		05:30 (1)	05:04		05:37 (1)	05:49	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06		21:52	19	05:49 (1)	21:57	18	05:55 (1)	21:14	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38		04:57		05:29 (1)	05:05		05:38 (1)	05:51	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08		21:53	19	05:48 (1)	21:56	18	05:56 (1)	21:12	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	05:36		04:57		05:30 (1)	05:06		05:39 (1)	05:52	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10		21:54	19	05:49 (1)	21:56	17	05:56 (1)	21:10	19:59	18:45	16:39	16:06	
10	08:41	07:57	06:55	06:40	05:35		04:56		05:29 (1)	05:07		05:40 (1)	05:54	06:49	07:43	07:42	08:32	
	16:27	17:24	18:19	20:17	21:12		21:55	19	05:48 (1)	21:55	16	05:56 (1)	21:08	19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33		04:56		05:30 (1)	05:08		05:41 (1)	05:56	06:51	07:44	07:44	08:33	
	16:28	17:26	18:21	20:19	21:13		21:56	18	05:48 (1)	21:54	16	05:57 (1)	21:06	19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		04:56		05:31 (1)	05:10		05:42 (1)	05:58	06:52	07:46	07:46	08:34	
	16:30	17:28	18:23	20:21	21:15		21:56	18	05:49 (1)	21:53	15	05:57 (1)	21:04	19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:33	05:29		04:55		05:31 (1)	05:11		05:43 (1)	05:59	06:54	07:48	07:48	08:35	
	16:31	17:30	18:25	20:22	21:17		21:57	17	05:48 (1)	21:52	14	05:57 (1)	21:01	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55		05:31 (1)	05:12		05:44 (1)	06:01	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:19		21:58	17	05:48 (1)	21:51	13	05:57 (1)	20:59	19:47	18:34	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26		04:55		05:32 (1)	05:13		05:46 (1)	06:03	06:58	07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	21:20		21:58	16	05:48 (1)	21:50	12	05:58 (1)	20:57	19:44	18:31	16:29	16:05	
16	08:36	07:45	06:41	06:25	05:24		04:55		05:32 (1)	05:15		05:47 (1)	06:05	07:00	07:54	07:53	08:38	
	16:36	17:36	18:31	20:28	21:22		21:59	16	05:48 (1)	21:49	11	05:58 (1)	20:55	19:42	18:29	16:28	16:05	
17	08:35	07:43	06:38	06:23	05:22		04:54		05:33 (1)	05:16		05:48 (1)	06:06	07:01	07:56	07:55	08:39	
	16:38	17:38	18:32	20:30	21:24		21:59	15	05:48 (1)	21:48	10	05:58 (1)	20:53	19:39	18:27	16:26	16:05	
18	08:33	07:41	06:36	06:21	05:21		04:54		05:33 (1)	05:17		05:49 (1)	06:08	07:03	07:58	07:57	08:39	
	16:40	17:40	18:34	20:32	21:25		22:00	15	05:48 (1)	21:46	9	05:58 (1)	20:51	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:19	05:19		04:54		05:33 (1)	05:19		05:51 (1)	06:10	07:05	07:59	07:59	08:40	
	16:42	17:42	18:36	20:33	21:27		22:00	15	05:48 (1)	21:45	7	05:58 (1)	20:48	19:34	18:22	16:23	16:05	
20	08:31	07:37	06:31	06:16	05:18		04:55		05:33 (1)	05:20		05:52 (1)	06:12	07:07	08:01	08:01	08:41	
	16:43	17:44	18:38	20:35	21:28		22:00	15	05:48 (1)	21:44	6	05:58 (1)	20:46	19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16	05:45 (1)	04:55		05:34 (1)	05:22		05:53 (1)	06:14	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30	2	05:47 (1)	22:01	15	05:49 (1)	21:42	4	05:57 (1)	20:44	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	05:44 (1)	04:55		05:34 (1)	05:23		05:55 (1)	06:15	07:10	08:05	08:04	08:42	
	16:47	17:48	18:42	20:39	21:31	3	05:47 (1)	22:01	15	05:49 (1)	21:41	3	05:58 (1)	20:42	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13	05:43 (1)	04:55		05:34 (1)	05:24		05:56 (1)	06:17	07:12	08:07	08:06	08:42	
	16:49	17:50	18:44	20:41	21:33	5	05:48 (1)	22:01	15	05:49 (1)	21:40	1	05:57 (1)	20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	05:41 (1)	04:55		05:34 (1)	05:26		06:19	07:14	08:09	08:08	08:43		
	16:51	17:52	18:45	20:43	21:35	6	05:47 (1)	22:01	15	05:49 (1)	21:38		20:37	19:22	18:11	16:17	16:08	
25	08:25	07:26	06:19	06:05	05:11	05:40 (1)	04:56		05:35 (1)	05:28		06:21	07:15	07:11	08:09	08:43		
	16:53	17:54	18:47	20:45	21:36	8	05:48 (1)	22:01	15	05:50 (1)	21:37		20:35	19:20	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:10	05:39 (1)	04:56		05:34 (1)	05:29		06:22	07:17	07:13	08:11	08:44		
	16:55	17:56	18:49	20:46	21:37	9	05:48 (1)	22:01	16	05:50 (1)	21:35		20:33	19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08	05:38 (1)	04:57		05:35 (1)	05:31		06:24	07:19	07:15	08:13	08:44		
	16:56	17:58	18:51	20:48	21:39	10	05:48 (1)	22:01	16	05:51 (1)	21:33		20:30	19:15	17:05	16:14	16:10	
28	08:20	07:19	06:11	05:59	05:07	05:37 (1)	04:57		05:34 (1)	05:32		06:26	07:21	07:17	08:15	08:44		
	16:58	18:00	18:53	20:50	21:40	12	05:49 (1)	22:01	17	05:51 (1)	21:32		20:28	19:12	17:02	16:13	16:11	
29	08:19		07:09	05:56	05:06	05:36 (1)	04:58		05:35 (1)	05:34		06:28	07:23	07:19	08:16	08:44		
	17:00		19:55	20:52	21:42	13	05:49 (1)	22:01	17	05:52 (1)	21:30		20:26	19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05	05:35 (1)	04:58		05:34 (1)	05:36		06:29	07:24	07:21	08:18	08:44		
	17:02		19:57	20:54	21:43	14	05:49 (1)	22:00	18	05:52 (1)	21:28		20:23	19:07	16:58	16:11	16:13	
31	08:15		07:04	05:04	05:04	05:34 (1)				05:37		06:31		07:22	07:22	08:44		
	17:04		19:58	21:44	21:44	14	05:48 (1)			21:27		20:21		16:56	16:14	16:14		
Potential sun hours	250	273	367	420	494		510			512		460		382	328	259	233	
Total, worst case					96		498			303								
Sun reduction					0.38		0.32			0.32								
Oper. time red.					1.00		1.00			1.00								
Wind dir. red.					0.66		0.66			0.66								
Total reduction					0.25		0.21			0.21								
Total, real					24		104			64								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: K - H11

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: L - H12

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		07:25 (5)	05:52			05:03		05:34 (3)
	16:15	17:06	18:02						20:00	10	07:35 (5)	20:55			21:45	9	05:43 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50			05:02		05:33 (3)
	16:16	17:08	18:04						20:02	13	07:36 (5)	20:57			21:47	10	05:43 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48			05:01		05:32 (3)
	16:17	17:10	18:06						20:04	15	07:35 (5)	20:59			21:48	11	05:43 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46			05:00		05:31 (3)
	16:18	17:12	18:08						20:06	17	07:35 (5)	21:01			21:49	12	05:43 (3)
5	08:43	08:07	07:07						06:52		07:15 (5)	05:44			04:59		05:31 (3)
	16:20	17:14	18:10						20:08	18	07:33 (5)	21:03			21:50	13	05:44 (3)
6	08:43	08:05	07:05						06:49		07:13 (5)	05:42			04:59		05:30 (3)
	16:21	17:16	18:11						20:09	20	07:33 (5)	21:04			21:51	13	05:43 (3)
7	08:42	08:03	07:02						06:47		07:11 (5)	05:40			04:58		05:30 (3)
	16:22	17:18	18:13						20:11	21	07:32 (5)	21:06			21:52	14	05:44 (3)
8	08:42	08:01	07:00						06:44		07:10 (5)	05:38			04:57		05:29 (3)
	16:24	17:20	18:15						20:13	20	07:30 (5)	21:08			21:53	14	05:43 (3)
9	08:41	07:59	06:57						06:42		07:12 (5)	05:36			04:57		05:29 (3)
	16:25	17:22	18:17						20:15	17	07:29 (5)	21:10			21:54	15	05:44 (3)
10	08:40	07:57	06:55						06:40		07:13 (5)	05:35			04:56		05:28 (3)
	16:27	17:24	18:19						20:17	13	07:26 (5)	21:12			21:55	15	05:43 (3)
11	08:40	07:55	06:53						06:37		07:17 (5)	05:33			04:56		05:28 (3)
	16:28	17:26	18:21						20:19	5	07:22 (5)	21:13			21:55	16	05:44 (3)
12	08:39	07:53	06:50						06:35			05:31			04:56		05:28 (3)
	16:30	17:28	18:23						20:21			21:15			21:56	16	05:44 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:27 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	17	05:44 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:27 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	17	05:44 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:27 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	17	05:44 (3)
16	08:35	07:45	06:41						06:25			05:24			04:55		05:27 (3)
	16:36	17:36	18:30						20:28			21:22			21:59	17	05:44 (3)
17	08:34	07:43	06:38						06:23			05:22			04:54		05:27 (3)
	16:38	17:38	18:32						20:30			21:23			21:59	17	05:44 (3)
18	08:33	07:41	06:36						06:21			05:21			04:54		05:27 (3)
	16:40	17:40	18:34						20:32			21:25			22:00	18	05:45 (3)
19	08:32	07:39	06:33						06:19			05:19			04:54		05:27 (3)
	16:42	17:42	18:36						20:33			21:27			22:00	18	05:45 (3)
20	08:31	07:37	06:31						06:16			05:18			04:55		05:27 (3)
	16:43	17:44	18:38						20:35			21:28			22:00	18	05:45 (3)
21	08:30	07:34	06:28						06:14			05:16			04:55		05:28 (3)
	16:45	17:46	18:40						20:37			21:30			22:01	18	05:46 (3)
22	08:29	07:32	06:26						06:12			05:15			04:55		05:28 (3)
	16:47	17:48	18:42						20:39			21:31			22:01	18	05:46 (3)
23	08:27	07:30	06:23						06:09			05:13			04:55		05:28 (3)
	16:49	17:50	18:44						20:41			21:33			22:01	18	05:46 (3)
24	08:26	07:28	06:21						06:07			05:12			04:55		05:28 (3)
	16:51	17:52	18:45						20:43			21:34			22:01	18	05:46 (3)
25	08:25	07:25	06:18						06:05			05:11		05:40 (3)	04:56		05:29 (3)
	16:53	17:54	18:47						20:44			21:36	1	05:41 (3)	22:01	18	05:47 (3)
26	08:23	07:23	06:16						06:03			05:10		05:39 (3)	04:56		05:29 (3)
	16:54	17:56	18:49						20:46			21:37	2	05:41 (3)	22:01	17	05:46 (3)
27	08:22	07:21	06:14						06:01			05:08		05:38 (3)	04:57		05:30 (3)
	16:56	17:58	18:51						20:48			21:39	4	05:42 (3)	22:01	17	05:47 (3)
28	08:20	07:19	06:11						05:59			05:07		05:37 (3)	04:57		05:30 (3)
	16:58	18:00	18:53						20:50			21:40	5	05:42 (3)	22:01	17	05:47 (3)
29	08:19		07:09					07:32 (5)	05:56			05:06		05:36 (3)	04:58		05:31 (3)
	17:00		19:55	2		07:34 (5)	20:52		05:52			21:41	6	05:42 (3)	22:01	17	05:48 (3)
30	08:17		07:06			07:30 (5)	05:54		05:54			05:05		05:35 (3)	04:58		05:31 (3)
	17:02		19:56	5		07:35 (5)	20:54		05:54			21:43	7	05:42 (3)	22:00	16	05:47 (3)
31	08:15		07:04			07:27 (5)			05:54			05:04		05:34 (3)			
	17:04		19:58	8		07:35 (5)			05:54			21:44	8	05:42 (3)			
Potential sun hours	250	273	367				420					494			510		
Total, worst case				15			169					33			471		
Sun reduction				0.27			0.35					0.38			0.32		
Oper. time red.				1.00			1.00					1.00			1.00		
Wind dir. red.				0.68			0.68					0.66			0.66		
Total reduction				0.18			0.24					0.25			0.21		
Total, real				3			40					8			99		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: L - H12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33	07:16 (5)	07:26	07:24	08:19			
	22:00	16 05:48 (3)	21:25	20:18	5 07:21 (5)	19:05	16:54	16:10			
2	05:00	05:33 (3)	05:40	06:35	07:12 (5)	07:28	07:26	08:21			
	22:00	16 05:49 (3)	21:23	20:16	13 07:25 (5)	19:02	16:52	16:09			
3	05:00	05:33 (3)	05:42	06:37	07:10 (5)	07:30	07:28	08:22			
	21:59	15 05:48 (3)	21:21	20:14	17 07:27 (5)	19:00	16:50	16:09			
4	05:01	05:34 (3)	05:44	06:38	07:07 (5)	07:32	07:30	08:24			
	21:59	15 05:49 (3)	21:19	20:11	20 07:27 (5)	18:57	16:48	16:08			
5	05:02	05:35 (3)	05:46	06:40	07:07 (5)	07:33	07:32	08:25			
	21:58	14 05:49 (3)	21:17	20:09	21 07:28 (5)	18:55	16:46	16:07			
6	05:03	05:36 (3)	05:47	06:42	07:09 (5)	07:35	07:34	08:26			
	21:58	14 05:50 (3)	21:16	20:06	20 07:29 (5)	18:53	16:45	16:07			
7	05:04	05:37 (3)	05:49	06:44	07:10 (5)	07:37	07:36	08:28			
	21:57	13 05:50 (3)	21:14	20:04	19 07:29 (5)	18:50	16:43	16:06			
8	05:05	05:38 (3)	05:51	06:45	07:12 (5)	07:39	07:38	08:29			
	21:56	12 05:50 (3)	21:12	20:01	17 07:29 (5)	18:48	16:41	16:06			
9	05:06	05:39 (3)	05:52	06:47	07:14 (5)	07:41	07:40	08:30			
	21:55	11 05:50 (3)	21:10	19:59	15 07:29 (5)	18:45	16:39	16:06			
10	05:07	05:40 (3)	05:54	06:49	07:16 (5)	07:43	07:42	08:32			
	21:55	11 05:51 (3)	21:08	19:57	13 07:29 (5)	18:43	16:37	16:05			
11	05:08	05:41 (3)	05:56	06:51	07:17 (5)	07:44	07:44	08:33			
	21:54	10 05:51 (3)	21:06	19:54	11 07:28 (5)	18:41	16:36	16:05			
12	05:10	05:42 (3)	05:58	06:52	07:19 (5)	07:46	07:46	08:34			
	21:53	9 05:51 (3)	21:03	19:52	8 07:27 (5)	18:38	16:34	16:05			
13	05:11	05:43 (3)	05:59	06:54	07:21 (5)	07:48	07:47	08:35			
	21:52	8 05:51 (3)	21:01	19:49	6 07:27 (5)	18:36	16:32	16:05			
14	05:12	05:44 (3)	06:01	06:56	07:22 (5)	07:50	07:49	08:36			
	21:51	7 05:51 (3)	20:59	19:47	3 07:25 (5)	18:34	16:31	16:05			
15	05:13	05:45 (3)	06:03	06:58		07:52	07:51	08:37			
	21:50	6 05:51 (3)	20:57	19:44		18:31	16:29	16:05			
16	05:15	05:47 (3)	06:05	06:59		07:54	07:53	08:38			
	21:49	4 05:51 (3)	20:55	19:42		18:29	16:28	16:05			
17	05:16	05:48 (3)	06:06	07:01		07:56	07:55	08:39			
	21:47	3 05:51 (3)	20:53	19:39		18:27	16:26	16:05			
18	05:17	05:49 (3)	06:08	07:03		07:57	07:57	08:39			
	21:46	2 05:51 (3)	20:51	19:37		18:24	16:25	16:05			
19	05:19		06:10	07:05		07:59	07:59	08:40			
	21:45		20:48	19:34		18:22	16:23	16:05			
20	05:20		06:12	07:07		08:01	08:01	08:41			
	21:44		20:46	19:32		18:20	16:22	16:06			
21	05:21		06:14	07:08		08:03	08:02	08:41			
	21:42		20:44	19:29		18:18	16:21	16:06			
22	05:23		06:15	07:10		08:05	08:04	08:42			
	21:41		20:42	19:27		18:15	16:19	16:07			
23	05:24		06:17	07:12		08:07	08:06	08:42			
	21:39		20:39	19:24		18:13	16:18	16:07			
24	05:26		06:19	07:14		08:09	08:08	08:43			
	21:38		20:37	19:22		18:11	16:17	16:08			
25	05:28		06:21	07:15		07:11	08:09	08:43			
	21:36		20:35	19:19		17:09	16:16	16:08			
26	05:29		06:22	07:17		07:13	08:11	08:43			
	21:35		20:33	19:17		17:07	16:15	16:09			
27	05:31		06:24	07:19		07:15	08:13	08:44			
	21:33		20:30	19:15		17:05	16:14	16:10			
28	05:32		06:26	07:21		07:17	08:14	08:44			
	21:32		20:28	19:12		17:02	16:13	16:11			
29	05:34		06:28	07:23		07:19	08:16	08:44			
	21:30		20:25	19:10		17:00	16:12	16:12			
30	05:35		06:29	07:24		07:20	08:18	08:44			
	21:28		20:23	19:07		16:58	16:11	16:13			
31	05:37		06:31			07:22		08:44			
	21:27		20:21			16:56		16:14			
Potential sun hours	512		460	382		328	259	233			
Total, worst case	186			188							
Sun reduction	0.32			0.32							
Oper. time red.	1.00			1.00							
Wind dir. red.	0.66			0.68							
Total reduction	0.21			0.22							
Total, real	40			41							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: M - H13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14		07:16		17:11 (5)	07:01	05:52		19:29 (4)	05:03
	16:15	17:06		18:02	23	17:34 (5)	20:00	20:55	36	20:05 (4)	21:45
2	08:44	08:12		07:14		17:10 (5)	06:59	05:50		19:30 (4)	05:02
	16:16	17:08		18:04	26	17:36 (5)	20:02	20:57	34	20:04 (4)	21:46
3	08:43	08:10		07:11		17:11 (5)	06:56	05:48		19:31 (4)	05:01
	16:17	17:10		18:06	27	17:38 (5)	20:04	20:59	32	20:03 (4)	21:48
4	08:43	08:08		07:09		17:11 (5)	06:54	05:46		19:32 (4)	05:00
	16:18	17:12		18:07	27	17:38 (5)	20:06	21:01	30	20:02 (4)	21:49
5	08:43	08:07		07:07		17:10 (5)	06:51	05:44		19:33 (4)	04:59
	16:20	17:14		18:09	27	17:37 (5)	20:07	21:03	27	20:00 (4)	21:50
6	08:42	08:05		07:04		17:11 (5)	06:49	05:42		19:34 (4)	04:59
	16:21	17:16		18:11	26	17:37 (5)	20:09	21:04	24	19:58 (4)	21:51
7	08:42	08:03		07:02		17:11 (5)	06:47	05:40		19:37 (4)	04:58
	16:22	17:18		18:13	24	17:35 (5)	20:11	21:06	20	19:57 (4)	21:52
8	08:41	08:01		07:00		17:12 (5)	06:44	05:38		19:39 (4)	04:57
	16:24	17:20		18:15	23	17:35 (5)	20:13	21:08	16	19:55 (4)	21:53
9	08:41	07:59		06:57		17:12 (5)	06:42	19:45 (4)	05:36	19:42 (4)	04:57
	16:25	17:22		18:17	21	17:33 (5)	20:15	19:48 (4)	21:10	9	19:51 (4)
10	08:40	07:57		06:55		17:14 (5)	06:39	19:41 (4)	05:34		04:56
	16:26	17:24		18:19	17	17:31 (5)	20:17	8	19:49 (3)	21:11	21:55
11	08:40	07:55		06:52		17:17 (5)	06:37	19:39 (4)	05:33		04:56
	16:28	17:26		18:21	12	17:29 (5)	20:19	12	19:51 (3)	21:13	21:55
12	08:39	07:53		06:50			06:35	19:37 (4)	05:31		04:55
	16:30	17:28		18:23			20:20	16	19:53 (3)	21:15	21:56
13	08:38	07:51		06:48			06:32	19:35 (4)	05:29		04:55
	16:31	17:30		18:25			20:22	19	19:54 (3)	21:17	21:57
14	08:37	07:49		06:45			06:30	19:34 (4)	05:27		04:55
	16:33	17:32		18:27			20:24	22	19:56 (3)	21:18	21:57
15	08:36	07:47		06:43			06:28	19:33 (4)	05:26		04:55
	16:34	17:34		18:28			20:26	25	19:58 (3)	21:20	21:58
16	08:35	07:45		06:40			06:25	19:32 (4)	05:24		04:54
	16:36	17:36		18:30			20:28	28	20:00 (3)	21:22	21:59
17	08:34	07:43		06:38			06:23	19:30 (4)	05:22		04:54
	16:38	17:38		18:32			20:30	31	20:01 (3)	21:23	21:59
18	08:33	07:41		06:35			06:21	19:29 (4)	05:21		04:54
	16:40	17:40		18:34			20:31	34	20:03 (3)	21:25	22:00
19	08:32	07:39		06:33			06:18	19:29 (4)	05:19		04:54
	16:41	17:42		18:36			20:33	36	20:05 (3)	21:27	22:00
20	08:31	07:36		06:31			06:16	19:29 (4)	05:18		04:54
	16:43	17:44		18:38			20:35	38	20:07 (4)	21:28	22:00
21	08:30	07:34		06:28			06:14	19:27 (4)	05:16		04:54
	16:45	17:46		18:40			20:37	41	20:08 (4)	21:30	22:00
22	08:28	07:32		06:26			06:12	19:27 (4)	05:15		04:55
	16:47	17:48		18:41			20:39	42	20:09 (4)	21:31	22:01
23	08:27	07:30	17:20 (5)	06:23			06:09	19:27 (4)	05:13		04:55
	16:49	17:50	2	17:22 (5)	18:43		20:41	42	20:09 (4)	21:33	22:01
24	08:26	07:28		17:17 (5)	06:21		06:07	19:27 (4)	05:12		04:55
	16:50	17:52	7	17:24 (5)	18:45		20:42	42	20:09 (4)	21:34	22:01
25	08:24	07:25		17:15 (5)	06:18		06:05	19:27 (4)	05:11		04:56
	16:52	17:54	11	17:26 (5)	18:47		20:44	42	20:09 (4)	21:36	22:01
26	08:23	07:23		17:14 (5)	06:16		06:03	19:27 (4)	05:09		04:56
	16:54	17:56	14	17:28 (5)	18:49		20:46	41	20:08 (4)	21:37	22:01
27	08:22	07:21		17:13 (5)	06:13		06:01	19:28 (4)	05:08		04:56
	16:56	17:58	18	17:31 (5)	18:51		20:48	40	20:08 (4)	21:39	22:01
28	08:20	07:18		17:12 (5)	06:11		05:58	19:28 (4)	05:07		04:57
	16:58	18:00	20	17:32 (5)	18:53		20:50	39	20:07 (4)	21:40	22:01
29	08:18			07:08			05:56	19:28 (4)	05:06		04:57
	17:00			19:54			20:52	39	20:07 (4)	21:41	22:01
30	08:17			07:06			05:54	19:29 (4)	05:05		04:58
	17:02			19:56			20:53	37	20:06 (4)	21:43	22:00
31	08:15			07:04					05:04		1
	17:04			19:58					21:44		21:24 (2)
Potential sun hours	250	273		367		420		494		510	
Total, worst case		72		253		677		228		64	
Sun reduction		0.23		0.27		0.35		0.38		0.32	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.68		0.68		0.65		0.65		0.61	
Total reduction		0.16		0.18		0.23		0.25		0.19	
Total, real		11		46		156		57		12	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: M - H13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	12 19:38 (4) 19:50 (3)	07:26 19:05	07:24 16:54
2	05:00 22:00	05:40 21:23	06:35 20:16	19:40 (4) 19:48 (3)	07:28 19:02	16:54 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	19:42 (4) 19:45 (4)	07:30 19:00	16:52 16:08
4	05:01 21:59	05:44 21:19	19:51 (4) 20:03 (4)	06:38 20:11	07:31 18:57	16:08 16:48
5	05:02 21:58	05:45 21:17	19:47 (4) 20:05 (4)	06:40 20:09	07:33 18:55	08:25 16:07
6	05:03 21:57	05:47 21:15	19:45 (4) 20:07 (4)	06:42 20:06	07:35 18:52	16:07 16:07
7	05:04 21:57	05:49 21:13	19:44 (4) 20:09 (4)	06:43 20:04	07:37 18:50	08:28 16:06
8	05:05 21:56	05:51 21:11	19:42 (4) 20:10 (4)	06:45 20:01	07:39 18:48	08:29 16:06
9	05:06 21:55	05:52 21:09	19:41 (4) 20:11 (4)	06:47 19:59	07:41 18:45	08:30 16:05
10	05:07 21:55	05:54 21:07	19:39 (4) 20:12 (4)	06:49 19:56	07:42 18:43	08:31 16:05
11	05:08 21:54	05:56 21:05	19:38 (4) 20:13 (4)	06:50 19:54	07:44 18:40	08:33 16:05
12	05:09 21:53	05:57 21:03	19:38 (4) 20:14 (4)	06:52 19:51	07:46 18:38	08:34 16:05
13	05:11 21:52	05:59 21:01	19:36 (4) 20:14 (4)	06:54 19:49	07:48 18:36	08:35 16:05
14	05:12 21:51	06:01 20:59	19:36 (4) 20:14 (4)	06:56 19:47	07:50 18:33	08:36 16:05
15	05:13 21:50	06:03 20:57	19:35 (4) 20:15 (4)	06:58 19:44	07:52 18:31	08:37 16:05
16	05:14 21:49	06:05 20:55	19:34 (4) 20:15 (4)	06:59 19:42	07:54 18:29	08:38 16:05
17	05:16 21:47	06:06 20:53	19:34 (4) 20:15 (4)	07:01 19:39	07:55 18:26	08:38 16:05
18	05:17 21:46	06:08 20:50	19:34 (4) 20:15 (4)	07:03 19:37	07:57 18:24	08:39 16:05
19	05:18 21:45	06:10 20:48	19:33 (4) 20:15 (4)	07:05 19:34	07:59 18:22	08:40 16:05
20	05:20 21:44	06:12 20:46	19:33 (4) 20:15 (4)	07:06 19:32	08:01 18:20	08:41 16:06
21	05:21 21:42	06:13 20:44	19:33 (4) 20:15 (4)	07:08 19:29	08:03 18:17	08:41 16:06
22	05:23 21:41	06:15 20:42	19:32 (4) 20:12 (4)	07:10 19:27	08:05 18:15	08:42 16:06
23	05:24 21:39	06:17 20:39	19:32 (4) 20:10 (4)	07:12 19:24	08:07 18:13	08:42 16:07
24	05:26 21:38	06:19 20:37	19:33 (4) 20:09 (3)	07:13 19:22	08:09 18:11	08:43 16:08
25	05:27 21:36	06:20 20:35	19:32 (4) 20:06 (3)	07:15 19:19	07:11 17:09	08:43 16:08
26	05:29 21:35	06:22 20:32	19:33 (4) 20:04 (3)	07:17 19:17	07:13 17:06	08:43 16:09
27	05:30 21:33	06:24 20:30	19:34 (4) 20:02 (3)	07:19 19:14	07:14 17:04	08:44 16:10
28	05:32 21:32	06:26 20:28	19:33 (4) 19:59 (3)	07:21 19:12	07:16 17:02	08:44 16:11
29	05:34 21:30	06:27 20:25	19:34 (4) 19:57 (3)	07:22 19:09	07:18 17:00	08:44 16:11
30	05:35 21:28	06:29 20:23	19:36 (4) 19:55 (3)	07:24 19:07	07:20 16:58	08:44 16:12
31	05:37 21:26	06:31 20:21	19:36 (4) 19:52 (3)	07:22 16:56	07:22 16:56	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		895	23	331		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.65	0.68		
Total reduction		0.22	0.21	0.20		
Total, real		199	5	66		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: N - H14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14		07:16		16:59 (5)	07:01	19:04 (4)	05:52	05:03	20:48 (2)
	16:15	17:06		18:02	18	17:17 (5)	20:00	19:33 (3)	20:55	21:45	22 21:10 (2)
2	08:44	08:12		07:14		17:00 (5)	06:59	19:02 (4)	05:50	05:02	20:49 (2)
	16:16	17:08		18:04	14	17:14 (5)	20:02	19:35 (3)	20:57	21:46	23 21:12 (2)
3	08:43	08:10		07:11		17:03 (5)	06:56	19:02 (4)	05:48	05:01	20:48 (2)
	16:17	17:10		18:06	9	17:12 (5)	20:04	19:37 (3)	20:59	21:48	25 21:13 (2)
4	08:43	08:08		07:09			06:54	19:02 (4)	05:46	05:00	20:48 (2)
	16:18	17:12		18:07			20:06	19:39 (3)	21:01	21:49	26 21:14 (2)
5	08:43	08:07		07:07			06:51	19:01 (4)	05:44	04:59	20:48 (2)
	16:19	17:14		18:09			20:07	19:40 (3)	21:03	21:50	26 21:14 (2)
6	08:42	08:05		07:04			06:49	19:01 (4)	05:42	04:59	20:49 (2)
	16:21	17:16		18:11			20:09	19:42 (3)	21:04	21:51	27 21:16 (2)
7	08:42	08:03		07:02			06:47	19:00 (4)	05:40	04:58	20:48 (2)
	16:22	17:18		18:13			20:11	19:43 (3)	21:06	21:52	28 21:16 (2)
8	08:41	08:01		07:00			06:44	19:00 (4)	05:38	04:57	20:49 (2)
	16:24	17:20		18:15			20:13	19:46 (3)	21:08	21:53	29 21:18 (2)
9	08:41	07:59		06:57			06:42	19:00 (4)	05:36	04:57	20:49 (2)
	16:25	17:22		18:17			20:15	19:48 (3)	21:10	21:54	29 21:18 (2)
10	08:40	07:57		06:55			06:39	19:00 (4)	05:34	04:56	20:49 (2)
	16:26	17:24		18:19			20:17	19:47 (3)	21:11	21:55	30 21:19 (2)
11	08:40	07:55		06:52			06:37	19:00 (4)	05:33	04:56	20:50 (2)
	16:28	17:26		18:21			20:19	19:47 (3)	21:13	21:55	29 21:19 (2)
12	08:39	07:53		06:50			06:35	19:01 (4)	05:31	04:55	20:49 (2)
	16:30	17:28		18:23			20:20	19:46 (3)	21:15	21:56	30 21:19 (2)
13	08:38	07:51		06:48			06:32	19:01 (4)	05:29	04:55	20:50 (2)
	16:31	17:30		18:25			20:22	19:43 (3)	21:17	21:57	29 21:19 (2)
14	08:37	07:49		06:45			06:30	19:02 (4)	05:27	04:55	20:50 (2)
	16:33	17:32		18:27			20:24	19:42 (3)	21:18	21:57	29 21:19 (2)
15	08:36	07:47	17:03 (5)	06:43			06:28	19:03 (4)	05:26	04:55	20:50 (2)
	16:34	17:34	2 17:05 (5)	18:28			20:26	19:39 (3)	21:20	21:58	30 21:20 (2)
16	08:35	07:45	17:01 (5)	06:40			06:25	19:04 (4)	05:24	04:54	20:51 (2)
	16:36	17:36	6 17:07 (5)	18:30			20:28	19:33 (4)	21:22	21:59	29 21:20 (2)
17	08:34	07:43	17:00 (5)	06:38			06:23	19:05 (4)	05:22	04:54	20:51 (2)
	16:38	17:38	9 17:09 (5)	18:32			20:30	19:30 (4)	21:23	21:59	29 21:20 (2)
18	08:33	07:41	16:58 (5)	06:35			06:21	19:07 (4)	05:21	04:54	20:51 (2)
	16:40	17:40	13 17:11 (5)	18:34			20:31	19:29 (4)	21:25	22:00	29 21:20 (2)
19	08:32	07:39	16:57 (5)	06:33			06:18	19:09 (4)	05:19	04:54	20:51 (2)
	16:41	17:42	16 17:13 (5)	18:36			20:33	19:26 (4)	21:27	22:00	29 21:20 (2)
20	08:31	07:36	16:57 (5)	06:31			06:16	19:13 (4)	05:18	04:54	20:51 (2)
	16:43	17:44	19 17:16 (5)	18:38			20:35	19:22 (4)	21:28	22:00	30 21:21 (2)
21	08:30	07:34	16:56 (5)	06:28			06:14		05:16	04:54	20:51 (2)
	16:45	17:46	22 17:18 (5)	18:40			20:37		21:30	4 20:57 (2)	22:01 30 21:21 (2)
22	08:28	07:32	16:55 (5)	06:26			06:12		05:15	20:53 (2)	04:55 20:52 (2)
	16:47	17:48	24 17:19 (5)	18:41			20:39		21:31	6 20:59 (2)	22:01 30 21:22 (2)
23	08:27	07:30	16:55 (5)	06:23			06:09		05:13	20:51 (2)	04:55 20:52 (2)
	16:49	17:50	26 17:21 (5)	18:43			20:41		21:33	8 20:59 (2)	22:01 30 21:22 (2)
24	08:26	07:28	16:56 (5)	06:21			06:07		05:12	20:50 (2)	04:55 20:52 (2)
	16:50	17:52	26 17:22 (5)	18:45			20:42		21:34	11 21:01 (2)	22:01 29 21:21 (2)
25	08:24	07:25	16:55 (5)	06:18		18:19 (4)	06:05		05:11	20:50 (2)	04:56 20:53 (2)
	16:52	17:54	25 17:20 (5)	18:47	2	18:21 (4)	20:44		21:36	12 21:02 (2)	22:01 29 21:22 (2)
26	08:23	07:23	16:56 (5)	06:16		18:14 (4)	06:03		05:09	20:50 (2)	04:56 20:53 (2)
	16:54	17:56	24 17:20 (5)	18:49	8	18:22 (4)	20:46		21:37	14 21:04 (2)	22:01 29 21:22 (2)
27	08:22	07:21	16:57 (5)	06:13		18:12 (4)	06:01		05:08	20:49 (2)	04:56 20:52 (2)
	16:56	17:58	23 17:20 (5)	18:51	12	18:24 (4)	20:48		21:39	16 21:05 (2)	22:01 30 21:22 (2)
28	08:20	07:18	16:57 (5)	06:11		18:10 (4)	05:58		05:07	20:49 (2)	04:57 20:53 (2)
	16:58	18:00	21 17:18 (5)	18:53	16	18:26 (4)	20:50		21:40	17 21:06 (2)	22:01 30 21:23 (2)
29	08:18			07:08		19:08 (4)	05:56		05:06	20:49 (2)	04:57 20:54 (2)
	17:00			19:54	20	19:28 (4)	20:52		21:41	18 21:07 (2)	22:01 29 21:23 (2)
30	08:17			07:06		19:07 (4)	05:54		05:05	20:48 (2)	04:58 20:53 (2)
	17:02			19:56	23	19:30 (4)	20:53		21:43	20 21:08 (2)	22:00 30 21:23 (2)
31	08:15			07:04		19:05 (4)			05:04	20:48 (2)	
	17:04			19:58	26	19:31 (4)			21:44	21 21:09 (2)	
Potential sun hours	250	273		367		420		494		510	
Total, worst case			256		148		710		147		854
Sun reduction			0.23		0.27		0.35		0.38		0.32
Oper. time red.			1.00		1.00		1.00		1.00		1.00
Wind dir. red.			0.67		0.67		0.67		0.62		0.62
Total reduction			0.16		0.18		0.24		0.24		0.20
Total, real			40		27		168		35		168

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: N - H14

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:54 (2)	05:39	06:33	18:59 (4)	07:26		07:24	08:19		
	22:00	29	21:23 (2)	21:25	20:18	47	19:46 (3)	19:05	16:54	16:10	
2	05:00	20:54 (2)	05:40	06:35	18:59 (4)	07:28		07:26	08:21		
	22:00	30	21:24 (2)	21:23	20:16	47	19:46 (3)	19:02	16:52	16:09	
3	05:00	20:54 (2)	05:42	06:36	18:57 (4)	07:30		07:28	08:22		
	21:59	29	21:23 (2)	21:21	20:13	48	19:45 (3)	19:00	16:50	16:08	
4	05:01	20:54 (2)	05:44	06:38	18:57 (4)	07:31		07:30	08:24		
	21:59	29	21:23 (2)	21:19	20:11	46	19:43 (3)	18:57	16:48	16:08	
5	05:02	20:55 (2)	05:45	06:40	18:57 (4)	07:33		07:32	08:25		
	21:58	28	21:23 (2)	21:17	20:09	44	19:41 (3)	18:55	16:46	16:07	
6	05:03	20:55 (2)	05:47	06:42	18:57 (4)	07:35		07:34	08:26		
	21:57	27	21:22 (2)	21:15	20:06	42	19:39 (3)	18:52	16:44	16:07	
7	05:04	20:55 (2)	05:49	06:43	18:56 (4)	07:37		07:36	08:28		
	21:57	27	21:22 (2)	21:13	20:04	39	19:35 (3)	18:50	16:43	16:06	
8	05:05	20:56 (2)	05:51	06:45	18:56 (4)	07:39		07:38	08:29		
	21:56	25	21:21 (2)	21:11	20:01	37	19:33 (3)	18:48	16:41	16:06	
9	05:06	20:56 (2)	05:52	06:47	18:56 (4)	07:41		07:40	08:30		
	21:55	25	21:21 (2)	21:09	19:59	35	19:31 (3)	18:45	16:39	16:05	
10	05:07	20:56 (2)	05:54	06:49	18:56 (4)	07:42		07:42	08:31		
	21:55	24	21:20 (2)	21:07	19:56	32	19:28 (3)	18:43	16:37	16:05	
11	05:08	20:56 (2)	05:56	06:50	18:56 (4)	07:44		17:35 (5)	07:44	08:33	
	21:54	23	21:19 (2)	21:05	19:54	30	19:26 (3)	18:40	17:47 (5)	16:35	16:05
12	05:09	20:57 (2)	05:57	06:52	18:57 (4)	07:46		17:33 (5)	07:45	08:34	
	21:53	21	21:18 (2)	21:03	19:51	27	19:24 (4)	18:38	17:49 (5)	16:34	16:05
13	05:10	20:57 (2)	05:59	06:54	18:58 (4)	07:48		17:31 (5)	07:47	08:35	
	21:52	20	21:17 (2)	21:01	19:49	24	19:22 (4)	18:36	17:51 (5)	16:32	16:05
14	05:12	20:57 (2)	06:01	06:56	18:58 (4)	07:50		17:30 (5)	07:49	08:36	
	21:51	19	21:16 (2)	20:59	19:47	20	19:18 (4)	18:33	17:52 (5)	16:31	16:05
15	05:13	20:57 (2)	06:03	06:58	18:59 (4)	07:52		17:29 (5)	07:51	08:37	
	21:50	18	21:15 (2)	20:57	19:44	17	19:16 (4)	18:31	17:52 (5)	16:29	16:05
16	05:14	20:58 (2)	06:04	06:59	19:01 (4)	07:54		17:28 (5)	07:53	08:38	
	21:49	16	21:14 (2)	20:55	19:42	13	19:14 (4)	18:29	17:53 (5)	16:27	16:05
17	05:16	20:59 (2)	06:06	07:01	19:02 (4)	07:55		17:27 (5)	07:55	08:38	
	21:47	15	21:14 (2)	20:53	19:39	9	19:11 (4)	18:26	17:53 (5)	16:26	16:05
18	05:17	20:59 (2)	06:08	07:03	19:05 (4)	07:57		17:27 (5)	07:57	08:39	
	21:46	13	21:12 (2)	20:50	19:37	3	19:08 (4)	18:24	17:53 (5)	16:24	16:05
19	05:18	21:00 (2)	06:10	07:05		07:59		17:27 (5)	07:59	08:40	
	21:45	11	21:11 (2)	20:48	19:34			18:22	17:52 (5)	16:23	16:05
20	05:20	21:01 (2)	06:12	07:06		08:01		17:27 (5)	08:00	08:41	
	21:44	9	21:10 (2)	20:46	19:32			18:20	17:50 (5)	16:22	16:06
21	05:21	21:02 (2)	06:13	07:08		08:03		17:27 (5)	08:02	08:41	
	21:42	7	21:09 (2)	20:44	19:29			18:17	17:48 (5)	16:20	16:06
22	05:23	21:02 (2)	06:15	07:10		08:05		17:27 (5)	08:04	08:42	
	21:41	5	21:07 (2)	20:42	19:27			18:15	17:45 (5)	16:19	16:06
23	05:24	21:04 (2)	06:17	19:16 (4)	07:12			18:07	17:28 (5)	08:06	08:42
	21:39	3	21:07 (2)	20:39	19:26 (4)	19:24		18:13	17:43 (5)	16:18	16:07
24	05:26		06:19	19:13 (4)	07:13			18:09	17:28 (5)	08:08	08:43
	21:38		20:37	19:30 (4)	19:22			18:11	17:41 (5)	16:17	16:08
25	05:27		06:20	19:09 (4)	07:15			17:11	16:29 (5)	08:09	08:43
	21:36		20:35	19:32 (4)	19:19			17:09	16:38 (5)	16:16	16:08
26	05:29		06:22	19:07 (4)	07:17			17:13	16:31 (5)	08:11	08:43
	21:35		20:32	19:33 (4)	19:17			17:06	16:36 (5)	16:14	16:09
27	05:30		06:24	19:06 (4)	07:19			17:14	16:33 (5)	08:13	08:44
	21:33		20:30	19:35 (4)	19:14			17:04	16:34 (5)	16:13	16:10
28	05:32		06:26	19:04 (4)	07:21			17:16		08:14	08:44
	21:32		20:28	19:40 (3)	19:12			17:02		16:12	16:11
29	05:34		06:27	19:02 (4)	07:22			17:18		08:16	08:44
	21:30		20:25	19:43 (3)	19:09			17:00		16:12	16:11
30	05:35		06:29	19:02 (4)	07:24			17:20		08:18	08:44
	21:28		20:23	19:44 (3)	19:07			16:58		16:11	16:12
31	05:37		06:31	19:00 (4)				17:22			08:44
	21:26		20:21	19:45 (3)				16:56			16:13
Potential sun hours	512		460		382			328		259	233
Total, worst case		453		269		560			300		
Sun reduction		0.32		0.34		0.32			0.29		
Oper. time red.		1.00		1.00		1.00			1.00		
Wind dir. red.		0.62		0.67		0.67			0.67		
Total reduction		0.20		0.23		0.22			0.20		
Total, real		90		62		120			59		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: O - H15

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	18:54 (4)	05:52
	16:15	17:06	18:02	20:00	39	19:33 (3)
2	08:44	08:12	07:14	06:59	18:53 (4)	05:50
	16:16	17:08	18:04	20:02	42	19:35 (3)
3	08:43	08:10	07:11	06:56	18:53 (4)	05:48
	16:17	17:10	18:06	20:04	44	19:37 (3)
4	08:43	08:08	07:09	06:54	18:53 (4)	05:46
	16:18	17:12	18:07	20:06	46	19:39 (3)
5	08:43	08:07	07:07	06:51	18:53 (4)	05:44
	16:19	17:14	18:09	20:07	47	19:40 (3)
6	08:42	08:05	07:04	06:49	18:54 (4)	05:42
	16:21	17:16	18:11	20:09	48	19:42 (3)
7	08:42	08:03	07:02	06:47	18:54 (4)	05:40
	16:22	17:18	18:13	20:11	48	19:42 (3)
8	08:42	08:01	07:00	06:44	18:54 (4)	05:38
	16:24	17:20	18:15	20:13	47	19:41 (3)
9	08:41	07:59	06:57	06:42	18:56 (4)	05:36
	16:25	17:22	18:17	20:15	44	19:40 (3)
10	08:40	07:57	06:55	06:39	18:56 (4)	05:34
	16:26	17:24	18:19	20:17	42	19:38 (3)
11	08:40	07:55	06:52	06:37	18:58 (4)	05:33
	16:28	17:26	18:21	20:19	36	19:36 (3)
12	08:39	07:53	06:50	06:35	19:00 (4)	05:31
	16:30	17:28	18:23	20:20	21	19:21 (4)
13	08:38	07:51	16:57 (5)	06:48	19:01 (4)	05:29
	16:31	17:30	17:00 (5)	18:25	20:22	17
14	08:37	07:49	16:56 (5)	06:45	19:18 (4)	05:27
	16:33	17:32	17:02 (5)	18:27	20:24	7
15	08:36	07:47	16:55 (5)	06:43	19:13 (4)	05:26
	16:34	17:34	17:05 (5)	18:28	20:26	3
16	08:35	07:45	16:54 (5)	06:40	20:25	05:24
	16:36	17:36	17:07 (5)	18:30	20:28	6
17	08:34	07:43	16:53 (5)	06:38	20:22	05:22
	16:38	17:38	17:09 (5)	18:32	20:30	9
18	08:33	07:41	16:52 (5)	06:35	20:21	05:21
	16:40	17:40	17:11 (5)	18:34	20:31	11
19	08:32	07:39	16:52 (5)	06:33	20:18	05:19
	16:41	17:42	17:13 (5)	18:36	20:33	12
20	08:31	07:36	16:52 (5)	06:31	20:16	05:18
	16:43	17:44	17:16 (5)	18:38	20:35	14
21	08:30	07:34	16:52 (5)	06:28	18:08 (4)	06:14
	16:45	17:46	17:18 (5)	18:40	20:37	17
22	08:28	07:32	16:52 (5)	06:26	18:04 (4)	06:12
	16:47	17:48	17:17 (5)	18:41	20:39	19
23	08:27	07:30	16:52 (5)	06:23	18:03 (4)	06:09
	16:49	17:50	17:16 (5)	18:43	20:41	20
24	08:26	07:28	16:53 (5)	06:21	18:00 (4)	06:07
	16:50	17:52	17:16 (5)	18:45	20:42	22
25	08:24	07:25	16:53 (5)	06:18	17:59 (4)	06:05
	16:52	17:54	17:14 (5)	18:47	20:44	23
26	08:23	07:23	16:55 (5)	06:16	17:57 (4)	06:03
	16:54	17:56	17:13 (5)	18:49	20:46	25
27	08:22	07:21	16:56 (5)	06:13	17:57 (4)	06:01
	16:56	17:58	17:12 (5)	18:51	20:48	27
28	08:20	07:18	16:58 (5)	06:11	17:56 (4)	05:58
	16:58	18:00	17:09 (5)	18:53	20:50	27
29	08:18		07:08	18:55 (4)	05:56	05:06
	17:00		19:54	33	19:28 (3)	20:52
30	08:17		07:06	18:55 (4)	05:54	05:05
	17:02		19:56	35	19:30 (3)	20:53
31	08:15		07:04	18:54 (4)	05:04	20:39 (2)
	17:04		19:58	37	19:31 (3)	21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case		276	257	528	321	809
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.62	0.62
Total reduction		0.16	0.18	0.24	0.24	0.20
Total, real		43	47	126	76	161

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: O - H15

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:47 (2)	05:39	06:33	18:57 (4)	07:26		07:24	08:19		
	22:00	27	21:14 (2)	21:25	20:18	36	19:35 (3)	19:05	16:54	16:10	
2	04:59	20:47 (2)	05:40	06:35	18:55 (4)	07:28		07:26	08:21		
	22:00	28	21:15 (2)	21:23	20:16	42	19:37 (3)	19:02	16:52	16:09	
3	05:00	20:47 (2)	05:42	06:36	18:53 (4)	07:30		07:28	08:22		
	21:59	27	21:14 (2)	21:21	20:13	44	19:37 (3)	19:00	16:50	16:08	
4	05:01	20:47 (2)	05:44	06:38	18:52 (4)	07:31		07:30	08:24		
	21:59	28	21:15 (2)	21:19	20:11	46	19:38 (3)	18:57	16:48	16:08	
5	05:02	20:47 (2)	05:45	06:40	18:51 (4)	07:33		07:32	08:25		
	21:58	28	21:15 (2)	21:17	20:09	48	19:39 (3)	18:55	16:46	16:07	
6	05:03	20:47 (2)	05:47	06:42	18:50 (4)	07:35		07:34	08:26		
	21:57	29	21:16 (2)	21:15	20:06	49	19:39 (3)	18:52	16:44	16:07	
7	05:04	20:48 (2)	05:49	06:43	18:48 (4)	07:37		07:36	08:28		
	21:57	28	21:16 (2)	21:13	20:04	47	19:35 (3)	18:50	16:43	16:06	
8	05:05	20:48 (2)	05:51	06:45	18:48 (4)	07:39		07:38	08:29		
	21:56	28	21:16 (2)	21:11	20:01	45	19:33 (3)	18:48	16:41	16:06	
9	05:06	20:48 (2)	05:52	06:47	18:47 (4)	07:41		07:40	08:30		
	21:55	29	21:17 (2)	21:09	19:59	44	19:31 (3)	18:45	16:39	16:05	
10	05:07	20:48 (2)	05:54	06:49	18:46 (4)	07:42		07:42	08:31		
	21:55	29	21:17 (2)	21:07	19:56	42	19:28 (3)	18:43	16:37	16:05	
11	05:08	20:48 (2)	05:56	06:50	18:46 (4)	07:44		07:44	08:33		
	21:54	29	21:17 (2)	21:05	19:54	40	19:26 (3)	18:40	16:35	16:05	
12	05:09	20:48 (2)	05:57	06:52	18:46 (4)	07:46		07:45	08:34		
	21:53	29	21:17 (2)	21:03	19:51	38	19:24 (3)	18:38	16:34	16:05	
13	05:10	20:48 (2)	05:59	06:54	18:46 (4)	07:48		17:34 (5)	07:47	08:35	
	21:52	29	21:17 (2)	21:01	19:49	36	19:22 (3)	18:36	16:32	16:05	
14	05:12	20:48 (2)	06:01	06:56	18:45 (4)	07:50	6	17:40 (5)	07:49	08:36	
	21:51	28	21:16 (2)	20:59	19:47	33	19:18 (3)	18:33	17:43 (5)	16:31	16:05
15	05:13	20:48 (2)	06:03	06:58	18:46 (4)	07:52		17:28 (5)	07:51	08:37	
	21:50	27	21:15 (2)	20:57	19:44	30	19:16 (4)	18:31	17:45 (5)	16:29	16:05
16	05:14	20:48 (2)	06:04	06:59	18:46 (4)	07:54		17:26 (5)	07:53	08:38	
	21:49	26	21:14 (2)	20:55	19:42	28	19:14 (4)	18:29	17:46 (5)	16:27	16:05
17	05:16	20:49 (2)	06:06	07:01	18:46 (4)	07:55		17:25 (5)	07:55	08:38	
	21:47	25	21:14 (2)	20:53	19:39	25	19:11 (4)	18:26	17:47 (5)	16:26	16:05
18	05:17	20:49 (2)	06:08	07:03	18:47 (4)	07:57		17:24 (5)	07:57	08:39	
	21:46	23	21:12 (2)	20:50	19:37	21	19:08 (4)	18:24	17:47 (5)	16:24	16:05
19	05:18	20:49 (2)	06:10	07:05	18:48 (4)	07:59		17:23 (5)	07:59	08:40	
	21:45	22	21:11 (2)	20:48	19:34	18	19:06 (4)	18:22	17:48 (5)	16:23	16:05
20	05:20	20:50 (2)	06:12	07:06	18:49 (4)	08:01		17:23 (5)	08:00	08:41	
	21:44	20	21:10 (2)	20:46	19:32	15	19:04 (4)	18:20	17:48 (5)	16:22	16:06
21	05:21	20:50 (2)	06:13	07:08	18:49 (4)	08:03		17:23 (5)	08:02	08:41	
	21:42	19	21:09 (2)	20:44	19:29	12	19:01 (4)	18:17	17:48 (5)	16:20	16:06
22	05:23	20:50 (2)	06:15	07:10	18:52 (4)	08:05		17:22 (5)	08:04	08:42	
	21:41	17	21:07 (2)	20:42	19:27	6	18:58 (4)	18:15	17:45 (5)	16:19	16:06
23	05:24	20:51 (2)	06:17	07:12	18:55 (4)	08:07		17:22 (5)	08:06	08:42	
	21:39	16	21:07 (2)	20:39	19:24	1	18:56 (4)	18:13	17:43 (5)	16:18	16:07
24	05:26	20:51 (2)	06:19	07:13		08:09		17:23 (5)	08:08	08:43	
	21:38	14	21:05 (2)	20:37	19:22		18:11	17:41 (5)	16:17	16:08	
25	05:27	20:52 (2)	06:20	07:15		07:11		16:23 (5)	08:09	08:43	
	21:36	12	21:04 (2)	20:35	19:19		17:09	16:38 (5)	16:16	16:08	
26	05:29	20:53 (2)	06:22	07:17		07:13		16:24 (5)	08:11	08:43	
	21:35	9	21:02 (2)	20:32	19:17		17:06	16:36 (5)	16:14	16:09	
27	05:30	20:53 (2)	06:24	07:19		07:14		16:25 (5)	08:13	08:44	
	21:33	7	21:00 (2)	20:30	19:14		17:04	16:34 (5)	16:13	16:10	
28	05:32	20:55 (2)	06:26	07:21		07:16		16:26 (5)	08:14	08:44	
	21:32	4	20:59 (2)	20:28	19:12		17:02	16:31 (5)	16:12	16:11	
29	05:34	20:56 (2)	06:27	19:07 (4)	07:22		07:18	16:27 (5)	08:16	08:44	
	21:30	1	20:57 (2)	20:25	7	19:14 (4)	19:09	17:00	16:12	16:11	
30	05:35		06:29	19:02 (4)	07:24		07:20		08:18	08:44	
	21:28		20:23	17	19:19 (4)	19:07		16:58	16:11	16:12	
31	05:37		06:31	18:59 (4)			07:22			08:44	
	21:26		20:21	21	19:20 (4)		16:56			16:13	
Potential sun hours	512		460		382		328		259	233	
Total, worst case		638		45	746		281				
Sun reduction		0.32		0.34	0.32		0.29				
Oper. time red.		1.00		1.00	1.00		1.00				
Wind dir. red.		0.62		0.68	0.67		0.67				
Total reduction		0.20		0.23	0.22		0.20				
Total, real		129		10	161		55				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: P - H16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June			
1	08:44	08:14			07:16		07:01	18:48 (4)	05:52		05:03	20:35 (2)		
	16:15	17:06			18:02		20:00	45	19:33 (3)	20:55	21:45	27	21:02 (2)	
2	08:44	08:12			07:14		06:59	18:48 (4)	05:50		05:02	20:36 (2)		
	16:16	17:08			18:04		20:02	47	19:35 (3)	20:57	21:46	27	21:03 (2)	
3	08:43	08:10			07:11		06:56	18:49 (4)	05:48		05:01	20:36 (2)		
	16:17	17:10			18:06		20:04	48	19:37 (3)	20:59	21:48	27	21:03 (2)	
4	08:43	08:08			07:09		06:54	18:50 (4)	05:46		05:00	20:36 (2)		
	16:18	17:12			18:07		20:06	49	19:39 (3)	21:01	21:49	26	21:02 (2)	
5	08:43	08:07			07:07		06:51	18:50 (4)	05:44		04:59	20:36 (2)		
	16:19	17:14			18:09		20:07	48	19:38 (3)	21:03	21:50	26	21:02 (2)	
6	08:42	08:05			07:04		06:49	18:51 (4)	05:42		04:59	20:37 (2)		
	16:21	17:16			18:11		20:09	46	19:37 (3)	21:04	21:51	25	21:02 (2)	
7	08:42	08:03			07:02		06:47	18:52 (4)	05:40		04:58	20:37 (2)		
	16:22	17:18			18:13		20:11	42	19:35 (3)	21:06	21:52	25	21:02 (2)	
8	08:42	08:01			07:00		06:44	18:54 (4)	05:38		04:57	20:38 (2)		
	16:24	17:20			18:15		20:13	35	19:34 (3)	21:08	21:53	24	21:02 (2)	
9	08:41	07:59			06:57		06:42	18:57 (4)	05:36		04:57	20:38 (2)		
	16:25	17:22			18:17		20:15	23	19:31 (3)	21:10	21:54	24	21:02 (2)	
10	08:40	07:57			06:55		06:39	19:02 (4)	05:34		04:56	20:39 (2)		
	16:26	17:24			18:19		20:17	4	19:06 (4)	21:11	21:55	23	21:02 (2)	
11	08:40	07:55	16:55 (5)		06:52		06:37		05:33	20:41 (2)	04:56		20:40 (2)	
	16:28	17:26	1	16:56 (5)	18:21		20:19		21:13	1	20:42 (2)	21:55	22	21:02 (2)
12	08:39	07:53		16:52 (5)	06:50		06:35		05:31	20:39 (2)	04:55		20:40 (2)	
	16:30	17:28	6	16:58 (5)	18:23		20:20		21:15	4	20:43 (2)	21:56	21	21:01 (2)
13	08:38	07:51		16:51 (5)	06:48		06:32		05:29	20:37 (2)	04:55		20:40 (2)	
	16:31	17:30	9	17:00 (5)	18:25		20:22		21:17	7	20:44 (2)	21:57	22	21:02 (2)
14	08:37	07:49		16:50 (5)	06:45		06:30		05:27	20:37 (2)	04:55		20:41 (2)	
	16:33	17:32	12	17:02 (5)	18:27		20:24		21:18	10	20:47 (2)	21:57	21	21:02 (2)
15	08:36	07:47		16:50 (5)	06:43		06:28		05:26	20:35 (2)	04:55		20:41 (2)	
	16:34	17:34	15	17:05 (5)	18:28		20:26		21:20	13	20:48 (2)	21:58	21	21:02 (2)
16	08:35	07:45		16:49 (5)	06:40		06:25		05:24	20:35 (2)	04:54		20:42 (2)	
	16:36	17:36	18	17:07 (5)	18:30		20:28		21:22	15	20:50 (2)	21:59	20	21:02 (2)
17	08:34	07:43		16:49 (5)	06:38	18:04 (4)	06:23		05:22	20:34 (2)	04:54		20:42 (2)	
	16:38	17:38	20	17:09 (5)	18:32	2	18:06 (4)	20:30	21:23	17	20:51 (2)	21:59	20	21:02 (2)
18	08:33	07:41		16:48 (5)	06:35	18:00 (4)	06:21		05:21	20:34 (2)	04:54		20:43 (2)	
	16:40	17:40	23	17:11 (5)	18:34	7	18:07 (4)	20:31	21:25	19	20:53 (2)	22:00	19	21:02 (2)
19	08:32	07:39		16:49 (5)	06:33	17:58 (4)	06:18		05:19	20:34 (2)	04:54		20:43 (2)	
	16:41	17:42	24	17:13 (5)	18:36	12	18:10 (4)	20:33	21:27	20	20:54 (2)	22:00	19	21:02 (2)
20	08:31	07:36		16:49 (5)	06:31	17:56 (4)	06:16		05:18	20:33 (2)	04:54		20:43 (2)	
	16:43	17:44	25	17:14 (5)	18:38	15	18:11 (4)	20:35	21:28	22	20:55 (2)	22:00	19	21:02 (2)
21	08:30	07:34		16:50 (5)	06:28	17:55 (4)	06:14		05:16	20:33 (2)	04:54		20:43 (2)	
	16:45	17:46	23	17:13 (5)	18:40	18	18:13 (4)	20:37	21:30	24	20:57 (2)	22:01	19	21:02 (2)
22	08:28	07:32		16:49 (5)	06:26	17:53 (4)	06:12		05:15	20:34 (2)	04:55		20:44 (2)	
	16:47	17:48	23	17:12 (5)	18:41	22	18:15 (4)	20:39	21:31	25	20:59 (2)	22:01	19	21:03 (2)
23	08:27	07:30		16:50 (5)	06:23	17:52 (4)	06:09		05:13	20:33 (2)	04:55		20:44 (2)	
	16:49	17:50	21	17:11 (5)	18:43	25	18:17 (4)	20:41	21:33	26	20:59 (2)	22:01	19	21:03 (2)
24	08:26	07:28		16:52 (5)	06:21	17:50 (4)	06:07		05:12	20:33 (2)	04:55		20:44 (2)	
	16:50	17:52	18	17:10 (5)	18:45	28	18:18 (4)	20:42	21:34	28	21:01 (2)	22:01	19	21:03 (2)
25	08:24	07:25		16:53 (5)	06:18	17:50 (4)	06:05		05:11	20:33 (2)	04:55		20:44 (2)	
	16:52	17:54	15	17:08 (5)	18:47	31	18:21 (4)	20:44	21:36	29	21:02 (2)	22:01	20	21:04 (2)
26	08:23	07:23		16:55 (5)	06:16	17:49 (4)	06:03		05:09	20:33 (2)	04:56		20:44 (2)	
	16:54	17:56	11	17:06 (5)	18:49	33	18:22 (4)	20:46	21:37	30	21:03 (2)	22:01	20	21:04 (2)
27	08:22	07:21			06:13	17:49 (4)	06:01		05:08	20:34 (2)	04:56		20:44 (2)	
	16:56	17:58			18:51	35	18:24 (3)	20:48	21:39	29	21:03 (2)	22:01	20	21:04 (2)
28	08:20	07:18			06:11	17:49 (4)	05:58		05:07	20:34 (2)	04:57		20:44 (2)	
	16:58	18:00			18:53	37	18:26 (3)	20:50	21:40	29	21:03 (2)	22:01	21	21:05 (2)
29	08:18				07:08	18:48 (4)	05:56		05:06	20:34 (2)	04:57		20:44 (2)	
	17:00				19:54	40	19:28 (3)	20:52	21:41	29	21:03 (2)	22:01	22	21:06 (2)
30	08:17				07:06	18:48 (4)	05:54		05:05	20:34 (2)	04:58		20:44 (2)	
	17:02				19:56	42	19:30 (3)	20:53	21:43	29	21:03 (2)	22:00	21	21:05 (2)
31	08:15				07:04	18:48 (4)			05:04	20:35 (2)				
	17:04				19:58	43	19:31 (3)		21:44	28	21:03 (2)			
Potential sun hours	250	273			367		420		494		510			
Total, worst case		264			390		387		434		658			
Sun reduction		0.23			0.27		0.35		0.38		0.32			
Oper. time red.		1.00			1.00		1.00		1.00		1.00			
Wind dir. red.		0.67			0.68		0.67		0.63		0.63			
Total reduction		0.16			0.18		0.24		0.24		0.20			
Total, real		41			71		92		104		132			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: P - H16

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:44 (2)	05:39	20:50 (2)	06:33		07:26		07:24		08:19
	22:00	22	21:06 (2)	21:25	3 20:53 (2)		19:05		16:54		16:10
2	04:59	20:44 (2)	05:40		06:35		19:01 (4)		07:28		08:21
	22:00	23	21:07 (2)	21:23		4 19:05 (4)	19:02		16:52		16:09
3	05:00	20:44 (2)	05:42		06:36		18:54 (4)		07:30		08:22
	21:59	23	21:07 (2)	21:21		23 19:28 (3)	19:00		16:50		16:08
4	05:01	20:44 (2)	05:44		06:38		18:51 (4)		07:31		08:24
	21:59	23	21:07 (2)	21:19		35 19:31 (3)	18:57		16:48		16:08
5	05:02	20:44 (2)	05:45		06:40		18:49 (4)		07:33		08:25
	21:58	24	21:08 (2)	21:17		42 19:32 (3)	18:55		16:46		16:07
6	05:03	20:44 (2)	05:47		06:42		18:47 (4)		07:35		08:26
	21:58	25	21:09 (2)	21:15		46 19:33 (3)	18:52		16:44		16:07
7	05:04	20:44 (2)	05:49		06:43		18:45 (4)		07:37		08:28
	21:57	25	21:09 (2)	21:13		48 19:33 (3)	18:50		16:43		16:06
8	05:05	20:44 (2)	05:51		06:45		18:44 (4)		07:39		08:29
	21:56	26	21:10 (2)	21:11		49 19:33 (3)	18:48		16:41		16:06
9	05:06	20:44 (2)	05:52		06:47		18:43 (4)		07:41		08:30
	21:55	26	21:10 (2)	21:09		48 19:31 (3)	18:45		16:39		16:05
10	05:07	20:43 (2)	05:54		06:49		18:41 (4)		07:42		08:31
	21:55	27	21:10 (2)	21:07		47 19:28 (3)	18:43		16:37		16:05
11	05:08	20:43 (2)	05:56		06:50		18:40 (4)		07:44		08:33
	21:54	28	21:11 (2)	21:05		46 19:26 (3)	18:40		16:35		16:05
12	05:09	20:43 (2)	05:57		06:52		18:40 (4)		07:46		08:34
	21:53	28	21:11 (2)	21:03		44 19:24 (3)	18:38		16:34		16:05
13	05:10	20:43 (2)	05:59		06:54		18:40 (4)		07:48		08:35
	21:52	28	21:11 (2)	21:01		42 19:22 (3)	18:36		16:32		16:05
14	05:12	20:43 (2)	06:01		06:56		18:38 (4)		07:50		08:36
	21:51	28	21:11 (2)	20:59		40 19:18 (3)	18:33		16:31		16:05
15	05:13	20:43 (2)	06:03		06:58		18:38 (4)		07:52		08:37
	21:50	28	21:11 (2)	20:57		38 19:16 (3)	18:31	4 17:35 (5)	16:29		16:05
16	05:14	20:42 (2)	06:04		06:59		18:38 (4)		07:54		08:38
	21:49	29	21:11 (2)	20:55		36 19:14 (3)	18:29	12 17:39 (5)	16:27		16:05
17	05:16	20:43 (2)	06:06		07:01		18:37 (4)		07:55		08:38
	21:47	29	21:12 (2)	20:53		34 19:11 (4)	18:26	17 17:41 (5)	16:26		16:05
18	05:17	20:43 (2)	06:08		07:03		18:37 (4)		07:57		08:39
	21:46	29	21:12 (2)	20:50		31 19:08 (4)	18:24	19 17:42 (5)	16:24		16:05
19	05:18	20:43 (2)	06:10		07:05		18:38 (4)		07:59		08:40
	21:45	28	21:11 (2)	20:48		28 19:06 (4)	18:22	22 17:43 (5)	16:23		16:05
20	05:20	20:43 (2)	06:12		07:06		18:38 (4)		08:01		08:41
	21:44	27	21:10 (2)	20:46		26 19:04 (4)	18:20	23 17:43 (5)	16:22		16:06
21	05:21	20:43 (2)	06:13		07:08		18:38 (4)		08:03		08:41
	21:42	26	21:09 (2)	20:44		23 19:01 (4)	18:17	24 17:44 (5)	16:20		16:06
22	05:23	20:43 (2)	06:15		07:10		18:39 (4)		08:05		08:42
	21:41	24	21:07 (2)	20:42		19 18:58 (4)	18:15	25 17:44 (5)	16:19		16:06
23	05:24	20:44 (2)	06:17		07:12		18:40 (4)		08:07		08:42
	21:39	23	21:07 (2)	20:39		16 18:56 (4)	18:13	24 17:43 (5)	16:18		16:07
24	05:26	20:44 (2)	06:19		07:13		18:41 (4)		08:09		08:43
	21:38	21	21:05 (2)	20:37		13 18:54 (4)	18:11	22 17:41 (5)	16:17		16:08
25	05:27	20:45 (2)	06:20		07:15		18:42 (4)		07:11		08:43
	21:36	19	21:04 (2)	20:35		9 18:51 (4)	17:09	19 16:38 (5)	16:16		16:08
26	05:29	20:45 (2)	06:22		07:17		18:45 (4)		07:13		08:43
	21:35	17	21:02 (2)	20:32		3 18:48 (4)	17:06	17 16:36 (5)	16:14		16:09
27	05:30	20:45 (2)	06:24		07:19		17:14		16:19 (5)		08:44
	21:33	15	21:00 (2)	20:30			17:04	15 16:34 (5)	16:13		16:10
28	05:32	20:46 (2)	06:26		07:21		17:16		16:20 (5)		08:44
	21:32	13	20:59 (2)	20:28			17:02	11 16:31 (5)	16:12		16:11
29	05:34	20:46 (2)	06:27		07:22		17:18		16:21 (5)		08:44
	21:30	11	20:57 (2)	20:25			17:00	8 16:29 (5)	16:12		16:11
30	05:35	20:47 (2)	06:29		07:24		17:20		16:22 (5)		08:44
	21:28	9	20:56 (2)	20:23			16:58	5 16:27 (5)	16:11		16:12
31	05:37	20:49 (2)	06:31				07:22		16:24 (5)		08:44
	21:26	6	20:55 (2)	20:21			16:56	1 16:25 (5)			16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	710		3		790		268				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.63		0.63		0.67		0.67				
Total reduction	0.20		0.21		0.22		0.20				
Total, real	144		1		171		52				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: Q - H17

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:06 (5)		07:16		16:45 (4)	07:01			05:52		19:44 (2)	05:03		
	16:15			17:06	18:02	18	16:24 (5)	18:02	31	17:16 (4)	20:00		20:55	29	20:13 (2)	21:45		
2	08:44			08:12	16:07 (5)		07:14		16:46 (4)	06:59			05:50		19:44 (2)	05:02		
	16:16			17:08	18:04	16	16:23 (5)	18:04	27	17:13 (4)	20:02		20:57	28	20:12 (2)	21:46		
3	08:44			08:10	16:09 (5)		07:12		16:48 (4)	06:56			05:48		19:45 (2)	05:01		
	16:17			17:10	18:06	13	16:22 (5)	18:06	24	17:12 (4)	20:04		20:59	26	20:11 (2)	21:48		
4	08:43			08:08	16:11 (5)		07:09		16:51 (4)	06:54			05:46		19:46 (2)	05:00		
	16:18			17:12	18:07	8	16:19 (5)	18:07	19	17:10 (4)	20:06		21:01	24	20:10 (2)	21:49		
5	08:43			08:07			07:07		16:53 (4)	06:51			05:44		19:47 (2)	04:59		
	16:19			17:14			18:09	13	17:06 (4)	20:07			21:03	21	20:08 (2)	21:50		
6	08:42			08:05			07:04		17:42 (3)	06:49			05:42		19:49 (2)	04:59		
	16:21			17:16			18:11	3	17:45 (3)	20:09			21:04	17	20:06 (2)	21:51		
7	08:42			08:03			07:02		17:40 (3)	06:47			05:40		19:52 (2)	04:58		
	16:22			17:18			18:13	6	17:46 (3)	20:11			21:06	12	20:04 (2)	21:52		
8	08:42			08:01			07:00		17:39 (3)	06:44			05:38		19:56 (2)	04:57		
	16:24			17:20			18:15	9	17:48 (3)	20:13			21:08	3	19:59 (2)	21:53		
9	08:41			07:59	16:50 (4)		06:57		17:38 (3)	06:42			05:36			04:57		
	16:25			17:22	2	16:52 (4)	18:17	12	17:50 (3)	20:15			21:10			21:54		
10	08:40			07:57	16:49 (4)		06:55		17:38 (3)	06:39			05:34			04:56		
	16:26			17:24	5	16:54 (4)	18:19	14	17:52 (3)	20:17			21:11			21:55		
11	08:40			07:55	16:48 (4)		06:52		17:38 (3)	06:37			05:33			04:56		
	16:28			17:26	8	16:56 (4)	18:21	17	17:55 (3)	20:19			21:13			21:55		
12	08:39			07:53	16:46 (4)		06:50		17:38 (3)	06:35			05:31			04:55		
	16:30			17:28	12	16:58 (4)	18:23	18	17:56 (3)	20:20			21:15			21:56		
13	08:38			07:51	16:45 (4)		06:48		17:38 (3)	06:32			05:29			04:55		
	16:31			17:30	15	17:00 (4)	18:25	20	17:58 (3)	20:22			21:17			21:57		
14	08:37			07:49	16:44 (4)		06:45		17:38 (3)	06:30		19:53 (2)	05:27			04:55		
	16:33			17:32	18	17:02 (4)	18:27	22	18:00 (3)	20:24	3	19:56 (2)	21:18			21:58		
15	08:36			07:47	16:44 (4)		06:43		17:39 (3)	06:28		19:51 (2)	05:26			04:54		
	16:34			17:34	21	17:05 (4)	18:28	21	18:00 (3)	20:26	7	19:58 (2)	21:20			21:58		
16	08:35			07:45	16:43 (4)		06:40		17:39 (3)	06:25		19:49 (2)	05:24			04:54		
	16:36			17:36	24	17:07 (4)	18:30	19	17:58 (3)	20:28	11	20:00 (2)	21:22			21:59		
17	08:34	16:02 (5)		07:43	16:43 (4)		06:38		17:41 (3)	06:23		19:47 (2)	05:22			04:54		
	16:38	1	16:03 (5)	17:38	26	17:09 (4)	18:32	15	17:56 (3)	20:30	14	20:01 (2)	21:23			21:59		
18	08:33	16:02 (5)	07:41	16:42 (4)	06:35				17:43 (3)	06:21		19:46 (2)	05:21			04:54		
	16:40	3	16:05 (5)	17:40	29	17:11 (4)	18:34	10	17:53 (3)	20:31	17	20:03 (2)	21:25			22:00		
19	08:32	16:02 (5)	07:39	16:42 (4)	06:33				16:18			19:45 (2)	05:19			04:54		
	16:41	5	16:07 (5)	17:42	31	17:13 (4)	18:36		20:33	20	20:05 (2)	21:27				22:00		
20	08:31	16:01 (5)	07:36	16:42 (4)	06:31				06:16			19:45 (2)	05:18			04:54		
	16:43	7	16:08 (5)	17:44	34	17:16 (4)	18:38		20:35	22	20:07 (2)	21:28				22:00		
21	08:30	16:01 (5)	07:34	16:42 (4)	06:28				06:14			19:43 (2)	05:16			04:54		
	16:45	10	16:11 (5)	17:46	36	17:18 (4)	18:40		20:37	25	20:08 (2)	21:30				22:01		
22	08:29	16:01 (5)	07:32	16:41 (4)	06:26				06:12			19:43 (2)	05:15			04:55		
	16:47	11	16:12 (5)	17:48	38	17:19 (4)	18:41		20:39	27	20:10 (2)	21:31				22:01		
23	08:27	16:01 (5)	07:30	16:42 (4)	06:23				06:09			19:42 (2)	05:13			04:55		
	16:49	14	16:15 (5)	17:50	38	17:20 (4)	18:43		20:41	30	20:12 (2)	21:33				22:01		
24	08:26	16:01 (5)	07:28	16:42 (4)	06:21				06:07			19:42 (2)	05:12			04:55		
	16:50	16	16:17 (5)	17:52	38	17:20 (4)	18:45		20:42	32	20:14 (2)	21:34				22:01		
25	08:24	16:02 (5)	07:25	16:42 (4)	06:18				06:05			19:42 (2)	05:11			04:55		
	16:52	17	16:19 (5)	17:54	37	17:19 (4)	18:47		20:44	33	20:15 (2)	21:36				22:01		
26	08:23	16:02 (5)	07:23	16:43 (4)	06:16				06:03			19:42 (2)	05:09			04:56		
	16:54	19	16:21 (5)	17:56	36	17:19 (4)	18:49		20:46	34	20:16 (2)	21:37				22:01		
27	08:22	16:02 (5)	07:21	16:44 (4)	06:13				06:01			19:42 (2)	05:08			04:56		
	16:56	21	16:23 (5)	17:58	34	17:18 (4)	18:51		20:48	34	20:16 (2)	21:39				22:01		
28	08:20	16:03 (5)	07:18	16:44 (4)	06:11				05:58			19:43 (2)	05:07			04:57		
	16:58	23	16:26 (5)	18:00	32	17:16 (4)	18:53		20:50	32	20:15 (2)	21:40				22:01		
29	08:18	16:03 (5)			07:08				05:56			19:43 (2)	05:06			04:57		
	17:00	22	16:25 (5)		19:54				20:52	32	20:15 (2)	21:41				22:01		
30	08:17	16:03 (5)			07:06				05:54			19:43 (2)	05:05			04:58		
	17:02	22	16:25 (5)		19:56				20:53	31	20:14 (2)	21:43				22:00		
31	08:15	16:04 (5)			07:04							05:04						
	17:04	20	16:24 (5)		19:58							21:44						
Potential sun hours	250			273			367			420			494			510		
Total, worst case	211			569			300			404			160					
Sun reduction	0.24			0.23			0.27			0.35			0.38					
Oper. time red.	1.00			1.00			1.00			1.00			1.00					
Wind dir. red.	0.66			0.67			0.67			0.65			0.65					
Total reduction	0.16			0.16			0.18			0.23			0.25					
Total, real	34			88			55			92			40					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: Q - H17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:17 (3) 16:54	16:19 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:16 (3) 16:52	16:20 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:16 (3) 16:50	16:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:16 (3) 16:48	16:24 16:08
5	05:02 21:58	05:45 21:17	20:03 (2) 20:11 (2)	06:40 20:09	07:33 18:55	16:25 16:07
6	05:03 21:58	05:47 21:15	20:00 (2) 20:15 (2)	06:42 20:06	07:35 18:52	16:07 16:07
7	05:04 21:57	05:49 21:13	19:59 (2) 20:17 (2)	06:43 20:04	07:37 18:50	15:41 (5) 16:06
8	05:05 21:56	05:50 21:12	19:56 (2) 20:18 (2)	06:45 20:01	07:39 18:48	15:38 (5) 16:06
9	05:06 21:55	05:52 21:10	19:55 (2) 20:19 (2)	06:47 19:59	07:41 18:45	15:37 (5) 16:05
10	05:07 21:55	05:54 21:07	19:53 (2) 20:20 (2)	06:49 19:56	07:42 18:43	15:37 (5) 16:05
11	05:08 21:54	05:56 21:05	19:53 (2) 20:21 (2)	06:50 19:54	07:44 18:40	15:36 (5) 16:05
12	05:09 21:53	05:57 21:03	19:52 (2) 20:22 (2)	06:52 19:51	07:46 18:38	15:35 (5) 16:05
13	05:10 21:52	05:59 21:01	19:51 (2) 20:22 (2)	06:54 19:49	07:48 18:36	15:35 (5) 16:05
14	05:12 21:51	06:01 20:59	19:50 (2) 20:22 (2)	06:56 19:47	07:50 18:33	15:35 (5) 16:04
15	05:13 21:50	06:03 20:57	19:50 (2) 20:23 (2)	06:58 19:44	07:52 18:31	15:34 (5) 16:05
16	05:14 21:49	06:04 20:55	19:49 (2) 20:22 (2)	06:59 19:42	07:54 18:29	15:34 (5) 16:05
17	05:16 21:47	06:06 20:53	19:49 (2) 20:23 (2)	07:01 19:39	07:55 18:26	15:35 (5) 16:05
18	05:17 21:46	06:08 20:51	19:49 (2) 20:22 (2)	07:03 19:37	07:57 18:24	15:35 (5) 16:05
19	05:18 21:45	06:10 20:48	19:48 (2) 20:19 (2)	07:05 19:34	07:59 18:22	15:35 (5) 16:05
20	05:20 21:44	06:12 20:46	19:48 (2) 20:17 (2)	07:06 19:32	08:01 18:20	15:36 (5) 16:06
21	05:21 21:42	06:13 20:44	19:48 (2) 20:15 (2)	07:08 19:29	08:03 18:17	15:36 (5) 16:06
22	05:23 21:41	06:15 20:42	19:48 (2) 20:12 (2)	07:10 19:27	08:05 18:15	15:37 (5) 16:06
23	05:24 21:39	06:17 20:39	19:48 (2) 20:10 (2)	07:12 19:24	08:07 18:13	15:38 (5) 16:07
24	05:26 21:38	06:19 20:37	19:49 (2) 20:09 (2)	07:13 19:22	08:09 18:11	15:39 (5) 16:08
25	05:27 21:36	06:20 20:35	19:49 (2) 20:06 (2)	07:15 19:19	08:09 18:12	15:40 (5) 16:08
26	05:29 21:35	06:22 20:32	19:50 (2) 20:04 (2)	07:17 19:17	08:11 18:13	15:41 (5) 16:08
27	05:30 21:33	06:24 20:30	19:51 (2) 20:02 (2)	07:19 19:14	08:13 18:14	16:09 16:10
28	05:32 21:32	06:26 20:28	19:52 (2) 19:59 (2)	07:21 19:12	08:14 18:15	16:11 16:11
29	05:34 21:30	06:27 20:25	19:54 (2) 19:57 (2)	07:22 19:09	08:16 18:17	16:12 16:12
30	05:35 21:28	06:29 20:23	19:07	07:24 18:38 (3)	16:18 16:58	16:12 16:12
31	05:37 21:26	06:31 20:21		07:22 16:56	16:16 (4) 16:25 (4)	16:12 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		573	100	726	275	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.18	
Total, real		127	22	142	48	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: R - H18

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44		08:14	16:21 (4)	07:16		17:30 (3)	07:01	05:52	19:35 (2)	05:03
	16:15		17:06	16:35 (4)	18:02	4	17:34 (3)	20:00	20:55	20:02 (2)	21:45
2	08:44		08:12	16:20 (4)	07:14		17:28 (3)	06:59	05:50	19:36 (2)	05:02
	16:16		17:08	16:37 (4)	18:04	8	17:36 (3)	20:02	20:57	20:00 (2)	21:46
3	08:44		08:10	16:20 (4)	07:12		17:28 (3)	06:56	05:48	19:37 (2)	05:01
	16:17		17:10	16:39 (4)	18:06	10	17:38 (3)	20:04	20:59	19:58 (2)	21:48
4	08:43		08:08	16:19 (4)	07:09		17:27 (3)	06:54	05:46	19:39 (2)	05:00
	16:18		17:12	16:41 (4)	18:07	14	17:41 (3)	20:06	21:01	19:56 (2)	21:49
5	08:43		08:07	16:18 (4)	07:07		17:26 (3)	06:51	05:44	19:41 (2)	04:59
	16:19		17:14	16:43 (4)	18:09	16	17:42 (3)	20:07	21:03	19:53 (2)	21:50
6	08:43	15:42 (5)	08:05	16:18 (4)	07:04		17:26 (3)	06:49	05:42		04:59
	16:21	2	15:44 (5)	17:16	16:45 (4)	19	17:45 (3)	20:09	21:04		21:51
7	08:42	15:42 (5)	08:03	16:18 (4)	07:02		17:25 (3)	06:47	05:40		04:58
	16:22	3	15:45 (5)	17:18	16:47 (4)	21	17:46 (3)	20:11	21:06		21:52
8	08:42	15:42 (5)	08:01	16:17 (4)	07:00		17:26 (3)	06:44	05:38		04:57
	16:24	4	15:46 (5)	17:20	16:50 (4)	22	17:48 (3)	20:13	21:08		21:53
9	08:41	15:43 (5)	07:59	16:17 (4)	06:57		17:26 (3)	06:42	05:36		04:57
	16:25	6	15:49 (5)	17:22	16:52 (4)	24	17:50 (3)	20:15	21:10		21:54
10	08:40	15:43 (5)	07:57	16:17 (4)	06:55		17:27 (3)	06:39	19:43 (2)	05:34	04:56
	16:26	7	15:50 (5)	17:24	16:54 (4)	23	17:50 (3)	20:17	19:49 (2)	21:11	21:55
11	08:40	15:43 (5)	07:55	16:17 (4)	06:52		17:28 (3)	06:37	19:41 (2)	05:33	04:56
	16:28	9	15:52 (5)	17:26	16:56 (4)	21	17:49 (3)	20:19	19:51 (2)	21:13	21:55
12	08:39	15:43 (5)	07:53	16:16 (4)	06:50		17:28 (3)	06:35	19:39 (2)	05:31	04:55
	16:30	11	15:54 (5)	17:28	16:58 (4)	19	17:47 (3)	20:20	19:53 (2)	21:15	21:56
13	08:38	15:43 (5)	07:51	16:17 (4)	06:48		17:30 (3)	06:32	19:37 (2)	05:29	04:55
	16:31	12	15:55 (5)	17:30	16:58 (4)	15	17:45 (3)	20:22	19:54 (2)	21:17	21:57
14	08:37	15:43 (5)	07:49	16:17 (4)	06:45		17:33 (3)	06:30	19:36 (2)	05:27	04:55
	16:33	14	15:57 (5)	17:32	16:58 (4)	8	17:41 (3)	20:24	19:56 (2)	21:18	21:58
15	08:36	15:43 (5)	07:47	16:17 (4)	06:43			06:28	19:35 (2)	05:26	04:54
	16:34	16	15:59 (5)	17:34	16:58 (4)			20:26	19:58 (2)	21:20	21:58
16	08:35	15:43 (5)	07:45	16:18 (4)	06:40			06:25	19:34 (2)	05:24	04:54
	16:36	17	16:00 (5)	17:36	16:58 (4)			20:28	20:00 (2)	21:22	21:59
17	08:34	15:43 (5)	07:43	16:19 (4)	06:38			06:23	19:33 (2)	05:22	04:54
	16:38	20	16:03 (5)	17:38	16:58 (4)			20:30	20:01 (2)	21:23	21:59
18	08:33	15:44 (5)	07:41	16:19 (4)	06:35			06:21	19:32 (2)	05:21	04:54
	16:40	21	16:05 (5)	17:40	16:56 (4)			20:31	20:03 (2)	21:25	22:00
19	08:32	15:45 (5)	07:39	16:20 (4)	06:33			06:18	19:32 (2)	05:19	04:54
	16:41	22	16:07 (5)	17:42	16:56 (4)			20:33	20:05 (2)	21:27	22:00
20	08:31	15:44 (5)	07:36	16:21 (4)	06:31			06:16	19:32 (2)	05:18	04:54
	16:43	24	16:08 (5)	17:44	16:55 (4)			20:35	20:07 (2)	21:28	22:00
21	08:30	15:45 (5)	07:34	16:22 (4)	06:28			06:14	19:30 (2)	05:16	04:54
	16:45	24	16:09 (5)	17:46	16:54 (4)			20:37	20:08 (2)	21:30	22:01
22	08:29	15:45 (5)	07:32	16:23 (4)	06:26			06:12	19:30 (2)	05:15	04:55
	16:47	23	16:08 (5)	17:48	16:52 (4)			20:39	20:08 (2)	21:31	22:01
23	08:27	15:47 (5)	07:30	16:25 (4)	06:23			06:09	19:30 (2)	05:13	04:55
	16:49	22	16:09 (5)	17:50	16:51 (4)			20:41	20:07 (2)	21:33	22:01
24	08:26	15:47 (5)	07:28	16:27 (4)	06:21			06:07	19:31 (2)	05:12	04:55
	16:50	21	16:08 (5)	17:52	16:49 (4)			20:43	20:07 (2)	21:34	22:01
25	08:24	15:48 (5)	07:25	16:29 (4)	06:18			06:05	19:31 (2)	05:11	04:55
	16:52	20	16:08 (5)	17:54	16:45 (4)			20:44	20:07 (2)	21:36	22:01
26	08:23	15:49 (5)	07:23	16:36 (4)	06:16			06:03	19:31 (2)	05:09	04:56
	16:54	18	16:07 (5)	17:56	16:39 (4)			20:46	20:06 (2)	21:37	22:01
27	08:22	15:50 (5)	07:21		06:13			06:01	19:32 (2)	05:08	04:56
	16:56	16	16:06 (5)	17:58				20:48	20:06 (2)	21:39	22:01
28	08:20	15:53 (5)	07:18	17:31 (3)	06:11			05:58	19:32 (2)	05:07	04:57
	16:58	12	16:05 (5)	18:00	17:32 (3)			20:50	20:05 (2)	21:40	22:01
29	08:18	15:55 (5)			07:08			05:56	19:33 (2)	05:06	04:57
	17:00	12	16:28 (4)		19:54			20:52	20:04 (2)	21:41	22:01
30	08:17	16:23 (4)			07:06			05:54	19:34 (2)	05:05	04:58
	17:02	7	16:30 (4)		19:56			20:54	20:03 (2)	21:43	22:00
31	08:15	16:21 (4)			07:04				05:04		
	17:04	10	16:31 (4)		19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case		373		777		224		590		101	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.66		0.68		0.65		0.65	
Total reduction		0.16		0.15		0.18		0.23		0.25	
Total, real		60		118		41		136		25	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: R - H18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September		October		November		December					
1	04:59 22:00	05:39 21:25		06:33 20:18	10	19:40 (2) 19:50 (2)	07:26 19:05	18:08 (3) 18:25 (3)	07:24 16:54	36	15:47 (4) 16:23 (4)	08:19 16:10	9	15:25 (5) 15:34 (5)
2	04:59 22:00	05:40 21:23		06:35 20:16	6	19:42 (2) 19:48 (2)	07:28 19:02	18:06 (3) 18:26 (3)	07:26 16:52	34	15:47 (4) 16:21 (4)	08:21 16:09	8	15:25 (5) 15:33 (5)
3	05:00 21:59	05:42 21:21		06:36 20:13			07:30 19:00	18:05 (3) 18:27 (3)	07:28 16:50	32	15:47 (4) 16:19 (4)	08:22 16:08	6	15:26 (5) 15:32 (5)
4	05:01 21:59	05:44 21:19		06:38 20:11			07:31 18:57	18:04 (3) 18:28 (3)	07:30 16:48	30	15:47 (4) 16:17 (4)	08:24 16:08	5	15:27 (5) 15:32 (5)
5	05:02 21:58	05:45 21:17		06:40 20:09			07:33 18:55	18:03 (3) 18:26 (3)	07:32 16:46	27	15:48 (4) 16:15 (4)	08:25 16:07	3	15:27 (5) 15:30 (5)
6	05:03 21:58	05:47 21:15		06:42 20:06			07:35 18:52	18:03 (3) 18:24 (3)	07:34 16:44	24	15:48 (4) 16:12 (4)	08:26 16:07	1	15:29 (5) 15:30 (5)
7	05:04 21:57	05:49 21:13	5	19:55 (2) 20:00 (2)		06:43 20:04	07:37 18:50	18:01 (3) 18:21 (3)	07:36 16:43	21	15:49 (4) 16:10 (4)	08:28 16:06		
8	05:05 21:56	05:50 21:12	14	19:50 (2) 20:04 (2)		06:45 20:01	07:39 18:48	18:01 (3) 18:18 (3)	07:38 16:41	18	15:50 (4) 16:08 (4)	08:29 16:06		
9	05:06 21:55	05:52 21:10	18	19:48 (2) 20:06 (2)		06:47 19:59	07:41 18:45	18:01 (3) 18:16 (3)	07:40 16:39	16	15:50 (4) 16:06 (4)	08:30 16:05		
10	05:07 21:55	05:54 21:07	22	19:45 (2) 20:07 (2)		06:49 19:56	07:42 18:43	18:01 (3) 18:14 (3)	07:42 16:37	13	15:52 (4) 16:05 (4)	08:31 16:05		
11	05:08 21:54	05:56 21:05	25	19:44 (2) 20:09 (2)		06:50 19:54	07:44 18:40	18:02 (3) 18:11 (3)	07:44 16:35	10	15:53 (4) 16:03 (4)	08:33 16:05		
12	05:09 21:53	05:57 21:03	27	19:43 (2) 20:10 (2)		06:52 19:51	07:46 18:38	18:03 (3) 18:09 (3)	07:45 16:34	6	15:55 (4) 16:01 (4)	08:34 16:05		
13	05:10 21:52	05:59 21:01	30	19:41 (2) 20:11 (2)		06:54 19:49	07:48 18:36	18:04 (3) 18:07 (3)	07:47 16:32	11	15:27 (5) 15:59 (4)	08:35 16:05		
14	05:12 21:51	06:01 20:59	32	19:40 (2) 20:12 (2)		06:56 19:47	07:50 18:33	18:07 (3) 16:31	07:49 16:31	12	15:25 (5) 15:37 (5)	08:36 16:04		
15	05:13 21:50	06:03 20:57	32	19:40 (2) 20:12 (2)		06:58 19:44	07:52 18:31		07:51 16:29	16	15:23 (5) 15:39 (5)	08:37 16:05		
16	05:14 21:49	06:04 20:55	34	19:38 (2) 20:12 (2)		06:59 19:42	07:54 18:29	17:04 (4) 17:15 (4)	07:53 16:27	18	15:22 (5) 15:40 (5)	08:38 16:05		
17	05:16 21:47	06:06 20:53	35	19:38 (2) 20:13 (2)		07:01 19:39	07:55 18:26	17:00 (4) 17:18 (4)	07:55 16:26	20	15:21 (5) 15:41 (5)	08:38 16:05		
18	05:17 21:46	06:08 20:51	36	19:37 (2) 20:13 (2)		07:03 19:37	07:57 18:24	16:57 (4) 17:21 (4)	07:57 16:24	21	15:21 (5) 15:42 (5)	08:39 16:05		
19	05:18 21:45	06:10 20:48	37	19:36 (2) 20:13 (2)		07:05 19:34	07:59 18:22	16:55 (4) 17:22 (4)	07:59 16:23	22	15:21 (5) 15:43 (5)	08:40 16:05		
20	05:20 21:44	06:12 20:46	37	19:36 (2) 20:13 (2)		07:06 19:32	08:01 18:20	16:53 (4) 17:24 (4)	08:00 16:22	23	15:20 (5) 15:43 (5)	08:41 16:06		
21	05:21 21:42	06:13 20:44	37	19:36 (2) 20:13 (2)		07:08 19:29	08:03 18:17	16:52 (4) 17:25 (4)	08:02 16:20	24	15:20 (5) 15:44 (5)	08:41 16:06		
22	05:23 21:41	06:15 20:42	37	19:35 (2) 20:12 (2)		07:10 19:27	08:05 18:15	16:51 (4) 17:26 (4)	08:04 16:19	24	15:20 (5) 15:44 (5)	08:42 16:06		
23	05:24 21:39	06:17 20:39	35	19:35 (2) 20:10 (2)		07:12 19:24	08:07 18:13	16:50 (4) 17:26 (4)	08:06 16:18	22	15:21 (5) 15:43 (5)	08:42 16:07		
24	05:26 21:38	06:19 20:37	33	19:36 (2) 20:09 (2)		07:13 19:22	08:09 18:11	16:49 (4) 17:27 (4)	08:08 16:17	21	15:21 (5) 15:42 (5)	08:43 16:08		
25	05:27 21:36	06:20 20:35	31	19:35 (2) 20:06 (2)		07:15 19:19	07:11 17:09	15:48 (4) 16:27 (4)	08:09 16:16	20	15:21 (5) 15:41 (5)	08:43 16:08		
26	05:29 21:35	06:22 20:32	29	19:35 (2) 20:04 (2)		07:17 19:17	07:13 17:06	15:47 (4) 16:27 (4)	08:11 16:14	18	15:22 (5) 15:40 (5)	08:43 16:09		
27	05:30 21:33	06:24 20:30	26	19:36 (2) 20:02 (2)		07:19 19:14	07:15 17:04	15:47 (4) 16:28 (4)	08:13 16:13	16	15:22 (5) 15:38 (5)	08:44 16:10		
28	05:32 21:32	06:26 20:28	23	19:36 (2) 19:59 (2)		07:21 19:12	07:16 17:02	15:46 (4) 16:28 (4)	08:14 16:12	14	15:23 (5) 15:37 (5)	08:44 16:11		
29	05:34 21:30	06:27 20:25	20	19:37 (2) 19:57 (2)	4	07:22 19:09	07:18 18:20 (3)	15:46 (4) 16:28 (4)	08:16 16:12	13	15:23 (5) 15:36 (5)	08:44 16:11		
30	05:35 21:28	06:29 20:23	17	19:38 (2) 19:55 (2)	13	07:24 19:07	07:20 18:23 (3)	15:46 (4) 16:27 (4)	08:18 16:11	11	15:24 (5) 15:35 (5)	08:44 16:12		
31	05:37 21:27	06:31 20:21	14	19:38 (2) 19:52 (2)			07:22 16:56	15:46 (4) 16:25 (4)				08:44 16:13		
Potential sun hours	512	460		382			328		259			233		
Total, worst case		686		33			747		593			32		
Sun reduction		0.34		0.32			0.29		0.27			0.21		
Oper. time red.		1.00		1.00			1.00		1.00			1.00		
Wind dir. red.		0.65		0.66			0.66		0.66			0.66		
Total reduction		0.22		0.21			0.19		0.17			0.14		
Total, real		153		7			145		104			4		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: S - H19

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44		08:14	16:09 (3)	07:16		16:41 (2)	07:01	05:52	05:03	
	16:15		17:06	18	16:27 (3)	18:02	22	17:03 (2)	20:00	21:45	
2	08:44		08:12		16:10 (3)	07:14		16:42 (2)	06:59	05:02	
	16:16		17:08	15	16:25 (3)	18:04	18	17:00 (2)	20:02	21:46	
3	08:44		08:10		16:12 (3)	07:12		16:46 (2)	06:56	05:01	
	16:17		17:10	12	16:24 (3)	18:06	11	16:57 (2)	20:04	21:48	
4	08:43		08:08		16:14 (3)	07:09			06:54	05:00	
	16:18		17:12	7	16:21 (3)	18:07			20:06	21:49	
5	08:43		08:07			07:07			06:51	04:59	
	16:19		17:14			18:09			20:07	21:50	
6	08:43		08:05			07:04			06:49	04:58	
	16:21		17:16			18:11			20:09	21:51	
7	08:42		08:03			07:02			06:47	04:58	
	16:22		17:18			18:13			20:11	21:52	
8	08:42		08:01		16:46 (2)	07:00			06:44	04:57	
	16:24		17:20	4	16:50 (2)	18:15			20:13	21:53	
9	08:41		07:59		16:44 (2)	06:57			06:42	04:57	
	16:25		17:22	8	16:52 (2)	18:17			20:15	21:54	
10	08:40		07:57		16:42 (2)	06:55			06:39	04:56	
	16:26		17:24	12	16:54 (2)	18:19			20:17	21:55	
11	08:40		07:55		16:41 (2)	06:53			06:37	04:56	
	16:28		17:26	15	16:56 (2)	18:21			20:19	21:55	
12	08:39		07:53		16:40 (2)	06:50			06:35	04:55	
	16:30		17:28	19	16:59 (2)	18:23			20:20	21:56	
13	08:38		07:51		16:38 (2)	06:48			06:32	04:55	
	16:31		17:30	22	17:00 (2)	18:25			20:22	21:57	
14	08:37		07:49		16:37 (2)	06:45			06:30	04:55	
	16:33		17:32	25	17:02 (2)	18:27			20:24	21:58	
15	08:36		07:47		16:36 (2)	06:43			06:28	04:54	
	16:34		17:34	29	17:05 (2)	18:28			20:26	21:58	
16	08:35		07:45		16:36 (2)	06:40			06:25	04:54	
	16:36		17:36	31	17:07 (2)	18:30			20:28	21:59	
17	08:34		07:43		16:36 (2)	06:38			06:23	04:54	
	16:38		17:38	33	17:09 (2)	18:32			20:30	21:59	
18	08:33		07:41		16:35 (2)	06:35			06:21	04:54	
	16:40		17:40	35	17:10 (2)	18:34			20:31	22:00	
19	08:32	16:05 (3)	07:39		16:35 (2)	06:33			06:18	04:54	
	16:41	2	16:07 (3)	35	17:10 (2)	18:36			20:33	22:00	
20	08:31	16:04 (3)	07:36		16:35 (2)	06:31			06:16	04:54	
	16:43	4	16:08 (3)	35	17:10 (2)	18:38			20:35	22:00	
21	08:30	16:04 (3)	07:34		16:35 (2)	06:28			06:14	04:54	
	16:45	7	16:11 (3)	36	17:11 (2)	18:40			20:37	22:01	
22	08:29	16:04 (3)	07:32		16:35 (2)	06:26			06:12	04:55	
	16:47	8	16:12 (3)	35	17:10 (2)	18:42			20:39	22:01	
23	08:27	16:04 (3)	07:30		16:35 (2)	06:23			06:09	04:55	
	16:49	11	16:15 (3)	35	17:10 (2)	18:43			20:41	22:01	
24	08:26	16:04 (3)	07:28		16:36 (2)	06:21			06:07	04:55	
	16:50	13	16:17 (3)	33	17:09 (2)	18:45			20:43	22:01	
25	08:24	16:05 (3)	07:25		16:36 (2)	06:18			06:05	04:55	
	16:52	14	16:19 (3)	32	17:08 (2)	18:47			20:44	22:01	
26	08:23	16:04 (3)	07:23		16:37 (2)	06:16			06:03	04:56	
	16:54	17	16:21 (3)	30	17:07 (2)	18:49			20:46	22:01	
27	08:22	16:04 (3)	07:21		16:38 (2)	06:13			06:00	04:56	
	16:56	19	16:23 (3)	28	17:06 (2)	18:51			20:48	22:01	
28	08:20	16:06 (3)	07:18		16:39 (2)	06:11			05:58	04:57	
	16:58	20	16:26 (3)	25	17:04 (2)	18:53			20:50	22:01	
29	08:19	16:06 (3)				07:08			05:56	04:57	
	17:00	21	16:27 (3)			19:54			20:52	22:01	
30	08:17	16:06 (3)				07:06			05:54	04:58	
	17:02	21	16:27 (3)			19:56			20:54	22:00	
31	08:15	16:07 (3)				07:04				05:04	
	17:04	19	16:26 (3)			19:58				21:44	
Potential sun hours	250		273		367		420		494	510	
Total, worst case	176		609		51						
Sun reduction	0.24		0.23		0.27						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.66		0.66		0.66						
Total reduction	0.16		0.15		0.18						
Total, real	28		94		9						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: S - H19

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	16:12 (2) 16:23 (2)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	16:14 (2) 16:21 (2)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	16:17 (2) 16:19 (2)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	15:44 (3) 15:52 (3)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	15:41 (3) 15:54 (3)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	15:41 (3) 15:56 (3)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:24 (2) 17:28 (2)	15:40 (3) 15:57 (3)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:18 (2) 17:33 (2)	15:39 (3) 15:58 (3)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:15 (2) 17:35 (2)	15:38 (3) 15:59 (3)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:13 (2) 17:37 (2)	15:38 (3) 15:59 (3)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:11 (2) 17:38 (2)	15:37 (3) 15:57 (3)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:10 (2) 17:39 (2)	15:37 (3) 15:56 (3)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:09 (2) 17:40 (2)	15:37 (3) 15:54 (3)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:08 (2) 17:40 (2)	15:38 (3) 15:52 (3)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:07 (2) 17:41 (2)	15:38 (3) 15:50 (3)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:06 (2) 17:41 (2)	15:38 (3) 15:49 (3)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:06 (2) 17:41 (2)	15:39 (3) 15:47 (3)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:06 (2) 17:41 (2)	15:39 (3) 15:46 (3)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:05 (2) 17:41 (2)	15:40 (3) 15:44 (3)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:05 (2) 17:41 (2)	15:41 (3) 15:43 (3)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:05 (2) 17:40 (2)	15:41 (3) 15:43 (3)
25	05:27 21:36	06:20 20:35	07:15 19:19	08:11 18:09	16:05 (2) 16:38 (2)	15:43 (3) 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	08:13 18:07	16:06 (2) 16:36 (2)	16:08
27	05:30 21:33	06:24 20:30	07:19 19:14	08:15 18:04	16:06 (2) 16:34 (2)	16:09
28	05:32 21:32	06:26 20:28	07:21 19:12	08:16 18:02	16:07 (2) 16:31 (2)	16:10
29	05:34 21:30	06:27 20:25	07:22 19:09	08:18 18:00	16:07 (2) 16:29 (2)	16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	08:20 17:58	16:08 (2) 16:27 (2)	16:12
31	05:37 21:27	06:31 20:21	07:26 19:05	08:22 17:56	16:09 (2) 16:25 (2)	16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case				600	248	5
Sun reduction				0.29	0.27	0.21
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.66	0.66	0.65
Total reduction				0.19	0.18	0.13
Total, real				117	44	1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: T - H20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		16:32 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26					07:24		15:50 (2)	08:19			
2	16:15		17:06	2	16:34 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05					16:54	33	16:23 (2)	16:10			
	08:44		18:02		16:29 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28					07:26		15:51 (2)	08:21			
	16:16		17:08	8	16:37 (2)	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02					16:52	30	16:21 (2)	16:09			
3	08:44		08:10		16:27 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30					07:28		15:51 (2)	08:22			
	16:17		17:10	12	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00					16:51	28	16:19 (2)	16:08			
4	08:43		08:08		16:25 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31					07:30		15:52 (2)	08:24			
	16:18		17:12	16	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57					16:48	25	16:17 (2)	16:08			
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24	08:26		07:28		16:27 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09					16:50 (2)		15:30 (3)	08:43			
	16:50	22	16:16 (3)	17:52	20	16:47 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22					17:24 (2)	34	15:27 (3)	16:08			
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30	08:17		16:01 (3)			07:06	05:54	05:05</																

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: U - H21

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		16:26 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26							07:24		15:48 (2)	08:19	
	16:15		17:06	8	16:34 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05							16:54	33	16:21 (2)	16:10	
2	08:44		08:12		16:24 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28							07:26		15:48 (2)	08:21	
	16:16		17:08	13	16:37 (2)	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02							16:52	32	16:20 (2)	16:09	
3	08:44		08:10		16:23 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30							07:28		15:49 (2)	08:22	
	16:17		17:10	16	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00							16:50	30	16:19 (2)	16:08	
4	08:43		08:08		16:22 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31							07:30		15:49 (2)	08:24	
	16:18		17:12	19	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57							16:48	28	16:17 (2)	16:08	
5	08:43		08:07		16:21 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33							07:32		15:50 (2)	08:25	
	16:19		17:14	22	16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55							16:46	24	16:14 (2)	16:07	
6	08:43		08:05		16:20 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35							07:34		15:51 (2)	08:26	
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7	08:42		08:03		16:19 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37							07:36		15:52 (2)	08:28	
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8	08:42		08:01		16:19 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39							07:38		15:53 (2)	08:29	
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29	08:19					07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18							15:47 (2)	08:16		08:44	
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31	08:15		16:28 (2)			07:04		05:04		05:37	06:													

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: V - H22

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:07 (3)	08:14		15:21 (2)	07:16	07:01	05:52		05:03	04:59	05:39	06:33	07:26	07:24					08:19		14:52 (2)	
	16:15	30	15:37 (2)	17:06	27	15:48 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54						16:10	36	15:28 (2)	
2	08:44		15:08 (3)	08:12		15:22 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26						08:21		14:52 (2)	
	16:16	31	15:39 (2)	17:08	25	15:47 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52						16:09	35	15:27 (2)	
3	08:44		15:08 (3)	08:10		15:24 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28						08:22		14:53 (2)	
	16:17	31	15:39 (2)	17:10	21	15:45 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50						16:08	35	15:28 (2)	
4	08:43		15:09 (3)	08:08		15:27 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30						08:24		14:54 (2)	
	16:18	32	15:41 (2)	17:12	16	15:43 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48						16:08	35	15:29 (2)	
5	08:43		15:09 (3)	08:07		15:30 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32						08:25		14:55 (2)	
	16:19	32	15:41 (2)	17:14	10	15:40 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46						16:07	33	15:28 (2)	
6	08:43		15:10 (2)	08:05			07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34			14:59 (2)			08:26		14:56 (2)	
	16:21	33	15:43 (2)	17:16			18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	11	15:10 (2)	16:07			33	15:29 (2)		
7	08:42		15:09 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36			14:56 (2)			08:28		14:56 (3)	
	16:22	34	15:43 (2)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	17	15:13 (2)	16:06			32	15:28 (2)		
8	08:42		15:09 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38			14:54 (2)			08:29		14:56 (3)	
	16:24	34	15:43 (2)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	21	15:15 (2)	16:06			32	15:28 (2)		
9	08:41		15:10 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			14:53 (2)			08:30		14:57 (3)	
	16:25	35	15:45 (2)	17:22			18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	25	15:18 (2)	16:05			31	15:28 (2)		
10	08:40		15:10 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42			14:52 (2)			08:32		14:57 (3)	
	16:26	35	15:45 (2)	17:24			18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	27	15:19 (2)	16:05			31	15:28 (2)		
11	08:40		15:10 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44			14:51 (2)			08:33		14:57 (3)	
	16:28	36	15:46 (2)	17:26			18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	29	15:20 (2)	16:05			30	15:27 (2)		
12	08:39		15:10 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46			14:50 (2)			08:34		14:57 (3)	
	16:30	37	15:47 (2)	17:28			18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	31	15:21 (2)	16:05			30	15:27 (2)		
13	08:38		15:11 (2)	07:51			06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47			14:49 (2)			08:35		14:57 (3)	
	16:31	36	15:47 (2)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	33	15:22 (2)	16:04			29	15:26 (2)		
14	08:37		15:11 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49			14:48 (2)			08:36		14:58 (3)	
	16:33	37	15:48 (2)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	34	15:22 (2)	16:04			29	15:27 (2)		
15	08:36		15:11 (2)	07:47			06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51			14:48 (2)			08:37		14:58 (3)	
	16:34	37	15:48 (2)	17:34			18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	35	15:23 (2)	16:04			28	15:26 (2)		
16	08:35		15:10 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53			14:48 (2)			08:38		14:58 (3)	
	16:36	38	15:48 (2)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	35	15:23 (2)	16:05			28	15:26 (2)		
17	08:34		15:11 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55			14:47 (2)			08:39		14:59 (3)	
	16:38	38	15:49 (2)	17:38			18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	37	15:24 (2)	16:05			28	15:27 (2)		
18	08:33		15:11 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57			14:47 (2)			08:39		15:00 (3)	
	16:40	38	15:49 (2)	17:40			18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	37	15:24 (2)	16:05			27	15:27 (2)		
19	08:32		15:12 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59			14:47 (2)			08:40		15:00 (3)	
	16:41	38	15:50 (2)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	38	15:25 (2)	16:05			28	15:28 (2)		
20	08:31		15:12 (2)	07:36			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00			14:47 (2)			08:41		15:00 (3)	
	16:43	38	15:50 (2)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	38	15:25 (2)	16:06			27	15:27 (2)		
21	08:30		15:13 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02			14:48 (2)			08:41		15:01 (3)	
	16:45	38	15:51 (2)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	38	15:26 (2)	16:06			27	15:28 (2)		
22	08:29		15:12 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04			14:48 (2)			08:42		15:01 (3)	
	16:47	38	15:50 (2)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	38	15:26 (2)	16:06			27	15:28 (2)		
23	08:27		15:13 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06			14:48 (2)			08:42		15:02 (3)	
	16:49	38	15:51 (2)	17:50			18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	38	15:26 (2)	16:07			27	15:29 (2)		
24	08:26		15:13 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08			14:48 (2)			08:43		15:02 (3)	
	16:50	37	15:50 (2)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	39	15:27 (2)	16:08			27	15:29 (2)		
25	08:25		15:15 (2)	07:25			06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09			14:49 (2)			08:43		15:02 (3)	
	16:52	36	15:51 (2)	17:54			18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:16	38	15:27 (2)	16:08			28	15:30 (2)		
26	08:23		15:15 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11			14:50 (2)			08:43		15:03 (3)	
	16:54	36	15:51 (2)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	37	15:27 (2)	16:09			27	15:30 (2)		
27	08:22		15:15 (2)	07:21			06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13			14:50 (2)			08:44		15:04 (3)	
	16:56	35	15:50 (2)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	38	15:28 (2)	16:10			28	15:32 (2)		
28	08:20		15:17 (2)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14			14:51 (2)			08:44		15:05 (3)	
	16:58	33	15:50 (2)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	37	15:28 (2)	16:10			28	15:33 (2)		
29	08:19		15:17 (2)				07:09	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16			14:51 (2)			08:44		15:05 (3)	
	17:00	33	15:50 (2)				19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:12	36	15:27 (2)	16:11			29	15:34 (2)		
30	08:17		15:18 (2)				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18			14:51 (2)			08:44		15:06 (3)	
	17:02	31	15:49 (2)				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	37	15:28 (2)	16:12			29	15:35 (2)</		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: W - H23

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:01 (2)	08:14	15:16 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:45 (2)									
2	16:15	34	15:35 (2)	17:06	25	15:41 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54							16:10	38	15:23 (2)
	08:44		15:02 (2)	08:12		15:18 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21						16:10	38	15:23 (2)
3	16:16	34	15:36 (2)	17:08	22	15:40 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52							16:10	38	15:23 (2)
	08:44		15:01 (2)	08:10		15:21 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22						16:10	38	15:23 (2)
4	16:17	35	15:36 (2)	17:10	16	15:37 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50							16:10	37	15:23 (2)
	08:43		15:02 (2)	08:08		15:24 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24						16:10	37	15:23 (2)
5	16:18	35	15:37 (2)	17:12	10	15:34 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48							16:08	37	15:24 (2)
	08:43		15:02 (2)	08:07			07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25						16:07	37	15:24 (2)
6	16:19	35	15:37 (2)	17:14			18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46							16:07	37	15:24 (2)
	08:43		15:02 (2)	08:05			07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26						16:07	37	15:24 (2)
7	16:21	36	15:38 (2)	17:16			18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44							16:07	36	15:24 (2)
	08:42		15:02 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	14:53 (2)	08:28					14:49 (2)	35	15:24 (2)
8	16:22	37	15:39 (2)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	11	15:04 (2)	16:06	35	15:24 (2)		14:49 (2)	35	15:24 (2)
	08:42		15:02 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	14:50 (2)	08:29					14:49 (2)	35	15:24 (2)
9	16:24	37	15:39 (2)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	17	15:07 (2)	16:06	35	15:24 (2)		14:49 (2)	35	15:24 (2)
	08:41		15:03 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	14:49 (2)	08:30					14:50 (2)	35	15:25 (2)
10	16:25	37	15:40 (2)	17:22			18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	21	15:10 (2)	16:05	35	15:25 (2)		14:51 (2)	34	15:25 (2)
	08:40		15:03 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	14:47 (2)	08:32					14:51 (2)	34	15:25 (2)
11	16:26	38	15:41 (2)	17:24			18:19	20:17	21:12	21:55	21:58	21:08	19:56	18:43	16:37	25	15:12 (2)	16:05	34	15:25 (2)		14:51 (2)	34	15:25 (2)
	08:40		15:03 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44	14:46 (2)	08:33					14:51 (2)	34	15:25 (2)
12	16:28	38	15:41 (2)	17:26			18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	27	15:13 (2)	16:05	34	15:25 (2)		14:51 (2)	34	15:25 (2)
	08:39		15:03 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	14:45 (2)	08:34					14:52 (2)	34	15:25 (2)
13	16:30	39	15:42 (2)	17:28			18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	29	15:14 (2)	16:05	33	15:25 (2)		14:52 (2)	33	15:25 (2)
	08:38		15:04 (2)	07:51			06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	14:44 (2)	08:35					14:52 (2)	33	15:25 (2)
14	16:31	38	15:42 (2)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	31	15:15 (2)	16:05	33	15:25 (2)		14:52 (2)	33	15:25 (2)
	08:37		15:04 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	14:43 (2)	08:36					14:54 (2)	33	15:26 (2)
15	16:33	39	15:43 (2)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	33	15:16 (2)	16:04	32	15:26 (2)		14:54 (2)	32	15:26 (2)
	08:36		15:04 (2)	07:47			06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51	14:42 (2)	08:37					14:53 (2)	32	15:26 (2)
16	16:34	39	15:43 (2)	17:34			18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	35	15:17 (2)	16:04	32	15:25 (2)		14:54 (2)	32	15:26 (2)
	08:35		15:04 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	14:42 (2)	08:38					14:54 (2)	32	15:26 (2)
17	16:36	39	15:43 (2)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	35	15:17 (2)	16:05	32	15:26 (2)		14:55 (2)	32	15:26 (2)
	08:34		15:04 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	14:42 (2)	08:39					14:55 (2)	32	15:26 (2)
18	16:38	40	15:44 (2)	17:38			18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	36	15:18 (2)	16:05	31	15:26 (2)		14:56 (2)	31	15:26 (2)
	08:33		15:05 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	14:41 (2)	08:39					14:56 (2)	31	15:27 (2)
19	16:40	39	15:44 (2)	17:40			18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	38	15:19 (2)	16:05	31	15:27 (2)		14:56 (2)	31	15:27 (2)
	08:32		15:06 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	14:41 (2)	08:40					14:56 (2)	31	15:27 (2)
20	16:41	39	15:45 (2)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	38	15:19 (2)	16:05	32	15:28 (2)		14:56 (2)	31	15:27 (2)
	08:31		15:05 (2)	07:36			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	14:41 (2)	08:41					14:56 (2)	31	15:27 (2)
21	16:43	39	15:44 (2)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	39	15:20 (2)	16:06	31	15:27 (2)		14:57 (2)	31	15:27 (2)
	08:30		15:06 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	14:41 (2)	08:41					14:57 (2)	31	15:28 (2)
22	16:45	39	15:45 (2)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	39	15:20 (2)	16:06	31	15:28 (2)		14:57 (2)	31	15:28 (2)
	08:29		15:06 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	14:42 (2)	08:42					14:57 (2)	31	15:28 (2)
23	16:47	39	15:45 (2)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	38	15:20 (2)	16:06	31	15:28 (2)		14:58 (2)	31	15:28 (2)
	08:27		15:07 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	14:42 (2)	08:42					14:58 (2)	31	15:29 (2)
24	16:49	38	15:45 (2)	17:50			18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	39	15:21 (2)	16:07	31	15:29 (2)		14:58 (2)	31	15:29 (2)
	08:26		15:07 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	14:42 (2)	08:43					14:58 (2)	31	15:29 (2)
25	16:50	38	15:45 (2)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	39	15:21 (2)	16:08	31	15:29 (2)		14:59 (2)	31	15:29 (2)
	08:25		15:09 (2)	07:25			06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09	14:42 (2)	08:43					14:59 (2)	31	15:30 (2)
26	16:52	36	15:45 (2)	17:54			18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	40	15:22 (2)	16:08	31	15:30 (2)		14:59 (2)	31	15:30 (2)
	08:23		15:09 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	14:43 (2)	08:43					14:59 (2)	31	15:30 (2)
27	16:54	35	15:44 (2)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	39	15:22 (2)	16:09	31	15:30 (2)		14:59 (2)	31	15:30 (2)
	08:22		15:10 (2)	07:21			06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13	14:43 (2)	08:44					15:00 (2)	32	15:32 (2)
28	16:56	34	15:44 (2)	17:58	</																			

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: X - H24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:36 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19		15:19 (1)							
	16:15	1	15:37 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10	15	15:34 (1)							
2	08:44		15:36 (1)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26		08:21		15:20 (1)							
	16:16	2	15:38 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09	13	15:33 (1)							
3	08:44		15:36 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22		15:20 (1)							
	16:17	3	15:39 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50		16:08	12	15:32 (1)							
4	08:43		15:36 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24		15:21 (1)							
	16:18	5	15:41 (1)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48		16:08	11	15:32 (1)							
5	08:43		15:36 (1)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25		15:21 (1)							
	16:19	6	15:42 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46		16:07	9	15:30 (1)							
6	08:43		15:36 (1)	08:05	07:05	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34		08:26		15:22 (1)							
	16:21	8	15:44 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44		16:07	8	15:30 (1)							
7	08:42		15:36 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36		08:28		15:23 (1)							
	16:22	9	15:45 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43		16:06	6	15:29 (1)							
8	08:42		15:36 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38		08:29		15:24 (1)							
	16:24	10	15:46 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41		16:06	5	15:29 (1)							
9	08:41		15:37 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:30		15:25 (1)							
	16:25	12	15:49 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39		16:05	3	15:28 (1)							
10	08:40		15:37 (1)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42		08:32		15:25 (1)							
	16:26	13	15:50 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37		16:05	3	15:28 (1)							
11	08:40		15:37 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44		08:33		15:26 (1)							
	16:28	15	15:52 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:35		16:05	1	15:27 (1)							
12	08:39		15:37 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46		08:34		15:26 (1)							
	16:30	16	15:53 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34		16:05		15:27 (1)							
13	08:38		15:37 (1)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47		08:35		15:24 (1)							
	16:31	18	15:55 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32		16:05		15:25 (1)							
14	08:37		15:37 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49		08:36		15:26 (1)							
	16:33	20	15:57 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31		16:04		15:27 (1)							
15	08:36		15:38 (1)	07:47	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51		15:21 (1)		15:28 (1)							
	16:34	21	15:59 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	8	15:29 (1)		15:29 (1)							
16	08:35		15:38 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53		15:19 (1)		15:34 (1)							
	16:36	23	16:01 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	12	15:31 (1)		15:31 (1)							
17	08:34		15:38 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55		15:18 (1)		15:38 (1)							
	16:38	23	16:01 (1)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	15	15:33 (1)		15:33 (1)							
18	08:33		15:39 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57		15:17 (1)		15:39 (1)							
	16:40	22	16:01 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:24	17	15:34 (1)		15:34 (1)							
19	08:32		15:39 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59		15:16 (1)		15:35 (1)							
	16:41	23	16:02 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	19	15:35 (1)		15:35 (1)							
20	08:31		15:39 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01		15:16 (1)		15:36 (1)							
	16:43	22	16:01 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	20	15:36 (1)		15:36 (1)							
21	08:30		15:41 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02		15:16 (1)		15:37 (1)							
	16:45	20	16:01 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	20	15:36 (1)		15:36 (1)							
22	08:29		15:41 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		15:15 (1)		15:37 (1)							
	16:47	20	16:01 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	22	15:37 (1)		15:37 (1)							
23	08:27		15:42 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		15:16 (1)		15:38 (1)							
	16:49	19	16:01 (1)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	22	15:38 (1)		15:38 (1)							
24	08:26		15:43 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08		15:16 (1)		15:39 (1)							
	16:50	17	16:00 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	22	15:38 (1)		15:38 (1)							
25	08:25		15:45 (1)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09		15:16 (1)		15:39 (1)							
	16:52	15	16:00 (1)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	23	15:39 (1)		15:39 (1)							
26	08:23		15:46 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11		15:16 (1)		15:39 (1)							
	16:54	12	15:58 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	23	15:39 (1)		15:39 (1)							
27	08:22		15:48 (1)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13		15:17 (1)		15:44 (1)							
	16:56	8	15:56 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	21	15:38 (1)		16:10 (1)							
28	08:20			07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14		15:17 (1)		15:44 (1)							
	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	20	15:37 (1)		16:11 (1)							
29	08:19				07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16		15:17 (1)		15:44 (1)							
	17:00				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	18	15:35 (1)		16:11 (1)							
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18		15:18 (1)		15:44 (1)							
	17:02				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	17	15:35 (1)		16:12 (1)							
31	08:15																							

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: Y - H25

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: Z - H26

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
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29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AA - H27

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:50 (5) 20:20 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:10 (5) 20:19 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:50 (5) 20:20 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:07 (5) 20:22 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:50 (5) 20:19 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:05 (5) 20:23 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:50 (5) 20:19 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:04 (5) 20:25 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:52 (5) 20:17 (5)	05:04 21:52	05:49 21:57	05:49 21:13	20:01 (5) 20:27 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:03 20:57	19:57 (5) 20:28 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	06:24 20:30	19:57 (5) 19:14	07:19 17:04	07:14 17:04	07:14 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	06:26 20:28	19:57 (5) 19:12	07:21 17:02	07:16 17:02	07:16 16:13	08:44 16:11
29	08:18 17:00	07:09 19:54	05:56 20:52	05:06 21:41	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	06:28 20:25	19:57 (5) 19:09	07:22 17:00	07:18 17:00	07:18 16:12	08:44 16:11
30	08:17 17:02	07:06 19:56	05:54 20:53	05:05 21:43	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	06:29 20:23	19:57 (5) 19:07	07:24 16:58	07:20 16:58	07:20 16:11	08:44 16:12
31	08:15 17:04	07:04 19:58	05:04 21:44	05:04 21:44	05:04 21:44	05:04 21:44	05:37 21:26	06:31 20:21	06:31 20:21	19:57 (5) 19:07	07:22 16:56	07:22 16:56	07:22 16:11	08:44 16:12
Potential sun hours	250	273	367	420	494	510	512	460	535	382	328	259	233	
Total, worst case				255	275				535					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.65	0.65				0.65					
Total reduction				0.23	0.25				0.22					
Total, real				58	68				118					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AB - H28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:49 (5) 20:18 (5)	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:49 (5) 20:17 (5)	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:49 (5) 20:16 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:07 (5) 20:17 (5)	06:36 20:13	07:30 19:00	07:28 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:50 (5) 20:16 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:05 (5) 20:20 (5)	06:38 20:11	07:31 18:57	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:50 (5) 20:15 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:03 (5) 20:21 (5)	06:40 20:09	07:33 18:55	07:32 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:51 (5) 20:13 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:02 (5) 20:23 (5)	06:42 20:06	07:35 18:52	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:53 (5) 20:13 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:01 (5) 20:24 (5)	06:43 20:04	07:37 18:50	07:36 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	19:54 (5) 20:11 (5)	04:57 21:53	05:05 21:56	05:51 21:11	19:59 (5) 20:24 (5)	06:45 20:01	07:39 18:48	07:38 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	19:56 (5) 20:09 (5)	04:57 21:54	05:06 21:55	05:52 21:09	19:59 (5) 20:25 (5)	06:47 19:59	07:41 18:45	07:40 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	19:58 (5) 20:06 (5)	04:56 21:55	05:07 21:54	05:54 21:07	19:57 (5) 20:25 (5)	06:49 19:56	07:42 18:43	07:42 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13		04:56 21:55	05:08 21:54	05:56 21:05	19:57 (5) 20:26 (5)	06:50 19:54	07:44 18:40	07:43 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15		04:55 21:56	05:09 21:53	05:58 21:03	19:57 (5) 20:26 (5)	06:52 19:51	07:46 18:38	07:45 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	19:56 (5) 20:26 (5)	06:54 19:49	07:48 18:36	07:47 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:51	05:12 21:51	06:01 20:59	19:56 (5) 20:26 (5)	06:56 19:47	07:50 18:33	07:49 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	05:13 21:50	06:03 20:57	19:56 (5) 20:26 (5)	06:58 19:44	07:52 18:31	07:51 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	19:55 (5) 20:25 (5)	06:59 19:42	07:54 18:29	07:53 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	19:56 (5) 20:23 (5)	07:01 19:39	07:55 18:26	07:55 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:58 (5) 20:03 (5)	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	19:56 (5) 20:22 (5)	07:03 19:37	07:57 18:24	07:57 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	19:56 (5) 20:05 (5)	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	19:56 (5) 20:19 (5)	07:05 19:34	07:59 18:22	07:59 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:54 (5) 20:07 (5)	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	19:56 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:00 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:52 (5) 20:08 (5)	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	19:57 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:02 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	19:51 (5) 20:10 (5)	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	19:57 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:04 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:50 (5) 20:12 (5)	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	19:58 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:06 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:50 (5) 20:13 (5)	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	20:00 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:07 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19:49 (5) 20:15 (5)	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	20:01 (5) 20:06 (5)	07:15 19:19	07:11 17:09	08:09 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:49 (5) 20:17 (5)	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32		07:17 19:17	07:13 17:07	08:11 16:15
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:49 (5) 20:19 (5)	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	19:48 (5) 20:19 (5)	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	19:48 (5) 20:19 (5)	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	19:48 (5) 20:18 (5)	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44			05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233
Total, worst case				283	215				500				
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.65	0.65				0.65				
Total reduction				0.23	0.25				0.22				
Total, real				65	53				111				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AC - H29

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	19:48 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:55	20:16 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10			
2	08:44	08:12	07:14	06:59	05:50	19:48 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	20:15 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09			
3	08:43	08:10	07:11	06:56	05:48	19:49 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	20:14 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08			
4	08:43	08:08	07:09	06:54	05:46	19:50 (5)	05:00	05:01	05:44	20:09 (5)	06:38	07:31	08:24			
	16:18	17:12	18:07	20:06	21:01	20:13 (5)	21:49	21:59	21:19	5	20:14 (5)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44	19:51 (5)	04:59	05:02	05:45	20:05 (5)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:03	20:11 (5)	21:50	21:58	21:17	12	20:17 (5)	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42	19:52 (5)	04:59	05:03	05:47	20:03 (5)	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	20:10 (5)	21:51	21:57	21:15	16	20:19 (5)	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40	19:54 (5)	04:58	05:04	05:49	20:02 (5)	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	20:09 (5)	21:52	21:57	21:13	19	20:21 (5)	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38	19:56 (5)	04:57	05:05	05:51	20:00 (5)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	20:06 (5)	21:53	21:56	21:11	21	20:21 (5)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	19:59 (5)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	24	20:23 (5)	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	19:57 (5)	06:49	07:42	07:42	08:31		
	16:27	17:24	18:19	20:17	21:11		21:55	21:54	21:07	26	20:23 (5)	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	19:57 (5)	06:50	07:44	07:43	08:33		
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	26	20:23 (5)	19:54	18:40	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:58	19:56 (5)	06:52	07:46	07:45	08:34		
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	28	20:24 (5)	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:55 (5)	06:54	07:48	07:47	08:35		
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	29	20:24 (5)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:55 (5)	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	29	20:24 (5)	19:47	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	19:55 (5)	06:58	07:52	07:51	08:37		
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	30	20:25 (5)	19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	19:54 (5)	06:59	07:54	07:53	08:38		
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	30	20:24 (5)	19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	19:58 (5)	05:22	04:54	05:16	06:06	19:54 (5)	07:01	07:55	07:55	08:38		
	16:38	17:38	18:32	20:30	3	20:01 (5)	21:23	21:59	21:47	20:53	29	20:23 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	19:55 (5)	05:21	04:54	05:17	06:08	19:55 (5)	07:03	07:57	07:57	08:39		
	16:40	17:40	18:34	20:31	8	20:03 (5)	21:25	21:59	21:46	20:50	27	20:22 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	19:54 (5)	05:19	04:54	05:18	06:10	19:54 (5)	07:05	07:59	07:59	08:40		
	16:41	17:42	18:36	20:33	11	20:05 (5)	21:27	22:00	21:45	20:48	25	20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:52 (5)	05:18	04:54	05:20	06:12	19:55 (5)	07:06	08:01	08:00	08:41		
	16:43	17:44	18:38	20:35	15	20:07 (5)	21:28	22:00	21:43	20:46	22	20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:50 (5)	05:16	04:54	05:21	06:13	19:55 (5)	07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	18	20:08 (5)	21:30	22:00	21:42	20:44	20	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:49 (5)	05:15	04:55	05:23	06:15	19:55 (5)	07:10	08:05	08:04	08:42		
	16:47	17:48	18:41	20:39	21	20:10 (5)	21:31	22:01	21:41	20:42	17	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:49 (5)	05:13	04:55	05:24	06:17	19:56 (5)	07:12	08:07	08:06	08:42		
	16:49	17:50	18:43	20:41	23	20:12 (5)	21:33	22:01	21:39	20:39	14	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:48 (5)	05:12	04:55	05:26	06:19	19:58 (5)	07:13	08:09	08:07	08:43		
	16:51	17:52	18:45	20:42	25	20:13 (5)	21:34	22:01	21:38	20:37	11	20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:48 (5)	05:11	04:56	05:27	06:20	19:58 (5)	07:15	07:11	08:09	08:43		
	16:52	17:54	18:47	20:44	27	20:15 (5)	21:36	22:01	21:36	20:35	8	20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:48 (5)	05:09	04:56	05:29	06:22	20:01 (5)	07:17	07:13	08:11	08:43		
	16:54	17:56	18:49	20:46	29	20:17 (5)	21:37	22:01	21:35	20:32	3	20:04 (5)	19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	19:48 (5)	05:08	04:56	05:30	06:24	19:57 (5)	07:19	07:14	08:13	08:44		
	16:56	17:58	18:51	20:48	29	20:17 (5)	21:39	22:01	21:33	20:30		19:14	17:04	16:14	16:10	
28	08:20	07:18	06:11	05:58	19:48 (5)	05:07	04:57	05:32	06:26	19:57 (5)	07:21	07:16	08:14	08:44		
	16:58	18:00	18:53	20:50	29	20:17 (5)	21:40	22:01	21:32	20:28		19:12	17:02	16:13	16:11	
29	08:18		07:09	05:56	19:48 (5)	05:06	04:58	05:34	06:28	19:57 (5)	07:22	07:18	08:16	08:44		
	17:00		19:54	20:52	29	20:17 (5)	21:41	22:00	21:30	20:25		19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	19:48 (5)	05:05	04:58	05:35	06:29	19:57 (5)	07:24	07:20	08:17	08:44		
	17:02		19:56	20:53	28	20:16 (5)	21:43	22:00	21:28	20:23		19:07	16:58	16:11	16:12	
31	08:15		07:04			05:04			05:37	06:31		07:22			08:44	
	17:04		19:58			21:44			21:26	20:21		16:56			16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233		
Total, worst case				295	166				471							
Sun reduction				0.35	0.38				0.34							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.65	0.65				0.65							
Total reduction				0.23	0.25				0.22							
Total, real				68	41				104							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AD - H30

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	20:09 (5)	05:03	04:59	05:39	20:18 (5)	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	17	20:26 (5)	21:45	22:00	21:25	25	20:43 (5)	20:18	19:05
2	08:44	08:12	07:14	06:59	05:50		20:09 (5)	05:02	05:00	05:40		20:18 (5)	06:35	07:28
	16:16	17:08	18:04	20:02	20:57	18	20:27 (5)	21:46	22:00	21:23	26	20:44 (5)	20:16	19:02
3	08:43	08:10	07:11	06:56	05:48		20:08 (5)	05:01	05:00	05:42		20:17 (5)	06:36	07:30
	16:17	17:10	18:06	20:04	20:59	20	20:29 (5)	21:48	21:59	21:21	26	20:43 (5)	20:13	19:00
4	08:43	08:08	07:09	06:54	05:46	21	20:07 (5)	05:00	05:01	05:44		20:17 (5)	06:38	07:31
	16:18	17:12	18:07	20:06	21:01	23	20:30 (5)	21:49	21:59	21:19	27	20:44 (5)	20:11	18:57
5	08:43	08:07	07:07	06:51	05:44		20:07 (5)	04:59	05:02	05:45		20:17 (5)	06:40	07:33
	16:20	17:14	18:09	20:07	21:03	25	20:32 (5)	21:50	21:58	21:17	27	20:44 (5)	20:09	18:55
6	08:42	08:05	07:04	06:49	05:42		20:07 (5)	04:59	05:03	05:47		20:17 (5)	06:42	07:35
	16:21	17:16	18:11	20:09	21:04	26	20:33 (5)	21:51	21:57	21:15	27	20:44 (5)	20:06	18:52
7	08:42	08:03	07:02	06:47	05:40		20:07 (5)	04:58	05:04	05:49		20:17 (5)	06:43	07:37
	16:22	17:18	18:13	20:11	21:06	28	20:35 (5)	21:52	21:57	21:13	26	20:43 (5)	20:04	18:50
8	08:41	08:01	07:00	06:44	05:38		20:07 (5)	04:57	05:05	05:51		20:16 (5)	06:45	07:39
	16:24	17:20	18:15	20:13	21:08	27	20:34 (5)	21:53	21:56	21:11	25	20:41 (5)	20:01	18:48
9	08:41	07:59	06:57	06:42	05:36		20:07 (5)	04:57	05:06	05:52		20:17 (5)	06:47	07:41
	16:25	17:22	18:17	20:15	21:10	27	20:34 (5)	21:54	21:55	21:09	22	20:39 (5)	19:59	18:45
10	08:40	07:57	06:55	06:39	05:34		20:07 (5)	04:56	05:07	05:54		20:17 (5)	06:49	07:42
	16:27	17:24	18:19	20:17	21:11	26	20:33 (5)	21:54	21:54	21:07	20	20:37 (5)	19:56	18:43
11	08:40	07:55	06:52	06:37	05:33		20:08 (5)	04:56	05:08	05:56		20:17 (5)	06:50	07:44
	16:28	17:26	18:21	20:18	21:13	25	20:33 (5)	21:55	21:54	21:05	18	20:35 (5)	19:54	18:40
12	08:39	07:53	06:50	06:35	05:31		20:08 (5)	04:55	05:09	05:58		20:18 (5)	06:52	07:46
	16:30	17:28	18:23	20:20	21:15	24	20:32 (5)	21:56	21:53	21:03	16	20:34 (5)	19:51	18:38
13	08:38	07:51	06:48	06:32	05:29		20:09 (5)	04:55	05:11	05:59		20:18 (5)	06:54	07:48
	16:31	17:30	18:25	20:22	21:17	22	20:31 (5)	21:57	21:52	21:01	13	20:31 (5)	19:49	18:36
14	08:37	07:49	06:45	06:30	05:27		20:10 (5)	04:55	05:12	06:01		20:19 (5)	06:56	07:50
	16:33	17:32	18:27	20:24	21:18	21	20:31 (5)	21:57	21:51	20:59	10	20:29 (5)	19:47	18:33
15	08:36	07:47	06:43	06:28	05:26		20:10 (5)	04:55	05:13	06:03		20:21 (5)	06:58	07:52
	16:34	17:34	18:28	20:26	21:20	20	20:30 (5)	21:58	21:50	20:57	7	20:28 (5)	19:44	18:31
16	08:35	07:45	06:40	06:25	05:24		20:12 (5)	04:54	05:14	06:05		20:22 (5)	06:59	07:54
	16:36	17:36	18:30	20:28	21:22	17	20:29 (5)	21:59	21:48	20:55	3	20:25 (5)	19:42	18:29
17	08:34	07:43	06:38	06:23	05:22		20:13 (5)	04:54	05:16	06:06		07:01	07:55	07:55
	16:38	17:38	18:32	20:30	21:23	14	20:27 (5)	21:59	21:47	20:53		19:39	18:26	16:26
18	08:33	07:41	06:35	06:21	05:21		20:15 (5)	04:54	05:17	06:08		07:03	07:57	07:57
	16:40	17:40	18:34	20:31	21:25	11	20:26 (5)	21:59	21:46	20:50		19:37	18:24	16:25
19	08:32	07:39	06:33	06:18	05:19		20:19 (5)	04:54	05:18	06:10		07:05	07:59	07:59
	16:41	17:42	18:36	20:33	21:27	4	20:23 (5)	22:00	21:45	20:48		19:34	18:22	16:23
20	08:31	07:36	06:31	06:16	05:18			04:54	05:20	06:12		07:06	08:01	08:00
	16:43	17:44	18:38	20:35	21:28			22:00	21:43	20:46		19:32	18:20	16:22
21	08:30	07:34	06:28	06:14	05:16			04:54	05:21	06:13		07:08	08:03	08:02
	16:45	17:46	18:40	20:37	21:30			22:00	21:42	20:44		19:29	18:17	16:20
22	08:28	07:32	06:26	06:12	05:15			04:55	05:23	06:15		07:10	08:05	08:04
	16:47	17:48	18:41	20:39	21:31			22:01	21:41	20:42		19:27	18:15	16:19
23	08:27	07:30	06:23	06:09	05:13			04:55	05:24	06:17		07:12	08:07	08:06
	16:49	17:50	18:43	20:41	21:33			22:01	21:39	20:39		19:24	18:13	16:18
24	08:26	07:28	06:21	06:07	05:12			04:55	05:26	06:19		07:13	08:09	08:07
	16:51	17:52	18:45	20:42	21:34			22:01	21:38	20:37		19:22	18:11	16:17
25	08:24	07:25	06:18	06:05	05:11			04:56	05:27			07:15	07:11	08:09
	16:52	17:54	18:47	20:44	21:36			22:01	21:36	8		20:35 (5)	20:35	
26	08:23	07:23	06:16	06:03	05:09			04:56	05:29			20:25 (5)	06:22	
	16:54	17:56	18:49	20:46	21:37			22:01	21:35	12		20:37 (5)	20:32	
27	08:21	07:21	06:13	06:01	05:08			04:56	05:30			20:24 (5)	06:24	
	16:56	17:58	18:51	20:48	4	20:15 (5)	21:39	22:01	21:33	15		20:39 (5)	20:30	
28	08:20	07:18	06:11	05:58	20:13 (5)	05:07		04:57	05:32			20:22 (5)	06:26	
	16:58	18:00	18:53	20:50	8	20:21 (5)	21:40	22:01	21:32	18		20:40 (5)	20:28	
29	08:18		07:08	05:56	20:11 (5)	05:06		04:58	05:34			20:21 (5)	06:28	
	17:00		19:54	20:52	11	20:22 (5)	21:41	22:00	21:30	20		20:41 (5)	20:25	
30	08:17		07:06	05:54	20:10 (5)	05:05		04:58	05:35			20:20 (5)	06:29	
	17:02		19:56	20:53	14	20:24 (5)	21:43	22:00	21:28	22		20:42 (5)	20:23	
31	08:15		07:04			05:04			05:37			20:20 (5)	06:31	
	17:04		19:58		21:44			21:26	23	20:43 (5)		20:21		
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case				37	396			118		318				
Sun reduction				0.35	0.38			0.32		0.34				
Oper. time red.				1.00	1.00			1.00		1.00				
Wind dir. red.				0.64	0.64			0.64		0.64				
Total reduction				0.23	0.25			0.21		0.22				
Total, real				8	97			25		70				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AE - H31

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:18 (2)	08:14		09:33 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24						08:19		09:00 (2)	
	16:15	69	14:42 (1)	17:06	21	09:54 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54						16:10	69	14:25 (1)	
2	08:44		09:18 (2)	08:12		09:35 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26						08:21		09:01 (2)	
	16:16	70	14:43 (1)	17:08	17	09:52 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52						16:09	69	14:26 (1)	
3	08:44		09:17 (2)	08:10		09:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28						08:22		09:01 (2)	
	16:17	70	14:42 (1)	17:10	11	09:49 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50						16:08	71	14:27 (1)	
4	08:43		09:17 (2)	08:09			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30						08:24		09:02 (2)	
	16:18	72	14:43 (1)	17:12			18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48						16:08	71	14:28 (1)	
5	08:43		09:16 (2)	08:07			07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32						08:25		09:02 (2)	
	16:20	73	14:43 (1)	17:14			18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46						16:07	71	14:28 (1)	
6	08:43		09:17 (2)	08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34						08:27		09:03 (2)	
	16:21	72	14:43 (1)	17:16			18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44						16:07	71	14:29 (1)	
7	08:42		09:17 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36						08:28		09:03 (2)	
	16:22	71	14:43 (1)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43						16:06	73	14:30 (1)	
8	08:42		09:17 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38			09:09 (2)	08:29				09:05 (2)	
	16:24	70	14:43 (1)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	11	09:20 (2)	16:06	72	14:31 (1)				
9	08:41		09:18 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			09:06 (2)	08:30				09:06 (2)	
	16:25	71	14:44 (1)	17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	17	09:23 (2)	16:05	71	14:31 (1)				
10	08:40		09:18 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42			09:04 (2)	08:32				09:07 (2)	
	16:27	69	14:43 (1)	17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	21	09:25 (2)	16:05	71	14:32 (1)				
11	08:40		09:18 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44			09:02 (2)	08:33				09:08 (2)	
	16:28	69	14:43 (1)	17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	25	09:27 (2)	16:05	70	14:32 (1)				
12	08:39		09:18 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46			09:01 (2)	08:34				09:09 (2)	
	16:30	68	14:43 (1)	17:28			18:23	20:20	21:15	21:56	21:53	21:04	19:52	18:38	16:34	27	09:28 (2)	16:05	70	14:33 (1)				
13	08:38		09:19 (2)	07:51			06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48			09:00 (2)	08:35				09:11 (2)	
	16:31	66	14:42 (1)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	29	09:29 (2)	16:05	69	14:34 (1)				
14	08:37		09:19 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49			08:59 (2)	08:36				09:12 (2)	
	16:33	64	14:42 (1)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	31	09:30 (2)	16:05	69	14:35 (1)				
15	08:36		09:20 (2)	07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51			08:58 (2)	08:37				09:13 (2)	
	16:34	62	14:41 (1)	17:34			18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	33	09:31 (2)	16:05	67	14:35 (1)				
16	08:36		09:20 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53			08:58 (2)	08:38				09:13 (2)	
	16:36	59	14:40 (1)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	34	09:32 (2)	16:05	68	14:35 (1)				
17	08:34		09:20 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55			08:58 (2)	08:39				09:14 (2)	
	16:38	55	14:38 (1)	17:38			18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	35	09:33 (2)	16:05	67	14:36 (1)				
18	08:33		09:20 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57			08:57 (2)	08:39				09:15 (2)	
	16:40	50	14:36 (1)	17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	36	09:33 (2)	16:05	67	14:36 (1)				
19	08:32		09:21 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59			08:57 (2)	08:40				09:16 (2)	
	16:41	39	10:00 (2)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	37	09:34 (2)	16:05	67	14:37 (1)				
20	08:31		09:21 (2)	07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01			08:57 (2)	08:41				09:16 (2)	
	16:43	38	09:59 (2)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	37	09:34 (2)	16:06	67	14:37 (1)				
21	08:30		09:22 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02			08:57 (2)	08:41				09:17 (2)	
	16:45	38	10:00 (2)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	38	09:35 (2)	16:06	66	14:38 (1)				
22	08:29		09:22 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04			08:57 (2)	08:42				09:17 (2)	
	16:47	37	09:59 (2)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	38	09:35 (2)	16:06	66	14:38 (1)				
23	08:27		09:23 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06			08:57 (2)	08:42				09:18 (2)	
	16:49	37	10:00 (2)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	39	09:36 (2)	16:07	66	14:39 (1)				
24	08:26		09:23 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08			08:57 (2)	08:43				09:18 (2)	
	16:51	36	09:59 (2)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	50	14:13 (1)	16:08	67	14:39 (1)				
25	08:25		09:25 (2)	07:25			06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09			08:58 (2)	08:43				09:18 (2)	
	16:52	35	10:00 (2)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09	16:16	55	14:16 (1)	16:08	67	14:39 (1)				
26	08:23		09:25 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11			08:58 (2)	08:44				09:19 (2)	
	16:54	34	09:59 (2)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15	58	14:18 (1)	16:09	67	14:41 (1)				
27	08:22		09:26 (2)	07:21			06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13			08:59 (2)	08:44				09:19 (2)	
	16:56	33	09:59 (2)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	61	14:20 (1)	16:10	68	14:41 (1)				
28	08:20		09:27 (2)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14			08:59 (2)	08:44				09:19 (2)	
	16:58	31	09:58 (2)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	64	14:22 (1)	16:11	67	14:41 (1)				
29	08:19		09:28 (2)				07:09	05:56	05:06	04:57	05:34	06:28	07:23	07:19	08:16			08:59 (2)	08:44				09:19 (2)	
	17:00	29	09:57 (2)				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	66	14:22 (1)	16:11	69	14:42 (1)				
30	08:17		09:29 (2)				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18			09:00 (2)	08:44				09:19 (2)	
	17:02	27	09:56 (2)				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	67	14:24 (1)	16:12	69	14:42 (1)				
31	08:15		09:31 (2)				07:04		05:04			05:37	06:31	07:22	07:22			08:44					09:18 (2)	
	17:04	25	09:56 (2)				19:58		21:44			21:27												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AF - H32
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	09:09 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10
3	08:44	08:12	09:13 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26
4	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
5	08:44	08:10	09:12	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
6	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08
7	08:43	08:09	09:10	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30
8	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
9	08:43	08:07	09:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	07:25
10	16:20	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07
11	08:43	08:05	09:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	07:27
12	16:21	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	16:07
13	08:42	08:03	09:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	07:28
14	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06
15	08:42	08:01	09:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	07:29
16	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06
17	08:41	07:59	09:14	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	07:30
18	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05
19	08:41	07:57	09:13	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	07:32
20	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05
21	08:40	07:55	09:12	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	07:33
22	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05
23	08:39	07:53	09:11	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	07:34
24	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05
25	08:38	07:51	09:10	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	07:35
26	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05
27	08:37	07:49	09:09	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	07:36
28	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	16:05
29	08:37	07:47	09:08	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	07:37
30	16:34	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05
31	08:36	07:45	09:07	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	07:38
32	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16:05
33	08:35	07:43	09:05	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	07:39
34	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	16:05
35	08:33	07:41	09:04	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	07:39
36	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:05
37	08:32	07:39	09:03	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	07:40
38	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05
39	08:31	07:37	09:01	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	07:41
40	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:06
41	08:30	07:34	09:00	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	07:41
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06
43	08:29	07:32	09:00	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	07:42
44	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:07
45	08:27	07:30	09:00	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	07:42
46	16:49	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	16:07
47	08:26	07:28	09:00	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	07:43
48	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	16:08
49	08:25	07:25	09:01	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09	07:43
50	16:52	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:09	16:16	16:08
51	08:23	07:23	09:01	06:03	05:09	04:56	05:29	06:22	07:17	08:11	08:05	07:44
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:15	16:09
53	08:22	07:21	09:03	06:01	05:08	04:56	05:31	06:24	07:19	08:13	08:07	07:44
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:14	16:10
55	08:20	07:19	09:03	06:00	05:07	04:57	05:32	06:26	07:21	08:15	08:09	07:44
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:13	16:11
57	08:19	07:18	09:04	05:56	05:06	04:58	05:34	06:28	07:23	08:16	08:10	07:44
58	17:00	18:02	18:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:12	16:11
59	08:17	07:17	09:05	05:54	05:05	04:58	05:35	06:29	07:24	08:18	08:12	07:44
60	17:02	18:04	18:56	20:54	21:43	22:01	21:28	20:23	19:07	18:00	16:11	16:12
61	08:15	07:15	09:07	05:52	05:04	04:57	05:37	06:31	07:22	08:15	08:09	07:44
62	17:04	18:06	18:58	20:56	21:44	22:01	21:27	20:21	19:05	18:00	16:11	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	440	17									435	24
Sun reduction	0.24	0.23									0.27	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.61	0.61									0.61	0.61
Total reduction	0.15	0.14									0.16	0.13
Total, real	65	2									70	3

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AG - H33

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	11:17 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
2	16:15	26 11:43 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:10
3	08:44	11:18 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
4	16:16	25 11:43 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
5	08:44	11:19 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
6	16:17	23 11:42 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:08
7	08:43	11:21 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
8	16:18	21 11:42 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	11:16 (1)
9	08:43	11:22 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	11:19 (1)
10	16:20	19 11:41 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	11:23 (1)
11	08:43	11:24 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	11:23 (1)
12	16:21	16 11:40 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	11:26 (1)
13	08:42	11:26 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	11:28 (1)
14	16:22	12 11:38 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	11:28 (1)
15	08:42	11:30 (1)	08:01	08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	11:29 (1)
16	16:24	4 11:34 (1)	17:20	18:32 (2)	18:15	20:13	21:08	21:53	21:12	20:01	18:48	11:30 (1)
17	08:41		07:59	08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	11:31 (1)
18	16:25		17:22	7 08:33 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	11:31 (1)
19	08:41		07:57	08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	11:32 (1)
20	16:27		17:24	10 08:34 (2)	18:19	20:17	21:12	21:55	21:08	19:57	18:43	11:32 (1)
21	08:40		07:55	13 08:35 (2)	18:21	20:19	21:13	21:56	21:06	19:54	18:41	11:33 (1)
22	16:28		17:26	16 08:35 (2)	18:21	20:19	21:13	21:56	21:06	19:54	18:41	11:33 (1)
23	08:39		07:53	19 08:35 (2)	18:23	20:21	21:15	21:56	21:04	19:52	18:38	11:34 (1)
24	16:30		17:28	22 08:35 (2)	18:25	20:22	21:17	21:57	21:01	19:49	18:36	11:35 (1)
25	08:38		07:51	25 08:35 (2)	18:25	20:22	21:17	21:57	21:01	19:49	18:36	11:35 (1)
26	16:31		17:30	28 08:35 (2)	18:27	20:24	21:19	21:58	21:01	19:49	18:36	11:36 (1)
27	08:37		07:49	31 08:35 (2)	18:27	20:24	21:19	21:58	21:01	19:49	18:36	11:37 (1)
28	16:33		17:32	4 08:35 (2)	18:29	20:26	21:20	21:58	21:01	19:49	18:36	11:37 (1)
29	08:36		07:47	7 08:35 (2)	18:29	20:26	21:20	21:58	21:01	19:49	18:36	11:38 (1)
30	16:35		17:34	10 08:35 (2)	18:30	20:28	21:22	21:59	21:01	19:49	18:36	11:38 (1)
31	08:36		07:45	13 08:35 (2)	18:30	20:28	21:22	21:59	21:01	19:49	18:36	11:39 (1)
32	16:36		17:36	16 08:35 (2)	18:30	20:28	21:22	21:59	21:01	19:49	18:36	11:40 (1)
33	08:35		07:43	19 08:35 (2)	18:30	20:28	21:22	21:59	21:01	19:49	18:36	11:41 (1)
34	16:38		17:38	22 08:35 (2)	18:32	20:30	21:24	21:59	21:01	19:49	18:36	11:42 (1)
35	08:33		07:41	25 08:35 (2)	18:32	20:30	21:24	21:59	21:01	19:49	18:36	11:43 (1)
36	16:40		17:40	28 08:35 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	11:44 (1)
37	08:32		07:39	31 08:35 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	11:45 (1)
38	16:41		17:42	4 08:35 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	11:46 (1)
39	08:31		07:37	7 08:35 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	11:47 (1)
40	16:43		17:44	10 08:35 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	11:48 (1)
41	08:30		07:34	13 08:35 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	11:49 (1)
42	16:45		17:46	16 08:35 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	11:50 (1)
43	08:29		07:32	19 08:35 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	11:51 (1)
44	16:47		17:48	22 08:35 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	11:52 (1)
45	08:27		07:30	25 08:35 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	11:53 (1)
46	16:49		17:50	28 08:35 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	11:54 (1)
47	08:26		07:28	31 08:35 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	11:55 (1)
48	16:51		17:52	4 08:35 (2)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	11:56 (1)
49	08:25		07:25	7 08:35 (2)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	11:57 (1)
50	16:52		17:54	10 08:35 (2)	18:47	20:45	21:36	22:01	21:37	20:35	19:19	11:58 (1)
51	08:23		07:23	13 08:35 (2)	18:47	20:45	21:36	22:01	21:37	20:35	19:19	11:59 (1)
52	16:54		17:56	16 08:35 (2)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	12:00 (1)
53	08:22		07:21	19 08:35 (2)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	12:01 (1)
54	16:56		17:58	22 08:35 (2)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	12:02 (1)
55	08:20		07:19	25 08:35 (2)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	12:03 (1)
56	16:58		18:00	28 08:35 (2)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	12:04 (1)
57	08:19			31 08:35 (2)	18:55	20:52	21:42	22:01	21:30	20:26	19:10	12:05 (1)
58	17:00			4 08:35 (2)	18:55	20:52	21:42	22:01	21:30	20:26	19:10	12:06 (1)
59	08:17			7 08:35 (2)	18:56	20:54	21:43	22:00	21:28	20:23	19:07	12:07 (1)
60	17:02			10 08:35 (2)	18:56	20:54	21:43	22:00	21:28	20:23	19:07	12:08 (1)
61	08:15			13 08:35 (2)	18:58	20:56	21:45	22:01	21:27	20:21	18:59	12:09 (1)
62	17:04			16 08:35 (2)	18:58	20:56	21:45	22:01	21:27	20:21	18:59	12:10 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	146	250										941
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.60	0.63										0.60
Total reduction	0.15	0.15										0.12
Total, real	21	37										117

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AH - H34

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:13 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:04 20:55	06:59 19:42	07:53 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:27 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:12 17:06	08:11 16:14	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:00	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AI - H35

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 18:02 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 18:04 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	07:37 (1) 18:06 (1)	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	07:38 (1) 18:01 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:37 (1) 18:00 (1)	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:38 (1) 18:00 (1)	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:39 (1) 18:00 (1)	06:47 20:11	05:40 21:06	05:04 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:40 (1) 17:57 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:42 (1) 17:55 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:45 (1) 17:50 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:58	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:50 (1) 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:50 (1) 18:23	06:35 20:21	05:31 21:15	04:56 21:53	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:50 (1) 18:25	06:32 20:22	05:29 21:17	04:55 21:52	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	07:50 (1) 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	07:50 (1) 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	07:50 (1) 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	07:50 (1) 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	07:50 (1) 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	07:50 (1) 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	07:50 (1) 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	07:50 (1) 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	07:50 (1) 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	07:50 (1) 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:07 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	07:50 (1) 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:09 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	07:50 (1) 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 18:09	07:11 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	07:50 (1) 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 18:07	07:13 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	07:50 (1) 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 18:05	07:15 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	07:50 (1) 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 18:05	07:17 16:11
29	08:19 17:00	07:09 18:00	06:09 18:55	07:50 (1) 18:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 18:00	07:19 16:12
30	08:17 17:02	07:06 18:00	06:06 18:57	07:50 (1) 18:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 18:00	07:21 16:13
31	08:16 17:04	07:04 18:00	06:04 18:58	07:50 (1) 18:58	05:54 20:54	05:05 21:44	04:58 22:01	05:37 21:27	06:31 20:21	07:22 18:56	07:22 18:00	07:22 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	250	233
Total, worst case											250	
Sun reduction											0.29	
Oper. time red.											1.00	
Wind dir. red.											0.65	
Total reduction											0.19	
Total, real											47	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AJ - H36

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AK - H37

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AL - H38

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:18 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	08:44		
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AM - H39

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AN - H40

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AO - H41

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AP - H42

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AQ - H43

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AR - H44

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case **Shadow receptor:** AS - H45

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours), [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		[January	[February	[March			[April			[May			[June
	1	08:44	08:14	07:16			07:01		07:25 (5)	05:52			05:03
		16:15	17:06	18:02			20:00	10	07:35 (5)	20:55			21:45
	2	08:44	08:12	07:14			06:59		07:23 (5)	05:50			05:02
		16:16	17:08	18:04			20:02	13	07:36 (5)	20:57			21:47
	3	08:44	08:10	07:12			06:56		07:20 (5)	05:48			05:01
		16:17	17:10	18:06			20:04	15	07:35 (5)	20:59			21:48
	4	08:43	08:09	07:09			06:54		07:18 (5)	05:46			05:00
		16:18	17:12	18:08			20:06	18	07:36 (5)	21:01			21:49
	5	08:43	08:07	07:07			06:52		07:15 (5)	05:44		06:10 (4)	04:59
		16:20	17:14	18:10			20:08	20	07:35 (5)	21:03	2	06:12 (4)	21:50
	6	08:43	08:05	07:05			06:49		07:13 (5)	05:42		06:09 (4)	04:59
		16:21	17:16	18:11			20:09	22	07:35 (5)	21:04	4	06:13 (4)	21:51
	7	08:42	08:03	07:02			06:47		07:11 (5)	05:40		06:07 (4)	04:58
		16:22	17:18	18:13			20:11	24	07:35 (5)	21:06	5	06:12 (4)	21:52
	8	08:42	08:01	07:00			06:44		07:08 (5)	05:38		06:05 (4)	04:57
		16:24	17:20	18:15			20:13	26	07:34 (5)	21:08	7	06:12 (4)	21:53
	9	08:41	07:59	06:57			06:42		07:06 (5)	05:36		06:03 (4)	04:57
		16:25	17:22	18:17			20:15	28	07:34 (5)	21:10	8	06:11 (4)	21:54
	10	08:40	07:57	06:55			06:40		07:03 (5)	05:35		06:02 (4)	04:56
		16:27	17:24	18:19			20:17	29	07:32 (5)	21:12	9	06:11 (4)	21:55
	11	08:40	07:55	06:53			06:37		07:03 (5)	05:33		06:00 (4)	04:56
		16:28	17:26	18:21			20:19	29	07:32 (5)	21:13	10	06:10 (4)	21:55
	12	08:39	07:53	06:50			06:35		07:04 (5)	05:31		05:58 (4)	04:56
		16:30	17:28	18:23			20:20	27	07:31 (5)	21:15	11	06:09 (4)	21:56
	13	08:38	07:51	06:48			06:32		07:05 (5)	05:29		05:57 (4)	04:55
		16:31	17:30	18:25			20:22	25	07:30 (5)	21:17	12	06:09 (4)	21:57
	14	08:37	07:49	06:45			06:30		07:05 (5)	05:27		05:55 (4)	04:55
		16:33	17:32	18:27			20:24	22	07:27 (5)	21:18	12	06:07 (4)	21:58
	15	08:36	07:47	06:43			06:28		07:07 (5)	05:26		05:56 (4)	04:55
		16:35	17:34	18:29			20:26	18	07:25 (5)	21:20	10	06:06 (4)	21:58
	16	08:35	07:45	06:41			06:25		07:10 (5)	05:24		06:00 (4)	04:55
		16:36	17:36	18:30			20:28	13	07:23 (5)	21:22	1	06:01 (4)	21:59
	17	08:34	07:43	06:38			06:23			05:22			04:54
		16:38	17:38	18:32			20:30			21:23			21:59
	18	08:33	07:41	06:36			06:21			05:21			04:54
		16:40	17:40	18:34			20:32			21:25			22:00
	19	08:32	07:39	06:33			06:18			05:19			04:54
		16:42	17:42	18:36			20:33			21:27			22:00
	20	08:31	07:37	06:31			06:16			05:18			04:54
		16:43	17:44	18:38			20:35			21:28			22:00
	21	08:30	07:34	06:28			06:14			05:16			04:55
		16:45	17:46	18:40			20:37			21:30			22:01
	22	08:29	07:32	06:26			06:12			05:15			04:55
		16:47	17:48	18:42			20:39			21:31			22:01
	23	08:27	07:30	06:23			06:09			05:13			04:55
		16:49	17:50	18:44			20:41			21:33			22:01
	24	08:26	07:28	06:21			06:07			05:12			04:55
		16:51	17:52	18:45			20:43			21:34			22:01
	25	08:25	07:25	06:18			06:05			05:11			04:56
		16:53	17:54	18:47			20:44			21:36			22:01
	26	08:23	07:23	06:16			06:03			05:09			04:56
		16:54	17:56	18:49			20:46			21:37			22:01
	27	08:22	07:21	06:14			06:01			05:08			04:57
		16:56	17:58	18:51			20:48			21:39			22:01
	28	08:20	07:19	06:11			05:59			05:07			04:57
		16:58	18:00	18:53			20:50			21:40			22:01
	29	08:19		07:09			05:56			05:06			04:58
		17:00		19:55			20:52			21:41			22:01
	30	08:17		07:06		07:30 (5)	05:54			05:05			04:58
		17:02		19:56	3	07:33 (5)	20:54			21:43			22:00
	31	08:15		07:04		07:27 (5)				05:04			
		17:04		19:58	7	07:34 (5)				21:44			
Potential sun hours		250	273	367			420			494			510
Total, worst case				10			339			91			
Sun reduction				0.27			0.35			0.38			
Oper. time red.				1.00			1.00			1.00			
Wind dir. red.				0.67			0.67			0.67			
Total reduction				0.18			0.24			0.25			
Total, real				2			81			23			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AS - H45

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	06:09 (4)	06:33	07:02 (5)	07:26	07:24	08:19			
	22:00	21:25	11 06:20 (4)	20:18	29 07:31 (5)	19:05	16:54	16:10			
2	05:00	05:40	06:11 (4)	06:35	07:02 (5)	07:28	07:26	08:21			
	22:00	21:23	10 06:21 (4)	20:16	29 07:31 (5)	19:02	16:52	16:09			
3	05:00	05:42	06:12 (4)	06:37	07:04 (5)	07:30	07:28	08:22			
	21:59	21:21	9 06:21 (4)	20:14	28 07:32 (5)	19:00	16:50	16:09			
4	05:01	05:44	06:14 (4)	06:38	07:05 (5)	07:32	07:30	08:24			
	21:59	21:19	8 06:22 (4)	20:11	26 07:31 (5)	18:57	16:48	16:08			
5	05:02	05:46	06:16 (4)	06:40	07:07 (5)	07:33	07:32	08:25			
	21:58	21:17	6 06:22 (4)	20:09	24 07:31 (5)	18:55	16:46	16:07			
6	05:03	05:47	06:17 (4)	06:42	07:09 (5)	07:35	07:34	08:26			
	21:58	21:16	5 06:22 (4)	20:06	22 07:31 (5)	18:53	16:45	16:07			
7	05:04	05:49	06:19 (4)	06:44	07:10 (5)	07:37	07:36	08:28			
	21:57	21:14	3 06:22 (4)	20:04	20 07:30 (5)	18:50	16:43	16:06			
8	05:05	05:51	06:20 (4)	06:45	07:12 (5)	07:39	07:38	08:29			
	21:56	21:12	1 06:21 (4)	20:01	18 07:30 (5)	18:48	16:41	16:06			
9	05:06	05:52		06:47	07:14 (5)	07:41	07:40	08:30			
	21:55	21:10		19:59	16 07:30 (5)	18:45	16:39	16:06			
10	05:07	05:54		06:49	07:16 (5)	07:43	07:42	08:32			
	21:55	21:08		19:57	13 07:29 (5)	18:43	16:37	16:05			
11	05:08	05:56		06:51	07:17 (5)	07:44	07:44	08:33			
	21:54	21:06		19:54	10 07:27 (5)	18:41	16:36	16:05			
12	05:09	05:58		06:52	07:19 (5)	07:46	07:46	08:34			
	21:53	21:03		19:52	7 07:26 (5)	18:38	16:34	16:05			
13	05:11	05:59		06:54	07:21 (5)	07:48	07:47	08:35			
	21:52	21:01		19:49	4 07:25 (5)	18:36	16:32	16:05			
14	05:12	06:01		06:56		07:50	07:49	08:36			
	21:51	20:59		19:47		18:34	16:31	16:05			
15	05:13	06:03		06:58		07:52	07:51	08:37			
	21:50	20:57		19:44		18:31	16:29	16:05			
16	05:15	06:05		06:59		07:54	07:53	08:38			
	21:49	20:55		19:42		18:29	16:28	16:05			
17	05:16	06:06		07:01		07:56	07:55	08:39			
	21:47	20:53		19:39		18:27	16:26	16:05			
18	05:17	06:08		07:03		07:57	07:57	08:39			
	21:46	20:51		19:37		18:24	16:25	16:05			
19	05:19	06:10		07:05		07:59	07:59	08:40			
	21:45	20:48		19:34		18:22	16:23	16:05			
20	05:20	06:12		07:06		08:01	08:01	08:41			
	21:44	20:46		19:32		18:20	16:22	16:06			
21	05:21	06:13		07:08		08:03	08:02	08:41			
	21:42	20:44		19:29		18:18	16:21	16:06			
22	05:23	06:15		07:10		08:05	08:04	08:42			
	21:41	20:42		19:27		18:15	16:19	16:07			
23	05:24	06:17		07:12		08:07	08:06	08:42			
	21:39	20:39		19:24		18:13	16:18	16:07			
24	05:26	06:19		07:14		08:09	08:08	08:43			
	21:38	20:37		19:22		18:11	16:17	16:08			
25	05:27	06:21		07:15		07:11	08:09	08:43			
	21:36	20:35		19:19		17:09	16:16	16:08			
26	05:29	06:22	07:16 (5)	07:17		07:13	08:11	08:43			
	21:35	20:32	4 07:20 (5)	19:17		17:07	16:15	16:09			
27	05:31	06:24	07:11 (5)	07:19		07:15	08:13	08:44			
	21:33	20:30	14 07:25 (5)	19:15		17:05	16:14	16:10			
28	05:32	06:26	07:09 (5)	07:21		07:17	08:14	08:44			
	21:32	20:28	18 07:27 (5)	19:12		17:02	16:13	16:11			
29	05:34	06:06 (4)	06:28	07:06 (5)	07:23	07:18	08:16	08:44			
	21:30	11 06:17 (4)	20:25	22 07:28 (5)	19:10	17:00	16:12	16:12			
30	05:35	06:06 (4)	06:29	07:05 (5)	07:24	07:20	08:18	08:44			
	21:28	12 06:18 (4)	20:23	25 07:30 (5)	19:07	16:58	16:11	16:13			
31	05:37	06:08 (4)	06:31	07:04 (5)		07:22		08:44			
	21:27	12 06:20 (4)	20:21	27 07:31 (5)		16:56		16:14			
Potential sun hours	512		460	382		328	259	233			
Total, worst case	41		163	246							
Sun reduction	0.32		0.34	0.32							
Oper. time red.	1.00		1.00	1.00							
Wind dir. red.	0.67		0.67	0.67							
Total reduction	0.22		0.23	0.22							
Total, real	9		37	53							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AT - H46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	05:52	06:18 (4)
	16:15	17:06	18:02	20:00	20:55	13 06:31 (4)
2	08:44	08:12	07:14	06:59	05:50	06:16 (4)
	16:16	17:08	18:04	20:02	20:57	14 06:30 (4)
3	08:44	08:10	07:12	06:56	05:48	06:14 (4)
	16:17	17:10	18:06	20:04	20:59	15 06:29 (4)
4	08:43	08:09	07:09	06:54	05:46	06:12 (4)
	16:18	17:12	18:08	20:06	21:01	16 06:28 (4)
5	08:43	08:07	07:07	06:52	05:44	06:10 (4)
	16:20	17:14	18:10	20:08	21:03	17 06:27 (4)
6	08:43	08:05	07:05	06:49	05:42	06:09 (4)
	16:21	17:16	18:11	20:09	21:04	18 06:27 (4)
7	08:42	08:03	07:02	06:47	05:40	06:10 (4)
	16:22	17:18	18:13	20:11	21:06	15 06:25 (4)
8	08:42	08:01	07:00	06:44	05:38	06:12 (4)
	16:24	17:20	18:15	20:13	21:08	11 06:23 (4)
9	08:41	07:59	06:57	07:22 (5)	05:36	04:57
	16:25	17:22	18:17	20:15	21:10	21:54
10	08:40	07:57	06:55	07:19 (5)	05:35	04:56
	16:27	17:24	18:19	20:17	21:12	21:55
11	08:40	07:55	06:53	07:17 (5)	05:33	04:56
	16:28	17:26	18:21	20:19	21:13	21:55
12	08:39	07:53	06:50	07:14 (5)	05:31	04:56
	16:30	17:28	18:23	20:20	21:15	21:56
13	08:38	07:51	06:48	07:12 (5)	05:29	04:55
	16:31	17:30	18:25	20:22	21:17	21:57
14	08:37	07:49	06:45	07:09 (5)	05:27	04:55
	16:33	17:32	18:27	20:24	21:18	21:58
15	08:36	07:47	06:43	07:07 (5)	05:26	04:55
	16:35	17:34	18:29	20:26	21:20	21:58
16	08:35	07:45	06:40	07:04 (5)	05:24	04:55
	16:36	17:36	18:30	20:28	21:22	21:59
17	08:34	07:43	06:38	07:02 (5)	05:22	04:54
	16:38	17:38	18:32	20:30	21:23	21:59
18	08:33	07:41	06:36	06:59 (5)	05:21	04:54
	16:40	17:40	18:34	20:32	21:25	22:00
19	08:32	07:39	06:33	06:57 (5)	05:19	04:54
	16:41	17:42	18:36	20:33	21:27	22:00
20	08:31	07:37	06:31	06:54 (5)	05:18	04:54
	16:43	17:44	18:38	20:35	21:28	22:00
21	08:30	07:34	06:28	06:52 (5)	05:16	04:55
	16:45	17:46	18:40	20:37	21:30	22:01
22	08:29	07:32	06:26	06:49 (5)	05:15	04:55
	16:47	17:48	18:42	20:39	21:31	22:01
23	08:27	07:30	06:23	06:48 (5)	05:13	04:55
	16:49	17:50	18:43	20:41	21:33	22:01
24	08:26	07:28	06:21	06:49 (5)	05:12	04:55
	16:51	17:52	18:45	20:43	21:34	22:01
25	08:25	07:25	06:18	06:49 (5)	05:11	04:56
	16:53	17:54	18:47	20:44	2 06:32 (4)	22:01
26	08:23	07:23	06:16	06:50 (5)	05:09	04:56
	16:54	17:56	18:49	20:46	4 06:32 (4)	22:01
27	08:22	07:21	06:14	06:50 (5)	05:08	04:57
	16:56	17:58	18:51	20:48	6 06:32 (4)	22:01
28	08:20	07:19	06:11	06:52 (5)	05:07	04:57
	16:58	18:00	18:53	20:50	8 06:32 (4)	22:01
29	08:19		07:09	07:53 (5)	05:06	04:58
	17:00		19:55	24 08:17 (5)	10 06:32 (4)	22:01
30	08:17		07:06	07:55 (5)	05:05	04:58
	17:02		19:56	19 08:14 (5)	11 06:31 (4)	22:00
31	08:15		07:04	07:58 (5)	05:04	
	17:04		19:58	12 08:10 (5)	21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case			558	41	119	16
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.66	0.68	0.68	0.66
Total reduction			0.18	0.24	0.26	0.21
Total, real			101	10	31	3

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AT - H46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (5) 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (5) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:56 (5) 16:50	08:22 16:09
4	05:01 21:59	05:44 21:19	06:24 (4) 20:11	07:32 18:57	07:58 (5) 16:48	08:24 16:08
5	05:02 21:58	05:46 21:17	06:22 (4) 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:16	06:19 (4) 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57	05:49 21:14	06:19 (4) 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56	05:51 21:12	06:20 (4) 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:22 (4) 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55	05:54 21:08	06:24 (4) 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54	05:56 21:06	06:25 (4) 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	05:09 21:53	05:58 21:03	06:27 (4) 19:52	07:51 (5) 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52	05:59 21:01	06:28 (4) 19:49	07:47 (5) 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:30 (4) 19:47	07:43 (5) 18:34	07:50 16:31	08:36 16:05
15	05:13 21:50	06:03 20:57	06:32 (4) 19:44	07:41 (5) 18:31	07:52 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	06:33 (4) 19:42	07:40 (5) 18:29	07:54 16:28	08:38 16:05
17	05:16 21:47	06:06 20:53	06:35 (4) 19:39	07:39 (5) 18:27	07:56 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	06:37 (4) 19:37	07:37 (5) 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:36 (5) 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	07:35 (5) 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	07:35 (5) 18:18	08:03 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	07:36 (5) 18:15	08:05 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	07:38 (5) 18:13	08:07 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	07:40 (5) 18:11	08:09 16:17	08:43 16:08
25	05:27 21:36	06:21 20:35	07:15 19:19	07:42 (5) 18:09	07:11 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:43 (5) 18:07	07:13 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:45 (5) 18:04	07:15 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:47 (5) 18:02	07:17 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:49 (5) 18:00	07:18 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:51 (5) 17:58	07:20 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case		166	530	35		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.68	0.66	0.66		
Total reduction		0.23	0.21	0.19		
Total, real		38	113	7		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AU - H47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01	07:25 (5)	05:52				05:03	05:34 (3)	
	16:15	17:06	18:02						20:00	12	07:37 (5)	20:55			21:45	17	05:51 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50			05:02		05:33 (3)
	16:16	17:08	18:04						20:02	14	07:37 (5)	20:57			21:47	17	05:50 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48			05:01		05:32 (3)
	16:17	17:10	18:06						20:04	16	07:36 (5)	20:59			21:48	17	05:49 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46			05:00		05:32 (3)
	16:18	17:12	18:08						20:06	17	07:35 (5)	21:01			21:49	17	05:49 (3)
5	08:43	08:07	07:07						06:52		07:15 (5)	05:44			04:59		05:34 (3)
	16:20	17:14	18:10						20:08	18	07:33 (5)	21:03			21:50	15	05:49 (3)
6	08:43	08:05	07:05						06:49		07:15 (5)	05:42			04:59		05:34 (3)
	16:21	17:16	18:11						20:09	17	07:32 (5)	21:04			21:51	14	05:48 (3)
7	08:42	08:03	07:02						06:47		07:17 (5)	05:40			04:58		05:36 (3)
	16:22	17:18	18:13						20:11	13	07:30 (5)	21:06			21:52	12	05:48 (3)
8	08:42	08:01	07:00						06:44		07:20 (5)	05:38			04:57		05:36 (3)
	16:24	17:20	18:15						20:13	6	07:26 (5)	21:08			21:53	11	05:47 (3)
9	08:41	07:59	06:57						06:42			05:36			04:57		05:38 (3)
	16:25	17:22	18:17						20:15			21:10			21:54	9	05:47 (3)
10	08:40	07:57	06:55						06:40			05:35			04:56		05:38 (3)
	16:27	17:24	18:19						20:17			21:12			21:55	7	05:45 (3)
11	08:40	07:55	06:53						06:37			05:33			04:56		05:40 (3)
	16:28	17:26	18:21						20:19			21:13			21:56	5	05:45 (3)
12	08:39	07:53	06:50						06:35			05:31			04:56		
	16:30	17:28	18:23						20:21			21:15			21:56		
13	08:38	07:51	06:48						06:32			05:29			04:55		
	16:31	17:30	18:25						20:22			21:17			21:57		
14	08:37	07:49	06:45						06:30			05:27			04:55		
	16:33	17:32	18:27						20:24			21:18			21:58		
15	08:36	07:47	06:43						06:28			05:26			04:55		
	16:35	17:34	18:29						20:26			21:20			21:58		
16	08:35	07:45	06:41						06:25			05:24			04:55		
	16:36	17:36	18:30						20:28			21:22			21:59		
17	08:34	07:43	06:38						06:23			05:22			04:54		
	16:38	17:38	18:32						20:30			21:23			21:59		
18	08:33	07:41	06:36						06:21		05:49 (3)	04:54					
	16:40	17:40	18:34						20:32		21:25	2	05:51 (3)	22:00			
19	08:32	07:39	06:33						06:19		05:19	05:48 (3)	04:54				
	16:42	17:42	18:36						20:33		21:27	4	05:52 (3)	22:00			
20	08:31	07:37	06:31						06:16		05:18	05:46 (3)	04:55				
	16:43	17:44	18:38						20:35		21:28	5	05:51 (3)	22:00			
21	08:30	07:34	06:28						06:14		05:16	05:45 (3)	04:55				
	16:45	17:46	18:40						20:37		21:30	7	05:52 (3)	22:01			
22	08:29	07:32	06:26						06:12		05:15	05:44 (3)	04:55				
	16:47	17:48	18:42						20:39		21:31	8	05:52 (3)	22:01			
23	08:27	07:30	06:23						06:09		05:13	05:43 (3)	04:55				
	16:49	17:50	18:44						20:41		21:33	9	05:52 (3)	22:01			
24	08:26	07:28	06:21						06:07		05:12	05:41 (3)	04:55				
	16:51	17:52	18:45						20:43		21:34	10	05:51 (3)	22:01			
25	08:25	07:25	06:18						06:05		05:11	05:40 (3)	04:56				
	16:53	17:54	18:47						20:44		21:36	11	05:51 (3)	22:01			
26	08:23	07:23	06:16						06:03		05:10	05:39 (3)	04:56				
	16:54	17:56	18:49						20:46		21:37	12	05:51 (3)	22:01			
27	08:22	07:21	06:14						06:01		05:08	05:38 (3)	04:57				
	16:56	17:58	18:51						20:48		21:39	13	05:51 (3)	22:01			
28	08:20	07:19	06:11					06:35 (5)	05:59		05:07	05:37 (3)	04:57				
	16:58	18:00				2	06:37 (5)	20:50			21:40	14	05:51 (3)	22:01			
29	08:19		07:09				07:32 (5)	05:56			05:06	05:36 (3)	04:58				
	17:00		19:55			5	07:37 (5)	20:52			21:41	15	05:51 (3)	22:01			
30	08:17		07:06				07:30 (5)	05:54			05:05	05:35 (3)	04:58				
	17:02		19:56			8	07:38 (5)	20:54			21:43	16	05:51 (3)	22:00			
31	08:15		07:04				07:27 (5)				05:04	05:34 (3)					
	17:04		19:58			10	07:37 (5)				21:44	16	05:50 (3)				
Potential sun hours	250	273	367					420			494		510				
Total, worst case						25		113			142		141				
Sun reduction						0.27		0.35			0.38		0.32				
Oper. time red.						1.00		1.00			1.00		1.00				
Wind dir. red.						0.68		0.68			0.65		0.65				
Total reduction						0.18		0.24			0.25		0.21				
Total, real						5		27			35		29				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AU - H47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:45 (3)	05:39	06:33		07:26	07:24	08:19			
	22:00	3 05:48 (3)	21:25	20:18		19:05	16:54	16:10			
2	05:00	05:44 (3)	05:40	06:35		07:28	07:26	08:21			
	22:00	6 05:50 (3)	21:23	20:16		19:02	16:52	16:09			
3	05:00	05:42 (3)	05:42	06:37		07:30	07:28	08:22			
	21:59	9 05:51 (3)	21:21	20:14		19:00	16:50	16:09			
4	05:01	05:42 (3)	05:44	06:38		07:32	07:30	08:24			
	21:59	10 05:52 (3)	21:19	20:11	6	07:23 (5)	18:57	16:48	16:08		
5	05:02	05:41 (3)	05:46	06:40		07:13 (5)	07:33	07:32	08:25		
	21:58	12 05:53 (3)	21:17	20:09	13	07:26 (5)	18:55	16:46	16:07		
6	05:03	05:41 (3)	05:47	06:42		07:12 (5)	07:35	07:34	08:26		
	21:58	13 05:54 (3)	21:16	20:06	16	07:28 (5)	18:53	16:45	16:07		
7	05:04	05:40 (3)	05:49	06:44		07:10 (5)	07:37	07:36	08:28		
	21:57	15 05:55 (3)	21:14	20:04	18	07:28 (5)	18:50	16:43	16:06		
8	05:05	05:40 (3)	05:51	06:45		07:12 (5)	07:39	07:38	08:29		
	21:56	16 05:56 (3)	21:12	20:01	17	07:29 (5)	18:48	16:41	16:06		
9	05:06	05:40 (3)	05:52	06:47		07:14 (5)	07:41	07:40	08:30		
	21:55	17 05:57 (3)	21:10	19:59	16	07:30 (5)	18:45	16:39	16:06		
10	05:07	05:40 (3)	05:54	06:49		07:16 (5)	07:43	07:42	08:32		
	21:55	17 05:57 (3)	21:08	19:57	14	07:30 (5)	18:43	16:37	16:05		
11	05:08	05:41 (3)	05:56	06:51		07:17 (5)	07:44	07:44	08:33		
	21:54	17 05:58 (3)	21:06	19:54	12	07:29 (5)	18:41	16:36	16:05		
12	05:10	05:42 (3)	05:58	06:52		07:19 (5)	07:46	07:46	08:34		
	21:53	16 05:58 (3)	21:04	19:52	10	07:29 (5)	18:38	16:34	16:05		
13	05:11	05:43 (3)	05:59	06:54		07:21 (5)	07:48	07:47	08:35		
	21:52	16 05:59 (3)	21:01	19:49	8	07:29 (5)	18:36	16:32	16:05		
14	05:12	05:44 (3)	06:01	06:56		07:22 (5)	07:50	07:49	08:36		
	21:51	15 05:59 (3)	20:59	19:47	6	07:28 (5)	18:34	16:31	16:05		
15	05:13	05:45 (3)	06:03	06:58		07:24 (5)	07:52	07:51	08:37		
	21:50	15 06:00 (3)	20:57	19:44	3	07:27 (5)	18:31	16:29	16:05		
16	05:15	05:47 (3)	06:05	06:59			07:54	07:53	08:38		
	21:49	14 06:01 (3)	20:55	19:42			18:29	16:28	16:05		
17	05:16	05:48 (3)	06:06	07:01			07:56	07:55	08:39		
	21:47	13 06:01 (3)	20:53	19:39			18:27	16:26	16:05		
18	05:17	05:49 (3)	06:08	07:03			07:57	07:57	08:39		
	21:46	12 06:01 (3)	20:51	19:37			18:24	16:25	16:05		
19	05:19	05:51 (3)	06:10	07:05			07:59	07:59	08:40		
	21:45	11 06:02 (3)	20:48	19:34			18:22	16:23	16:05		
20	05:20	05:52 (3)	06:12	07:07			08:01	08:01	08:41		
	21:44	10 06:02 (3)	20:46	19:32			18:20	16:22	16:06		
21	05:21	05:53 (3)	06:14	07:08			08:03	08:02	08:41		
	21:42	9 06:02 (3)	20:44	19:29			18:18	16:21	16:06		
22	05:23	05:55 (3)	06:15	07:10			08:05	08:04	08:42		
	21:41	7 06:02 (3)	20:42	19:27			18:15	16:19	16:07		
23	05:24	05:56 (3)	06:17	07:12			08:07	08:06	08:42		
	21:39	6 06:02 (3)	20:39	19:24			18:13	16:18	16:07		
24	05:26	05:57 (3)	06:19	07:14			08:09	08:08	08:43		
	21:38	5 06:02 (3)	20:37	19:22			18:11	16:17	16:08		
25	05:28	05:59 (3)	06:21	07:15			07:11	08:09	08:43		
	21:36	3 06:02 (3)	20:35	19:19			17:09	16:16	16:08		
26	05:29	06:00 (3)	06:22	07:17			07:13	08:11	08:43		
	21:35	1 06:01 (3)	20:33	19:17			17:07	16:15	16:09		
27	05:31		06:24	07:19			07:15	08:13	08:44		
	21:33		20:30	19:15			17:05	16:14	16:10		
28	05:32		06:26	07:21			07:17	08:14	08:44		
	21:32		20:28	19:12			17:02	16:13	16:11		
29	05:34		06:28	07:23			07:19	08:16	08:44		
	21:30		20:25	19:10			17:00	16:12	16:12		
30	05:36		06:29	07:24			07:20	08:18	08:44		
	21:28		20:23	19:07			16:58	16:11	16:13		
31	05:37		06:31				07:22		08:44		
	21:27		20:21				16:56		16:14		
Potential sun hours	512		460	382			328	259	233		
Total, worst case	288			139							
Sun reduction	0.32			0.32							
Oper. time red.	1.00			1.00							
Wind dir. red.	0.65			0.68							
Total reduction	0.21			0.22							
Total, real	61			30							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AV - H48

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01	07:25 (5)	05:52				05:03	05:39 (3)	
	16:15	17:06	18:02						20:00	12	07:37 (5)	20:55			21:45	12	05:51 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50			05:02		05:41 (3)
	16:16	17:08	18:04						20:02	14	07:37 (5)	20:57			21:47	8	05:49 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48			05:01		05:42 (3)
	16:17	17:10	18:06						20:04	15	07:35 (5)	20:59			21:48	5	05:47 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46			05:00		
	16:18	17:12	18:08						20:06	17	07:35 (5)	21:01			21:49		
5	08:43	08:07	07:07						06:52		07:16 (5)	05:44			04:59		
	16:20	17:14	18:10						20:08	16	07:32 (5)	21:03			21:50		
6	08:43	08:05	07:05						06:49		07:18 (5)	05:42			04:59		
	16:21	17:16	18:11						20:09	13	07:31 (5)	21:04			21:51		
7	08:42	08:03	07:02						06:47		07:21 (5)	05:40			04:58		
	16:22	17:18	18:13						20:11	7	07:28 (5)	21:06			21:52		
8	08:42	08:01	07:00						06:44			05:38			04:57		
	16:24	17:20	18:15						20:13			21:08			21:53		
9	08:41	07:59	06:57						06:42			05:36			04:57		
	16:25	17:22	18:17						20:15			21:10			21:54		
10	08:40	07:57	06:55						06:40			05:35			04:56		
	16:27	17:24	18:19						20:17			21:12			21:55		
11	08:40	07:55	06:53						06:37			05:33			04:56		
	16:28	17:26	18:21						20:19			21:13			21:56		
12	08:39	07:53	06:50						06:35			05:31			04:56		
	16:30	17:28	18:23						20:21			21:15			21:56		
13	08:38	07:51	06:48						06:32			05:29			04:55		
	16:31	17:30	18:25						20:22			21:17			21:57		
14	08:37	07:49	06:45						06:30			05:27			04:55		
	16:33	17:32	18:27						20:24			21:18			21:58		
15	08:36	07:47	06:43						06:28			05:26		05:54 (3)	04:55		
	16:35	17:34	18:29						20:26			21:20	1	05:55 (3)	21:58		
16	08:35	07:45	06:41						06:25			05:24		05:52 (3)	04:55		
	16:36	17:36	18:30						20:28			21:22	3	05:55 (3)	21:59		
17	08:34	07:43	06:38						06:23			05:22		05:51 (3)	04:54		
	16:38	17:38	18:32						20:30			21:23	5	05:56 (3)	21:59		
18	08:33	07:41	06:36						06:21			05:21		05:49 (3)	04:54		
	16:40	17:40	18:34						20:32			21:25	6	05:55 (3)	22:00		
19	08:32	07:39	06:33						06:19			05:19		05:48 (3)	04:54		
	16:42	17:42	18:36						20:33			21:27	8	05:56 (3)	22:00		
20	08:31	07:37	06:31						06:16			05:18		05:46 (3)	04:55		
	16:43	17:44	18:38						20:35			21:28	9	05:55 (3)	22:00		
21	08:30	07:34	06:28						06:14			05:16		05:45 (3)	04:55		
	16:45	17:46	18:40						20:37			21:30	10	05:55 (3)	22:01		
22	08:29	07:32	06:26						06:12			05:15		05:44 (3)	04:55		
	16:47	17:48	18:42						20:39			21:31	11	05:55 (3)	22:01		
23	08:27	07:30	06:23						06:09			05:13		05:43 (3)	04:55		
	16:49	17:50	18:44						20:41			21:33	12	05:55 (3)	22:01		
24	08:26	07:28	06:21						06:07			05:12		05:41 (3)	04:55		
	16:51	17:52	18:45						20:43			21:34	13	05:54 (3)	22:01		
25	08:25	07:25	06:18						06:05			05:11		05:40 (3)	04:56		
	16:53	17:54	18:47						20:44			21:36	14	05:54 (3)	22:01		
26	08:23	07:23	06:16						06:03			05:10		05:39 (3)	04:56		
	16:54	17:56	18:49						20:46			21:37	15	05:54 (3)	22:01		
27	08:22	07:21	06:14						06:01			05:08		05:38 (3)	04:57		
	16:56	17:58	18:51						20:48			21:39	15	05:53 (3)	22:01		
28	08:20	07:19	06:11					06:35 (5)	05:59			05:07		05:37 (3)	04:57		
	16:58	18:00					3	06:38 (5)	20:50			21:40	16	05:53 (3)	22:01		
29	08:19		07:09					07:32 (5)	05:56			05:06		05:36 (3)	04:58		
	17:00		19:55				6	07:38 (5)	20:52			21:41	16	05:52 (3)	22:01		
30	08:17		07:06					07:30 (5)	05:54			05:05		05:37 (3)	04:58		
	17:02		19:56				8	07:38 (5)	20:54			21:43	14	05:51 (3)	22:00		
31	08:15		07:04					07:27 (5)				05:04		05:38 (3)			
	17:04		19:58				10	07:37 (5)				21:44	13	05:51 (3)			
Potential sun hours	250	273	367					420				494		510			
Total, worst case						27		94				181		25			
Sun reduction						0.27		0.35				0.38		0.32			
Oper. time red.						1.00		1.00				1.00		1.00			
Wind dir. red.						0.68		0.68				0.66		0.66			
Total reduction						0.18		0.24				0.25		0.21			
Total, real						5		22				45		5			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AV - H48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	06:33			07:26	07:24	08:19			
	22:00	21:25	20:18			19:05	16:54	16:10			
2	05:00	05:40	06:35			07:28	07:26	08:21			
	22:00	21:23	20:16			19:02	16:52	16:09			
3	05:01	05:42	06:37			07:30	07:28	08:22			
	21:59	21:21	20:14			19:00	16:50	16:09			
4	05:01	05:44	06:38			07:32	07:30	08:24			
	21:59	21:19	20:11			18:57	16:48	16:08			
5	05:02	05:46	06:40		07:17 (5)	07:33	07:32	08:25			
	21:58	21:17	20:09	7	07:24 (5)	18:55	16:46	16:07			
6	05:03	05:47	06:42		07:14 (5)	07:35	07:34	08:26			
	21:58	21:16	20:06	13	07:27 (5)	18:53	16:45	16:07			
7	05:04	05:49	06:44		07:11 (5)	07:37	07:36	08:28			
	21:57	21:14	20:04	16	07:27 (5)	18:50	16:43	16:06			
8	05:05	05:51	06:45		07:12 (5)	07:39	07:38	08:29			
	21:56	21:12	20:01	17	07:29 (5)	18:48	16:41	16:06			
9	05:06	05:52	06:47		07:14 (5)	07:41	07:40	08:30			
	21:55	21:10	19:59	16	07:30 (5)	18:45	16:39	16:06			
10	05:07	05:49 (3)	05:54	06:49		07:16 (5)	07:43	07:42	08:32		
	21:55	05:56 (3)	21:08	19:57	14	07:30 (5)	18:43	16:37	16:05		
11	05:08	05:47 (3)	05:56	06:51		07:17 (5)	07:44	07:44	08:33		
	21:54	05:57 (3)	21:06	19:54	12	07:29 (5)	18:41	16:36	16:05		
12	05:10	05:46 (3)	05:58	06:52		07:19 (5)	07:46	07:46	08:34		
	21:53	05:59 (3)	21:04	19:52	10	07:29 (5)	18:38	16:34	16:05		
13	05:11	05:46 (3)	05:59	06:54		07:21 (5)	07:48	07:47	08:35		
	21:52	06:00 (3)	21:01	19:49	8	07:29 (5)	18:36	16:32	16:05		
14	05:12	05:45 (3)	06:01	06:56		07:22 (5)	07:50	07:49	08:36		
	21:51	06:00 (3)	20:59	19:47	6	07:28 (5)	18:34	16:31	16:05		
15	05:13	05:45 (3)	06:03	06:58		07:24 (5)	07:52	07:51	08:37		
	21:50	06:01 (3)	20:57	19:44	3	07:27 (5)	18:31	16:29	16:05		
16	05:15	05:47 (3)	06:05	06:59		07:26 (5)	07:54	07:53	08:38		
	21:49	06:03 (3)	20:55	19:42	1	07:27 (5)	18:29	16:28	16:05		
17	05:16	05:48 (3)	06:06	07:01		07:56	07:55	08:39			
	21:47	06:03 (3)	20:53	19:39		18:27	16:26	16:05			
18	05:17	05:49 (3)	06:08	07:03		07:57	07:57	08:39			
	21:46	06:03 (3)	20:51	19:37		18:24	16:25	16:05			
19	05:19	05:51 (3)	06:10	07:05		07:59	07:59	08:40			
	21:45	06:05 (3)	20:48	19:34		18:22	16:23	16:05			
20	05:20	05:52 (3)	06:12	07:07		08:01	08:01	08:41			
	21:44	06:05 (3)	20:46	19:32		18:20	16:22	16:06			
21	05:21	05:53 (3)	06:14	07:08		08:03	08:02	08:41			
	21:42	06:05 (3)	20:44	19:29		18:18	16:21	16:06			
22	05:23	05:55 (3)	06:15	07:10		08:05	08:04	08:42			
	21:41	06:06 (3)	20:42	19:27		18:15	16:19	16:07			
23	05:24	05:56 (3)	06:17	07:12		08:07	08:06	08:42			
	21:39	06:06 (3)	20:39	19:24		18:13	16:18	16:07			
24	05:26	05:57 (3)	06:19	07:14		08:09	08:08	08:43			
	21:38	06:05 (3)	20:37	19:22		18:11	16:17	16:08			
25	05:28	05:59 (3)	06:21	07:15		07:11	08:09	08:43			
	21:37	06:06 (3)	20:35	19:19		17:09	16:16	16:08			
26	05:29	06:00 (3)	06:22	07:17		07:13	08:11	08:43			
	21:35	06:06 (3)	20:33	19:17		17:07	16:15	16:09			
27	05:31	06:02 (3)	06:24	07:19		07:15	08:13	08:44			
	21:33	06:06 (3)	20:30	19:15		17:05	16:14	16:10			
28	05:32	06:03 (3)	06:26	07:21		07:17	08:14	08:44			
	21:32	06:05 (3)	20:28	19:12		17:02	16:13	16:11			
29	05:34	06:05 (3)	06:28	07:23		07:19	08:16	08:44			
	21:30	06:06 (3)	20:25	19:10		17:00	16:12	16:12			
30	05:36		06:29	07:24		07:20	08:18	08:44			
	21:28		20:23	19:07		16:58	16:11	16:13			
31	05:37		06:31			07:22		08:44			
	21:27		20:21			16:56		16:14			
Potential sun hours	512		460	382		328	259	233			
Total, worst case	208			123							
Sun reduction	0.32			0.32							
Oper. time red.	1.00			1.00							
Wind dir. red.	0.66			0.68							
Total reduction	0.21			0.22							
Total, real	44			27							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AW - H49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	18:44 (4)	05:52
	16:15	17:06	18:02	20:00	40	19:31 (3)
2	08:44	08:12	07:14	06:59	18:46 (4)	05:50
	16:16	17:08	18:04	20:02	32	19:29 (3)
3	08:43	08:10	07:11	06:56	19:12 (3)	05:48
	16:17	17:10	18:06	20:04	15	19:27 (3)
4	08:43	08:08	07:09	06:54	19:14 (3)	05:46
	16:18	17:12	18:07	20:06	11	19:25 (3)
5	08:43	08:07	07:07	06:51		05:44
	16:19	17:14	18:09	20:07		20:28 (2)
6	08:42	08:05	07:04	06:49	4	20:32 (2)
	16:21	17:16	18:11	20:09		20:26 (2)
7	08:42	08:03	07:02	06:47	7	20:33 (2)
	16:22	17:18	18:13	20:11		21:51
8	08:42	08:01	07:00	06:44	10	20:26 (2)
	16:24	17:20	18:15	20:13		20:25 (2)
9	08:41	07:59	06:57	06:42	12	20:37 (2)
	16:25	17:22	18:17	20:15		21:53
10	08:40	07:57	06:55	06:39	15	20:24 (2)
	16:26	17:24	18:19	20:17		20:39 (2)
11	08:40	07:55	06:52	06:37	17	20:23 (2)
	16:28	17:26	18:21	20:19		21:55
12	08:39	07:53	06:50	06:35	19	20:42 (2)
	16:30	17:28	18:23	20:20		20:22 (2)
13	08:38	07:51	06:48	06:32	21	20:43 (2)
	16:31	17:30	18:25	20:22		21:56
14	08:37	07:49	06:45	06:30	23	20:21 (2)
	16:33	17:32	18:27	20:24		21:57
15	08:36	07:47	06:43	06:28	25	20:44 (2)
	16:34	17:34	18:28	20:26		21:57
16	08:35	07:45	06:40	06:25	27	20:21 (2)
	16:36	17:36	18:30	20:28		21:58
17	08:34	07:43	06:38	06:23	28	20:22 (2)
	16:38	17:38	18:32	20:30		21:59
18	08:33	07:41	06:35	06:21	29	20:50 (2)
	16:40	17:40	18:34	20:31		21:59
19	08:32	07:39	06:33	06:18	29	20:22 (2)
	16:41	17:42	18:36	20:33		22:00
20	08:31	07:36	06:31	06:16	29	20:51 (2)
	16:43	17:44	18:38	20:35		22:00
21	08:30	07:34	06:28	06:14	28	20:22 (2)
	16:45	17:46	18:40	20:37		22:01
22	08:28	07:32	06:26	06:12	28	20:50 (2)
	16:47	17:48	18:41	20:39		22:01
23	08:27	07:30	06:23	06:09	27	20:23 (2)
	16:49	17:50	18:43	20:41		22:01
24	08:26	07:28	06:21	06:07	26	20:49 (2)
	16:50	17:52	18:45	20:42		22:01
25	08:24	07:25	06:18	06:05	26	20:24 (2)
	16:52	17:54	18:47	20:44		22:01
26	08:23	07:23	06:16	06:03	25	20:49 (2)
	16:54	17:56	18:49	20:46		22:01
27	08:22	07:21	06:13	06:01	24	20:25 (2)
	16:56	17:58	18:51	20:48		22:01
28	08:20	07:18	06:11	05:58	23	20:48 (2)
	16:58	18:00	18:53	20:50		22:01
29	08:18		07:08	05:56	22	20:27 (2)
	17:00		19:54	20:52		04:57
30	08:17		07:06	05:54	20	20:47 (2)
	17:02		19:56	20:53		22:01
31	08:15		07:04	05:50	19	20:28 (2)
	17:04		19:58	20:53		22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case		251	676	98	580	55
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.67	0.67	0.64	0.64
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		39	124	23	141	11

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AW - H49

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:32 (2)	06:33		07:26	18:26 (4)	07:24	16:14 (5)	08:19	
	22:00	21:25	20:53 (2)	20:18		19:05	18:36 (4)	16:54	16:23 (5)	16:10	
2	04:59	05:40	20:33 (2)	06:35		07:28	18:28 (4)	07:26	16:15 (5)	08:21	
	22:00	21:23	20:52 (2)	20:16		19:02	18:33 (4)	16:52	16:21 (5)	16:09	
3	05:00	05:42	20:33 (2)	06:36		07:30		07:28	16:16 (5)	08:22	
	21:59	21:21	20:50 (2)	20:13		19:00		16:50	16:19 (5)	16:08	
4	05:01	05:44	20:34 (2)	06:38		07:31		07:30		08:24	
	21:59	21:19	20:48 (2)	20:11		18:57		16:48		16:08	
5	05:02	05:45	20:34 (2)	06:40		07:33		07:32		08:25	
	21:58	21:17	20:46 (2)	20:09		18:55		16:46		16:07	
6	05:03	05:47	20:36 (2)	06:42		07:35		07:34		08:26	
	21:58	21:15	20:45 (2)	20:06		18:52		16:44		16:07	
7	05:04	05:49	20:37 (2)	06:43		07:37		07:36		08:28	
	21:57	21:13	20:43 (2)	20:04		18:50		16:43		16:06	
8	05:05	05:50	20:38 (2)	06:45	19:09 (3)	07:39		07:38		08:29	
	21:56	21:11	20:41 (2)	20:01	19:19 (3)	18:48		16:41		16:06	
9	05:06	05:52		06:47	19:06 (3)	07:41		07:40		08:30	
	21:55	21:09		19:59	19:21 (3)	18:45		16:39		16:05	
10	05:07	05:54		06:49	18:40 (4)	07:42		07:42		08:31	
	21:55	21:07		19:56	19:22 (3)	18:43		16:37		16:05	
11	05:08	05:56		06:50	18:37 (4)	07:44		07:44		08:33	
	21:54	21:05		19:54	19:23 (3)	18:40		16:35		16:05	
12	05:09	05:57		06:52	18:34 (4)	07:46		07:45		08:34	
	21:53	21:03		19:51	19:24 (3)	18:38		16:34		16:05	
13	05:10	05:59		06:54	18:32 (4)	07:48		07:47		08:35	
	21:52	21:01		19:49	19:22 (3)	18:36		16:32		16:05	
14	05:12	06:01		06:56	18:30 (4)	07:50		07:49		08:36	
	21:51	20:59		19:47	19:18 (3)	18:33		16:31		16:04	
15	05:13	06:03		06:58	18:28 (4)	07:52		07:51		08:37	
	21:50	20:57		19:44	19:16 (3)	18:31		16:29		16:05	
16	05:14	06:04		06:59	18:27 (4)	07:54		07:53		08:38	
	21:49	20:55		19:42	19:14 (3)	18:29		16:27		16:05	
17	05:16	06:06		07:01	18:25 (4)	07:55		07:55		08:38	
	21:47	20:53		19:39	19:11 (3)	18:26		16:26		16:05	
18	05:17	06:08		07:03	18:25 (4)	07:57		07:57		08:39	
	21:46	20:50		19:37	19:08 (3)	18:24		16:24		16:05	
19	05:18	06:10		07:05	18:24 (4)	07:59	17:21 (5)	07:59		08:40	
	21:45	20:48		19:34	19:06 (3)	18:22	17:29 (5)	16:23		16:05	
20	05:20	06:12		07:06	18:24 (4)	08:01	17:18 (5)	08:00		08:41	
	21:44	20:46		19:32	19:04 (3)	18:20	17:32 (5)	16:22		16:06	
21	05:21	06:13		07:08	18:22 (4)	08:03	17:16 (5)	08:02		08:41	
	21:42	20:44		19:29	19:00 (4)	18:17	17:33 (5)	16:20		16:06	
22	05:23	06:15		07:10	18:22 (4)	08:05	17:15 (5)	08:04		08:42	
	21:41	20:42		19:27	18:58 (4)	18:15	17:34 (5)	16:19		16:06	
23	05:24	06:17		07:12	18:22 (4)	08:07	17:14 (5)	08:06		08:42	
	21:39	20:39		19:24	18:56 (4)	18:13	17:35 (5)	16:18		16:07	
24	05:26	06:19		07:13	18:22 (4)	08:09	17:13 (5)	08:08		08:43	
	21:38	20:37		19:22	18:54 (4)	18:11	17:36 (5)	16:17		16:08	
25	05:27	06:20		07:15	18:22 (4)	07:11	16:12 (5)	08:09		08:43	
	21:36	20:35		19:19	18:51 (4)	17:09	16:36 (5)	16:16		16:08	
26	05:29	06:22		07:17	18:22 (4)	07:13	16:12 (5)	08:11		08:43	
	21:35	20:32		19:17	18:48 (4)	17:06	16:36 (5)	16:14		16:09	
27	05:30	06:24		07:19	18:22 (4)	07:14	16:12 (5)	08:13		08:44	
	21:33	20:30		19:14	18:46 (4)	17:04	16:34 (5)	16:13		16:10	
28	05:32	06:26		07:21	18:23 (4)	07:16	16:12 (5)	08:14		08:44	
	21:32	20:28		19:12	18:44 (4)	17:02	16:31 (5)	16:12		16:11	
29	05:34	06:27		07:22	18:24 (4)	07:18	16:12 (5)	08:16		08:44	
	21:30	20:25		19:09	18:41 (4)	17:00	16:29 (5)	16:12		16:11	
30	05:35	06:29		07:24	18:24 (4)	07:20	16:12 (5)	08:18		08:44	
	21:28	20:23		19:07	18:38 (4)	16:58	16:27 (5)	16:11		16:12	
31	05:37	06:31				07:22	16:12 (5)			08:44	
	21:26	20:21				16:56	16:25 (5)			16:13	
Potential sun hours	512	460		382		328	259			233	
Total, worst case	544	101		769		251	18				
Sun reduction	0.32	0.34		0.32		0.29	0.27				
Oper. time red.	1.00	1.00		1.00		1.00	1.00				
Wind dir. red.	0.64	0.64		0.67		0.66	0.66				
Total reduction	0.21	0.22		0.22		0.19	0.18				
Total, real	112	22		166		49	3				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: AX - H50

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1 08:44	12:51 (2) 08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		15:58 (1) 08:19
16:15	13:46 (2) 17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	25	16:23 (1) 16:10
2 08:44	12:52 (2) 08:12		16:35 (1) 07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28		15:58 (1) 08:21
16:16	13:47 (2) 17:08	2	16:37 (1) 18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	23	16:21 (1) 16:09
3 08:44	12:52 (2) 08:10		16:33 (1) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		15:58 (1) 08:22
16:17	13:46 (2) 17:10	6	16:39 (1) 18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	21	16:19 (1) 16:08
4 08:43	12:53 (2) 08:08		16:32 (1) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		15:59 (1) 08:24
16:18	13:47 (2) 17:12	9	16:41 (1) 18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	18	16:17 (1) 16:08
5 08:43	12:53 (2) 08:07		16:30 (1) 07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33		15:59 (1) 08:25
16:19	13:47 (2) 17:14	13	16:43 (1) 18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	15	16:14 (1) 16:07
6 08:43	12:54 (2) 08:05		16:30 (1) 07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		16:00 (1) 08:26
16:21	13:48 (2) 17:16	15	16:45 (1) 18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	12	16:12 (1) 16:07
7 08:42	12:55 (2) 08:03		16:29 (1) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37		16:01 (1) 08:28
16:22	13:47 (2) 17:18	18	16:47 (1) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	9	16:10 (1) 16:06
8 08:42	12:55 (2) 08:01		16:28 (1) 07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		16:03 (1) 08:29
16:24	13:47 (2) 17:20	22	16:50 (1) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	5	16:08 (1) 16:06
9 08:41	12:57 (2) 07:59		16:28 (1) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		16:06 (1) 08:30
16:25	13:48 (2) 17:22	24	16:52 (1) 18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	1	16:07 (1) 16:05
10 08:40	12:57 (2) 07:57		16:28 (1) 06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42		16:05
16:26	13:48 (2) 17:24	26	16:54 (1) 18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43		16:05
11 08:40	12:58 (2) 07:55		16:28 (1) 06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		16:05
16:28	13:48 (2) 17:26	26	16:54 (1) 18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40		16:05
12 08:39	12:59 (2) 07:53		16:28 (1) 06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46		16:05
16:30	13:48 (2) 17:28	27	16:55 (1) 18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38		16:05
13 08:38	13:00 (2) 07:51		16:27 (1) 06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48		16:05
16:31	13:48 (2) 17:30	27	16:54 (1) 18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:05
14 08:37	13:01 (2) 07:49		16:28 (1) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		16:05
16:33	13:47 (2) 17:32	26	16:54 (1) 18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:04
15 08:36	13:02 (2) 07:47		16:29 (1) 06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52		16:04
16:34	13:47 (2) 17:34	24	16:53 (1) 18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:05
16 08:35	13:03 (2) 07:45		16:29 (1) 06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54		16:05
16:36	13:47 (2) 17:36	24	16:53 (1) 18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:05
17 08:34	13:04 (2) 07:43		16:31 (1) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		16:05
16:38	13:46 (2) 17:38	21	16:52 (1) 18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26		16:05
18 08:33	13:05 (2) 07:41		16:31 (1) 06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57		16:05
16:40	13:45 (2) 17:40	19	16:50 (1) 18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	19	16:05
19 08:32	13:07 (2) 07:39		16:33 (1) 06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		16:05
16:41	13:45 (2) 17:42	16	16:49 (1) 18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22		16:05
20 08:31	13:08 (2) 07:37		16:36 (1) 06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		16:05
16:43	13:43 (2) 17:44	11	16:47 (1) 18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20		16:05
21 08:30	13:10 (2) 07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		16:05
16:45	13:43 (2) 17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	5	17:09 (1) 16:20
22 08:29	13:12 (2) 07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		17:05 (1) 16:04
16:47	13:41 (2) 17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	13	17:18 (1) 16:19
23 08:27	13:15 (2) 07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		17:03 (1) 16:06
16:49	13:39 (2) 17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	17	17:20 (1) 16:18
24 08:26	13:18 (2) 07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		17:01 (1) 16:08
16:50	13:37 (2) 17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	20	17:21 (1) 16:17
25 08:25	13:24 (2) 07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11		16:00 (1) 08:09
16:52	13:33 (2) 17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09		16:22 (1) 16:16
26 08:23	13:23 (2) 07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	22	16:22 (1) 16:16
16:54	13:33 (2) 17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:04		16:22 (1) 16:14
27 08:22	13:21 (2) 07:21		06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15		15:58 (1) 08:13
16:56	13:31 (2) 17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	25	16:23 (1) 16:13
28 08:20	13:19 (2) 07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17		15:57 (1) 08:14
16:58	13:24 (2) 18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	26	16:23 (1) 16:12
29 08:19			07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18		15:57 (1) 08:16
17:00			19:55	20:52	21:41	22:01	21:30	20:25	19:10	18:00	26	16:23 (1) 16:12
30 08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20		15:57 (1) 08:18
17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	26	16:23 (1) 16:11
31 08:15			07:04		05:04		05:37	06:31		07:22		15:58 (1)
17:04			19:58		21:44		21:27	20:21		16:56	26	16:24 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	1083	356									627	1714
Sun reduction	0.24	0.23									0.27	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.63	0.65									0.63	0.63
Total reduction	0.15	0.15									0.17	0.13
Total, real	166	54									106	224

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case **Shadow receptor:** AY - H51

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24					08:19	08:54 (2)						
2	16:15		17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	11			09:05 (2)	08:56 (2)						
3	08:44		08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	16:09	10			09:06 (2)	08:57 (2)						
4	16:16		17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:08	8			09:05 (2)	08:59 (2)						
5	08:44		08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	16:08	7			09:06 (2)	09:00 (2)						
6	16:17		17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:07	5			09:05 (2)	09:02 (2)						
7	08:43	1	09:17 (2)	08:09	07:09	06:54	05:00	05:01	05:44	06:38	07:32	07:30	16:07	4			09:06 (2)	09:03 (2)						
8	16:18		09:18 (2)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:06	2			09:05 (2)	09:02 (2)						
9	08:43		09:16 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	16:06	1			09:06 (2)							
10	16:20	2	09:18 (2)	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:05											
11	08:43		09:16 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	16:07											
12	16:21	4	09:20 (2)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:06											
13	08:42		09:15 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	16:07											
14	16:22	5	09:20 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06											
15	08:42		09:14 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	16:06											
16	16:24	7	09:21 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:05											
17	08:41		09:14 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	16:05											
18	16:25	8	09:22 (2)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:05											
19	08:41		09:13 (2)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	16:05											
20	16:27	10	09:23 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05											
21	08:40		09:12 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	16:05											
22	16:28	11	09:23 (2)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05											
23	08:39		09:11 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	16:05											
24	16:30	13	09:24 (2)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05											
25	08:38		09:10 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	16:05											
26	16:31	14	09:24 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:05											
27	08:37		09:09 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	16:05											
28	16:33	16	09:25 (2)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:05											
29	08:37		09:08 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	16:05											
30	16:34	18	09:26 (2)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05											
31	08:36		09:07 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	16:05											
32	16:36	19	09:26 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05											
33	08:35		09:05 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	16:05											
34	16:38	21	09:26 (2)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05											
35	08:33		09:04 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	16:05											
36	16:40	23	09:27 (2)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05											
37	08:32		09:03 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	16:05											
38	16:41	24	09:27 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:05											
39	08:31		09:01 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	16:05											
40	16:43	26	09:27 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:06											
41	08:30		09:02 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	16:06											
42	16:45	25	09:27 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:06											
43	08:29		09:03 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	16:07											
44	16:47	25	09:28 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:07											
45	08:27		09:03 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	16:07											
46	16:49	24	09:27 (2)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:08											
47	08:26		09:04 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	16:08											
48	16:51	22	09:26 (2)	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17											
49	08:25		09:05 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	16:08											
50	16:52	22	09:27 (2)	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16											
51	08:23		09:06 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	16:08											
52	16:54	20	09:26 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15											
53	08:22		09:08 (2)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	16:09											
54	16:56	18	09:26 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	16:14											
55	08:20		09:09 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	16:10											
56	16:58	15	09:24 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13											
57	08:19		09:11 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	16:12											
58	17:00	11	09:22 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12											
59	08:17		09:14 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	16:13											
60	17:02	4	09:18 (2)		19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11											
61	08:15				07:04		05:04		05:37	06:31		07:22												
62	17:04				19:58		21:44		21:27	20:21		16:56												
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	362	48										
Total, worst case	408												0.27											
Sun reduction	0.24												1.00											
Oper. time red.	1.00												0.61											
Wind dir. red.	0.61												0.16											
Total reduction	0.15												0.13											
Total, real	60												58	6										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: AZ - H52

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:18 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24			08:19		08:59 (2)						
	16:15	20	09:38 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54			16:10	25	09:24 (2)						
2	08:44		09:18 (2)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26			08:21		09:00 (2)						
	16:16	21	09:39 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52			16:09	25	09:25 (2)						
3	08:44		09:17 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			08:22		08:59 (2)						
	16:17	21	09:38 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50			16:08	26	09:25 (2)						
4	08:43		09:17 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30			08:24		09:00 (2)						
	16:18	22	09:39 (2)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48			16:08	26	09:26 (2)						
5	08:43		09:16 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32			08:25		09:00 (2)						
	16:20	23	09:39 (2)	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46			16:07	25	09:25 (2)						
6	08:43		09:16 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34			08:27		09:02 (2)						
	16:21	24	09:40 (2)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44			16:07	24	09:26 (2)						
7	08:42		09:15 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36			08:28		09:03 (2)						
	16:22	25	09:40 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43			16:06	23	09:26 (2)						
8	08:42		09:16 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38			08:29		09:05 (2)						
	16:24	25	09:41 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41			16:06	22	09:27 (2)						
9	08:41		09:16 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			08:30		09:06 (2)						
	16:25	26	09:42 (2)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39			16:05	22	09:28 (2)						
10	08:41		09:16 (2)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42			08:32		09:07 (2)						
	16:27	26	09:42 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37			16:05	21	09:28 (2)						
11	08:40		09:17 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44			08:33		09:08 (2)						
	16:28	25	09:42 (2)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36			16:05	20	09:28 (2)						
12	08:39		09:17 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46			08:34		09:10 (2)						
	16:30	25	09:42 (2)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34			16:05	19	09:29 (2)						
13	08:38		09:18 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48			08:35		09:11 (2)						
	16:31	24	09:42 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32			16:05	18	09:29 (2)						
14	08:37		09:19 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49			08:36		09:12 (2)						
	16:33	23	09:42 (2)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31			16:05	18	09:30 (2)						
15	08:37		09:20 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51			08:37		09:13 (2)						
	16:34	22	09:42 (2)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29			16:05	17	09:30 (2)						
16	08:36		09:21 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53			08:38		09:13 (2)						
	16:36	21	09:42 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28			16:05	17	09:30 (2)						
17	08:35		09:21 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55			08:39		09:14 (2)						
	16:38	20	09:41 (2)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26			16:05	16	09:30 (2)						
18	08:33		09:22 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57			08:39		09:15 (2)						
	16:40	19	09:41 (2)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25			16:05	16	09:31 (2)						
19	08:32		09:24 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59			08:40		09:16 (2)						
	16:41	17	09:41 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23			16:05	16	09:32 (2)						
20	08:31		09:25 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01			09:04 (2)	08:41		09:16 (2)					
	16:43	14	09:39 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	7		09:11 (2)	16:06	15	09:31 (2)					
21	08:30		09:27 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02			09:02 (2)	08:41		09:17 (2)					
	16:45	11	09:38 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	11		09:13 (2)	16:06	15	09:32 (2)					
22	08:29		09:30 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04			09:01 (2)	08:42		09:17 (2)					
	16:47	7	09:37 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	14		09:15 (2)	16:06	15	09:32 (2)					
23	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06			09:00 (2)	08:42		09:18 (2)					
	16:49			17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	17		09:17 (2)	16:07	15	09:33 (2)					
24	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08			08:59 (2)	08:43		09:18 (2)					
	16:51			17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	19		09:18 (2)	16:08	16	09:34 (2)					
25	08:25			07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11	08:09			08:59 (2)	08:43		09:18 (2)					
	16:52			17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	20		09:19 (2)	16:08	16	09:34 (2)					
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11			08:59 (2)	08:44		09:19 (2)					
	16:54			17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	21		09:20 (2)	16:09	16	09:35 (2)					
27	08:22			07:21	06:14	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13			08:59 (2)	08:44		09:19 (2)					
	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:14	22		09:21 (2)	16:10	16	09:35 (2)					
28	08:20			07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:15			08:59 (2)	08:44		09:19 (2)					
	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	23		09:22 (2)	16:11	17	09:36 (2)					
29	08:19				07:09	05:56	05:06	04:57	05:34	06:28	07:23	08:19	08:16			08:59 (2)	08:44		09:19 (2)					
	17:00				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	24		09:23 (2)	16:11	17	09:36 (2)					
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18			08:59 (2)	08:44		09:19 (2)					
	17:02				19:56	20:54	21:43	22:01	21:28	20:23	19:07	17:58	16:11	24		09:23 (2)	16:12	18	09:37 (2)			</		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BA - H53

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
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16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:18 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BB - H54

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	08:11 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	6 08:17 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12		06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:09	
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07		06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10		20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07	
6	08:43	08:05	07:05		06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12		20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02		06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13		20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00		06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:58		06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17		20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	
10	08:41	07:57	06:55		06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42	08:32	
	16:27	17:24	18:19		20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53		06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	
	16:28	17:26	18:21		20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	08:20 (1)	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	
	16:30	17:28	2 18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48		06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:42 (1)	07:48	08:35
	16:31	17:30	7 18:25 (1)	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	10 08:52 (1)	16:32	16:05
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:39 (1)	07:50	08:36
	16:33	17:32	10 08:25 (1)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16 08:55 (1)	16:31	16:05
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37 (1)	07:51	08:37
	16:35	17:34	13 08:26 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	19 08:56 (1)	16:29	16:05
16	08:36	07:45	06:41		06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:36 (1)	07:53	08:38
	16:36	17:36	16 08:27 (1)	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	21 08:57 (1)	16:28	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:35 (1)	07:55	08:39
	16:38	17:38	19 08:28 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	23 08:58 (1)	16:26	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:34 (1)	07:57	08:39
	16:40	17:40	22 08:29 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	25 08:59 (1)	16:25	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:33 (1)	07:59	08:40
	16:41	17:42	24 08:28 (1)	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	26 08:59 (1)	16:23	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:33 (1)	08:01	08:41
	16:43	17:44	27 08:29 (1)	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	26 08:59 (1)	16:22	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:32 (1)	08:02	08:41
	16:45	17:46	27 08:29 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	27 08:59 (1)	16:21	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:33 (1)	08:04	08:42
	16:47	17:48	27 08:28 (1)	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	26 08:59 (1)	16:19	16:07
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:35 (1)	08:06	08:42
	16:49	17:50	26 08:28 (1)	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	24 08:59 (1)	16:18	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:37 (1)	08:08	08:43
	16:51	17:52	24 08:27 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	21 08:58 (1)	16:17	16:08
25	08:25	07:26	06:19		06:05	05:11	04:56	05:27	06:21	07:15	08:11	07:39 (1)	08:10	08:43
	16:53	17:54	23 08:26 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09	19 07:58 (1)	16:16	16:08
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17	08:13	07:41 (1)	08:11	08:44
	16:54	17:56	21 08:25 (1)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16 07:57 (1)	16:15	16:09
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19	08:15	07:43 (1)	08:13	08:44
	16:56	17:58	18 08:24 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:05	13 07:56 (1)	16:14	16:10
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21	08:17	07:45 (1)	08:15	08:44
	16:58	18:00	14 08:21 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	9 07:54 (1)	16:13	16:11
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	08:19	07:47 (1)	08:16	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	18:00	6 07:53 (1)	16:12	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	08:21	07:50 (1)	08:18	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	18:00	1 07:51 (1)	16:11	16:13
31	08:15		07:04			05:04		05:37	06:31		07:22			08:44
	17:04		19:58			21:44		21:27	20:21		16:56			16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328		259	233
Total, worst case				6								328		
Sun reduction		0.23		0.27								0.29		
Oper. time red.		1.00		1.00								1.00		
Wind dir. red.		0.64		0.64								0.64		
Total reduction		0.15		0.17								0.19		
Total, real		47		1								61		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BC - H55

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December										
1	08:44	09:20 (3)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19	09:11 (3)									
	16:15	72	11:17 (1)	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10	56	11:00 (1)							
2	08:44	09:21 (3)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21	09:11 (3)									
	16:16	71	11:17 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	59	11:01 (1)							
3	08:44	09:21 (3)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22	09:10 (3)									
	16:17	71	11:17 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	61	11:01 (1)							
4	08:43	09:22 (3)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24	09:10 (3)									
	16:18	70	11:18 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	64	11:02 (1)							
5	08:43	09:23 (3)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25	09:09 (3)									
	16:20	68	11:17 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	66	11:03 (1)							
6	08:43	09:24 (3)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27	09:10 (3)									
	16:21	68	11:18 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	68	11:04 (1)							
7	08:42	09:24 (3)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28	09:10 (3)									
	16:22	66	11:18 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	68	11:04 (1)							
8	08:42	09:25 (3)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29	09:10 (3)									
	16:24	64	11:17 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	70	11:06 (1)							
9	08:41	09:27 (3)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30	09:10 (3)									
	16:25	61	11:18 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	71	11:06 (1)							
10	08:41	09:28 (3)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32	09:10 (3)									
	16:27	59	11:18 (1)	17:24	18:19	20:17	21:12	21:55	21:58	21:08	19:57	18:43	16:37	71	11:06 (1)							
11	08:40	09:29 (3)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33	09:10 (3)									
	16:28	57	11:18 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	72	11:07 (1)							
12	08:39	09:30 (3)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34	09:11 (3)									
	16:30	54	11:17 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	73	11:08 (1)							
13	08:38	09:32 (3)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35	09:12 (3)									
	16:31	49	11:17 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	7	16:32	73	11:09 (1)						
14	08:37	09:34 (3)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:30	07:49	16:36	09:12 (3)							
	16:33	43	11:16 (1)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	14	08:44 (2)	16:31	74	11:09 (1)					
15	08:37	10:41 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:28	07:51	16:37	09:13 (3)							
	16:35	35	11:16 (1)	17:34	2	08:15 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	18	08:46 (2)	16:29	73	11:10 (1)			
16	08:36	10:43 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:27	07:53	16:38	09:13 (3)							
	16:36	32	11:15 (1)	17:36	6	08:17 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	20	08:47 (2)	16:28	74	11:10 (1)			
17	08:35	10:43 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:26	07:55	16:39	09:14 (3)							
	16:38	31	11:14 (1)	17:38	9	08:18 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	22	08:48 (2)	16:26	73	11:10 (1)			
18	08:33	10:45 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:25	07:57	16:39	09:15 (3)							
	16:40	28	11:13 (1)	17:40	11	08:18 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	23	08:48 (2)	16:25	74	11:11 (1)			
19	08:32	10:48 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:27	07:59	16:40	09:16 (3)							
	16:41	24	11:12 (1)	17:42	14	08:18 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	22	08:49 (2)	16:23	73	11:12 (1)			
20	08:31	10:50 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:29	07:58	16:41	09:16 (3)							
	16:43	19	11:09 (1)	17:44	16	08:18 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	20	08:49 (2)	16:22	73	11:12 (1)			
21	08:30	10:53 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:31	07:58	16:41	09:17 (3)							
	16:45	14	11:07 (1)	17:46	18	08:18 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	18	08:49 (2)	16:20	14	10:28 (1)	16:06	73	11:13 (1)
22	08:29		07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:33	07:58	16:41	09:17 (3)							
	16:47		17:48	20	08:17 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	15	08:48 (2)	16:19	19	10:45 (1)	16:07	73	11:13 (1)	
23	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:35	07:58	16:41	09:18 (3)							
	16:49		17:50	22	08:17 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	13	08:48 (2)	16:18	24	10:48 (1)	16:07	73	11:14 (1)	
24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:37	07:58	16:41	09:18 (3)							
	16:51		17:52	23	08:17 (2)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	11	08:48 (2)	16:17	27	10:50 (1)	16:08	73	11:14 (1)	
25	08:25		07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:39	07:59	16:41	09:18 (3)							
	16:52		17:54	21	08:15 (2)	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	8	07:47 (2)	16:16	30	10:52 (1)	16:08	73	11:14 (1)	
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:41	07:58	16:41	09:19 (3)							
	16:54		17:56	19	08:14 (2)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	5	07:46 (2)	16:15	32	10:53 (1)	16:09	73	11:15 (1)	
27	08:22		07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:43	07:58	16:41	09:19 (3)							
	16:56		17:58	16	08:13 (2)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	2	07:45 (2)	16:14	35	10:55 (1)	16:10	74	11:16 (1)	
28	08:20		07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:45	07:59	16:41	09:19 (3)							
	16:58		18:00	12	08:10 (2)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	43	10:57 (1)	16:11	74	11:16 (1)			
29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:46	07:59	16:41	09:19 (3)							
	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	49	10:57 (1)	16:12	74	11:16 (1)					
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:48	07:59	16:41	09:19 (3)							
	17:02			19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	53	10:58 (1)	16:12	74	11:17 (1)					
31	08:15			07:04		05:04		05:37	06:31		07:22				08:44	09:19 (3)						
	17:04			19:58		21:44		21:27	20:21		16:56				16:13	74	11:16 (1)					
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	2194									
Total, worst case	1056	209											218	326		2194						
Sun reduction	0.24	0.23											0.29	0.27		0.21						
Oper. time red.	1.00	1.00											1.00	1.00		1.00						
Wind dir. red.	0.60	0.64											0.64	0.60		0.60						
Total reduction	0.15	0.15											0.19	0.16		0.12						
Total, real	153	31											41	52		272						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BD - H56

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March	April	May	June	July	August	September	October	November	December							
1	08:44		09:26 (3)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		08:19	09:19 (3)					
	16:15	70	11:28 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:10	46	11:09 (1)				
2	08:44		09:27 (3)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		08:21	09:18 (3)					
	16:16	68	11:28 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:09	51	11:11 (1)				
3	08:44		09:27 (3)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		08:22	09:17 (3)					
	16:17	68	11:28 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:08	54	11:11 (1)				
4	08:43		09:28 (3)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		08:24	09:17 (3)					
	16:18	65	11:28 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:08	57	11:13 (1)				
5	08:43		09:29 (3)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		08:25	09:16 (3)					
	16:20	64	11:28 (1)	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:07	60	11:13 (1)				
6	08:43		09:30 (3)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		08:27	09:16 (3)					
	16:21	62	11:28 (1)	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:07	61	11:14 (1)				
7	08:42		09:31 (3)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		08:28	09:16 (3)					
	16:22	60	11:28 (1)	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:06	64	11:15 (1)				
8	08:42		09:32 (3)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		08:29	09:17 (3)					
	16:24	57	11:28 (1)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	64	11:16 (1)				
9	08:41		09:34 (3)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		08:30	09:16 (3)					
	16:25	54	11:28 (1)	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:05	67	11:17 (1)				
10	08:41		09:35 (3)	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		08:32	09:16 (3)					
	16:27	51	11:28 (1)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:05	68	11:17 (1)				
11	08:40		09:37 (3)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		08:33	09:16 (3)					
	16:28	46	11:27 (1)	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	70	11:18 (1)				
12	08:39		09:40 (3)	07:53		06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		08:34	09:17 (3)					
	16:30	40	11:27 (1)	17:28		18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	69	11:19 (1)				
13	08:38		10:53 (1)	07:51	08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		08:35	09:17 (3)					
	16:31	33	11:26 (1)	17:30	1	08:19 (2)	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:05	71	11:20 (1)				
14	08:37		10:54 (1)	07:49	08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36 (2)	07:49	08:36	09:18 (3)				
	16:33	32	11:26 (1)	17:32	4	08:19 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	8	08:36 (2)	16:31	16:05	70	11:20 (1)	
15	08:37		10:56 (1)	07:47	08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:33 (2)	07:51	08:37	09:18 (3)				
	16:35	29	11:25 (1)	17:34	7	08:20 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	14	08:47 (2)	16:29	16:05	72	11:21 (1)	
16	08:36		10:58 (1)	07:45	08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:31 (2)	07:53	08:38	09:17 (3)				
	16:36	26	11:24 (1)	17:36	10	08:21 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	18	08:49 (2)	16:28	16:05	73	11:21 (1)	
17	08:35		10:59 (1)	07:43	08:09 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:30 (2)	07:55	08:39	09:18 (3)				
	16:38	23	11:22 (1)	17:38	13	08:22 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	20	08:50 (2)	16:26	16:05	72	11:21 (1)	
18	08:33		11:02 (1)	07:41	08:07 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:28 (2)	07:57	08:39	09:19 (3)				
	16:40	18	11:20 (1)	17:40	15	08:22 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	23	08:51 (2)	16:25	16:05	72	11:22 (1)	
19	08:32		11:05 (1)	07:39	08:04 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:27 (2)	07:59	08:40	09:20 (3)				
	16:41	12	11:17 (1)	17:42	17	08:21 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	25	08:52 (2)	16:23	16:05	73	11:23 (1)	
20	08:31		10:57 (1)	07:37	08:02 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:29 (2)	08:01	08:41	09:19 (3)				
	16:43	20	08:22 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	23	08:52 (2)	16:22	16:06	74	11:23 (1)				
21	08:30		10:58 (1)	07:34	08:00 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:31 (2)	08:02	08:41	09:20 (3)				
	16:45	22	08:22 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	21	08:52 (2)	16:20	16:06	74	11:24 (1)				
22	08:29		10:59 (1)	07:32	07:57 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:33 (2)	08:04	08:42	09:20 (3)				
	16:47	23	08:20 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	19	08:52 (2)	16:19	16:07	74	11:24 (1)				
23	08:27		10:56 (1)	07:30	07:56 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:35 (2)	08:06	10:42 (1)	08:42	09:21 (3)			
	16:49	24	08:20 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	17	08:52 (2)	16:18	11	10:53 (1)	16:07	74	11:25 (1)		
24	08:26		10:57 (1)	07:28	07:57 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:37 (2)	08:08	10:39 (1)	08:43	09:21 (3)			
	16:51	22	08:19 (2)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	14	08:51 (2)	16:17	18	10:57 (1)	16:08	73	11:25 (1)		
25	08:25		10:58 (1)	07:25	07:58 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	07:39 (2)	08:09	10:37 (1)	08:43	09:22 (3)			
	16:52	20	08:18 (2)	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	12	07:51 (2)	16:16	23	11:00 (1)	16:08	72	11:25 (1)		
26	08:23		10:59 (1)	07:23	07:59 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	07:41 (2)	08:11	10:36 (1)	08:44	09:23 (3)			
	16:54	17	08:16 (2)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	9	07:50 (2)	16:15	26	11:02 (1)	16:09	72	11:26 (1)		
27	08:22		10:57 (1)	07:21	08:02 (2)	06:14	06:01	05:08	04:54	05:20	06:12	07:06	08:01	08:29 (2)	08:01	08:41	09:19 (3)				
	16:56	12	08:14 (2)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	6	07:49 (2)	16:14	29	11:04 (1)	16:10	72	11:27 (1)		
28	08:20		10:58 (1)	07:19	08:06 (2)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	07:45 (2)	08:15	10:34 (1)	08:44	09:24 (3)			
	16:58	3	08:09 (2)	18:50	20:50	21:40	22:01	21:32	20:28	19:12	17:02	3	07:48 (2)	16:13	32	11:06 (1)	16:11	72	11:27 (1)		
29	08:19		10:59 (1)	07:00	07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	07:10	07:46	08:16	10:33 (1)	08:44	09:24 (3)			
	17:00	19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	33	11:06 (1)	16:12	71	11:27 (1)	09:24 (3)					
30	08:17		10:56 (1)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	09:21 (3)	08:44	09:25 (3)	08:44	09:25 (3)				
	17:02	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	40	11:08 (1)	16:12	71	11:28 (1)	09:25 (3)					
31	08:15		10:55 (1)	07:04	05:04	05:04	05:04	05:04	05:04	05:04	05:04	05:04	05:04	05:04	05:04	05:04	05:04	05:04	05:04	05:04	05:04
	17:04	19:58	21:44	21:44	21:44	21:44	21:44	21:44	21:44	21:44	21:44	21:44	21:44	21:44	21:44	21:44	21:44	21:44	21:44	21:44	21:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	212	2103								
Total, worst case	878	230																			
Sun reduction	0.24	0.23																			
Oper. time red.	1.00	1.00																			
Wind dir. red.	0.60	0.64																			
Total reduction	0.15	0.15																			
Total, real	128	34																			

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BE - H57

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:24 (1)	07:24	08:19		
	16:15	17:06	18:02	20	08:01 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	4	08:28 (1)	16:54	16:10
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:18 (1)	07:26	08:21		
	16:16	17:08	18:04	22	08:01 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	13	08:31 (1)	16:52	16:09
3	08:44	08:10	07:12	07:36 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:16 (1)	07:28	08:22		
	16:17	17:10	18:06	25	08:01 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	17	08:33 (1)	16:50	16:09
4	08:43	08:09	07:09	07:36 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:14 (1)	07:30	08:24		
	16:18	17:12	18:08	25	08:01 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	20	08:34 (1)	16:48	16:08
5	08:43	08:07	07:07	07:35 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:13 (1)	07:32	08:25		
	16:20	17:14	18:10	25	08:00 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	22	08:35 (1)	16:46	16:07
6	08:43	08:05	07:05	07:35 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:12 (1)	07:34	08:27		
	16:21	17:16	18:12	25	08:00 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	24	08:36 (1)	16:45	16:07
7	08:42	08:03	07:02	07:36 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:12 (1)	07:36	08:28		
	16:22	17:18	18:13	24	08:00 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	24	08:36 (1)	16:43	16:06
8	08:42	08:01	07:00	07:36 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:11 (1)	07:38	08:29		
	16:24	17:20	18:15	23	07:59 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	26	08:37 (1)	16:41	16:06
9	08:41	07:59	06:58	07:37 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:10 (1)	07:40	08:30		
	16:25	17:22	18:17	21	07:58 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	25	08:35 (1)	16:39	16:06
10	08:41	07:57	06:55	07:37 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:10 (1)	07:42	08:32		
	16:27	17:24	18:19	19	07:56 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	25	08:35 (1)	16:37	16:05
11	08:40	07:55	06:53	07:39 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:11 (1)	07:44	08:33		
	16:28	17:26	18:21	15	07:54 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41	24	08:35 (1)	16:36	16:05
12	08:39	07:53	06:50	07:42 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:13 (1)	07:46	08:34		
	16:30	17:28	18:23	8	07:50 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38	21	08:34 (1)	16:34	16:05
13	08:38	07:51	06:48		06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:15 (1)	07:48	08:35		
	16:31	17:30	18:25		20:22	21:17	21:57	21:52	21:02	19:49	18:36	18	08:33 (1)	16:32	16:05	
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:17 (1)	07:50	08:36		
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	15	08:32 (1)	16:31	16:06	
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:19 (1)	07:51	08:37		
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	12	08:31 (1)	16:29	16:05	
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	06:59	07:54	08:21 (1)	07:53	08:38		
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	8	08:29 (1)	16:28	16:05	
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:23 (1)	07:55	08:39		
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	4	08:27 (1)	16:26	16:05	
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58			07:57	08:39	
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24			16:25	16:05	
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59			07:59	08:40	
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22			16:23	16:05	
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01			08:01	08:41	
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20			16:22	16:06	
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03			08:02	08:41	
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18			16:21	16:06	
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05			08:04	08:42	
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15			16:19	16:07	
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07			08:06	08:42	
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13			16:18	16:07	
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09			08:08	08:43	
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11			16:17	16:08	
25	08:25	07:26	06:19	07:50 (1)	06:05	05:11	04:56	05:27	06:21	07:15	08:11			08:10	08:43	
	16:53	17:54	5	07:55 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20			16:16	16:08	
26	08:23	07:23	06:16	07:48 (1)	06:03	05:09	04:56	05:29	06:22	07:17	08:13			08:11	08:44	
	16:54	17:56	10	07:58 (1)	18:49	20:46	21:37	22:01	21:35	20:33	19:17			16:15	16:09	
27	08:22	07:21	06:14	07:46 (1)	06:01	05:08	04:57	05:31	06:24	07:19	08:15			08:13	08:44	
	16:56	17:58	13	07:59 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15			16:14	16:10	
28	08:20	07:19	06:11	07:43 (1)	06:01	05:09	04:57	05:32	06:26	07:21	08:17			08:15	08:44	
	16:58	18:00	17	08:00 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12			16:13	16:11	
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	07:19			08:16	08:44	
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	18:00			16:12	16:12	
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	07:21			08:18	08:44	
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	18:00			16:11	16:13	
31	08:16		07:04			05:04		05:37	06:31		07:22				08:44	
	17:04		19:58			21:44		21:27	20:21		16:56				16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382	328			259	233	
Total, worst case			45		252									302		
Sun reduction		0.23			0.27									0.29		
Oper. time red.		1.00			1.00									1.00		
Wind dir. red.		0.65			0.65									0.65		
Total reduction		0.15			0.18									0.19		
Total, real		7			44									57		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BF - H58

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	07:55 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04	07:56 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	07:12	07:36 (1)	06:57	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06	07:55 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
4	08:43	08:09	07:09	07:34 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08	07:56 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	08:07	07:07	07:33 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
	16:20	17:14	18:10	07:54 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05	07:05	07:33 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12	07:54 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03	07:02	07:34 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13	07:54 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01	07:00	07:35 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15	07:52 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:06
9	08:41	07:59	06:58	07:37 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:31
	16:25	17:22	18:17	07:50 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06
10	08:41	07:57	06:55	07:39 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24	18:19	07:46 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:11	07:44
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	17:29	16:05
12	08:39	07:53	06:50	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:13	07:46
	16:30	17:28	18:23	20:21	21:15	21:55	21:53	21:04	19:52	18:38	17:26	16:05
13	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:15	07:48
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	17:24	16:05
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:17	07:50
	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	17:22	16:05
15	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:19	07:51
	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	17:20	16:05
16	08:36	07:45	06:41	06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:21	07:53
	16:36	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	17:18	16:05
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:23	07:55
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	17:16	16:05
18	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:25	07:57
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	17:14	16:05
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:26	07:59
	16:42	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	17:12	16:05
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:28	08:41
	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	17:10	16:06
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:30	08:41
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	17:08	16:06
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:32	08:42
	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	17:05	16:07
23	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:34	08:43
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	17:03	16:07
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:36	08:43
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	17:01	16:08
25	08:25	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:38	08:43
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09	16:59	16:08
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:40	08:44
	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:57	16:09
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:42	08:44
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:05	16:57	16:10
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:44	08:44
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:57	16:11
29	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:46	08:44
	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:57	16:12
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:48	08:44
	17:02		19:57	20:54	21:43	22:01	21:28	20:23	19:07	18:00	16:57	16:13
31	08:16		07:04		05:04		05:37	06:31		07:23	08:50	08:44
	17:04		19:58		21:44		21:27	20:21		16:56		16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		26	171							195		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		4	30							37		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BG - H59

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case **Shadow receptor:** BH - H60

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26		07:58 (1)	07:24	08:19
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	19	08:17 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:56 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	21	08:17 (1)	16:52	16:09
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	21	08:17 (1)	16:50	16:09
4	08:43	08:09	07:09		07:34 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08	4	07:38 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	19	08:17 (1)	16:48	16:08
5	08:43	08:07	07:07		07:31 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10	7	07:38 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	17	08:17 (1)	16:46	16:07
6	08:43	08:05	07:05		07:29 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35		08:02 (1)	07:34	08:27
	16:21	17:16	18:12	10	07:39 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	14	08:16 (1)	16:45	16:07
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37		08:04 (1)	07:36	08:28
	16:22	17:18	18:13	13	07:40 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	12	08:16 (1)	16:43	16:06
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39		08:06 (1)	07:38	08:29
	16:24	17:20	18:15	16	07:40 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	9	08:15 (1)	16:41	16:06
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41		08:07 (1)	07:40	08:31
	16:25	17:22	18:17	18	07:40 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	6	08:13 (1)	16:39	16:06
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43		08:09 (1)	07:42	08:32
	16:27	17:24	18:19	20	07:39 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	2	08:11 (1)	16:37	16:05
11	08:40	07:55	06:53		07:18 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:45			07:44	08:33
	16:28	17:26	18:21	21	07:39 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41			16:36	16:05
12	08:39	07:53	06:50		07:18 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46			07:46	08:34
	16:30	17:28	18:23	19	07:37 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38			16:34	16:05
13	08:38	07:51	06:48		07:19 (1)	06:33	05:29	04:55	05:11	05:59	06:54	07:48			07:48	08:35
	16:31	17:30	18:25	18	07:37 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36			16:32	16:05
14	08:37	07:49	06:45		07:19 (1)	06:30	05:27	04:55	05:12	06:01	06:56	07:50			07:50	08:36
	16:33	17:32	18:27	15	07:34 (1)	20:24	21:19	21:58	21:51	20:59	19:47	18:34			16:31	16:05
15	08:37	07:47	06:43		07:22 (1)	06:28	05:26	04:55	05:13	06:03	06:58	07:52			07:51	08:37
	16:35	17:34	18:29	10	07:32 (1)	20:26	21:20	21:58	21:50	20:57	19:44	18:31			16:29	16:05
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	07:00		07:54			07:53	08:38
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42		18:29			16:28	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01		07:56			07:55	08:39
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39		18:27			16:26	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03		07:58			07:57	08:39
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37		18:24			16:25	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05		07:59			07:59	08:40
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34		18:22			16:23	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01			08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20			16:22	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03			08:02	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18			16:21	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05			08:04	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15			16:19	16:07
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07			08:06	08:43
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13			16:18	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09			08:08	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22		18:11			16:17	16:08
25	08:25	07:26	06:19		06:05	05:11	04:56	05:27	06:21	07:15		07:11			08:10	08:43
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20		17:09			16:16	16:08
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17		07:13			08:11	08:44
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17		17:07			16:15	16:09
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:15			08:13	08:44
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15		17:05			16:14	16:10
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:17			08:15	08:44
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	8	08:12 (1)	17:02		16:13	16:11
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		08:01 (1)	17:19		08:16	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	13	08:14 (1)	17:00		16:12	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		07:59 (1)	17:21		08:18	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	17	08:16 (1)	16:58		16:11	16:13
31	08:16		07:04			05:04		05:37	06:31			07:23				08:44
	17:04		19:58			21:44		21:27	20:21			16:56				16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case				171						38		140				
Sun reduction				0.27						0.32		0.29				
Oper. time red.				1.00						1.00		1.00				
Wind dir. red.				0.65						0.65		0.65				
Total reduction				0.18						0.21		0.19				
Total, real				30						8		27				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case **Shadow receptor:** BI - H61

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26	07:53 (1)	07:24	08:19	
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	14	08:07 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	12	08:06 (1)	16:52	16:09
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	9	08:05 (1)	16:50	16:09
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	6	08:04 (1)	16:48	16:08
5	08:43	08:07	07:07		06:52	05:44	04:59	05:02	05:46	06:40		07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10		20:08	21:03	21:50	21:58	21:18	20:09		18:55	2	08:02 (1)	16:46	16:07
6	08:43	08:05	07:05		06:49	05:42	04:59	05:03	05:47	06:42		07:35		07:34	08:27	
	16:21	17:16	18:12		20:10	21:05	21:51	21:58	21:16	20:06		18:53		16:45	16:07	
7	08:42	08:03	07:02		06:47	05:40	04:58	05:04	05:49	06:44		07:37		07:36	08:28	
	16:22	17:18	18:13		20:11	21:06	21:52	21:57	21:14	20:04		18:50		16:43	16:06	
8	08:42	08:01	07:00		06:44	05:38	04:57	05:05	05:51	06:45		07:39		07:38	08:29	
	16:24	17:20	18:15	1	07:25 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48		16:41	16:06	
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40	08:31	
	16:25	17:22	18:17	4	07:26 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	16:06	
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43		07:42	08:32	
	16:27	17:24	18:19	8	07:27 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	16:05	
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:45		07:44	08:33	
	16:28	17:26	18:21	10	07:27 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	16:05	
12	08:39	07:53	06:50		07:14 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46		07:46	08:34	
	16:30	17:28	18:23	13	07:27 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	16:05	
13	08:38	07:51	06:48		07:12 (1)	06:33	05:29	04:55	05:11	05:59	06:54	07:48		07:48	08:35	
	16:31	17:30	18:25	15	07:27 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36		16:32	16:05	
14	08:37	07:49	06:45		07:09 (1)	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:50	08:36	
	16:33	17:32	18:27	17	07:26 (1)	20:24	21:19	21:58	21:51	20:59	19:47	18:34		16:31	16:05	
15	08:37	07:47	06:43		07:07 (1)	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51	08:37	
	16:35	17:34	18:29	19	07:26 (1)	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	16:05	
16	08:36	07:45	06:41		07:05 (1)	06:25	05:24	04:55	05:15	06:05	07:00	07:54		07:53	08:38	
	16:36	17:36	18:31	20	07:25 (1)	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28	16:05	
17	08:35	07:43	06:38		07:06 (1)	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55	08:39	
	16:38	17:38	18:32	18	07:24 (1)	20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26	16:05	
18	08:34	07:41	06:36		07:07 (1)	06:21	05:21	04:54	05:17	06:08	07:03	07:58		07:57	08:39	
	16:40	17:40	18:34	15	07:22 (1)	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25	16:05	
19	08:32	07:39	06:33		07:09 (1)	06:19	05:19	04:54	05:19	06:10	07:05	07:59		07:59	08:40	
	16:42	17:42	18:36	11	07:20 (1)	20:34	21:27	22:00	21:45	20:49	19:34	18:22		16:23	16:05	
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01		08:01	08:41	
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20		16:22	16:06	
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03		08:02	08:41	
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18		16:21	16:06	
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05		08:04	08:42	
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15		16:19	16:07	
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07		08:06	08:43	
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13		16:18	16:07	
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09	07:53 (1)	08:09	08:43	
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	10	08:03 (1)	18:11	16:17	16:08	
25	08:25	07:26	06:19		06:05	05:11	04:56	05:28	06:21	07:15		07:51 (1)	07:11	08:10	08:43	
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	14	08:05 (1)	17:09	16:16	16:08	
26	08:23	07:23	06:16		06:03	05:10	04:56	05:29	06:22	07:17		07:48 (1)	07:13	08:11	08:44	
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	17	08:05 (1)	17:07	16:15	16:09	
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:47 (1)	07:15	08:13	08:44	
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	19	08:06 (1)	17:05	16:14	16:10	
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:47 (1)	07:17	08:15	08:44	
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	20	08:07 (1)	17:02	16:13	16:11	
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:49 (1)	07:19	08:16	08:44	
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	18	08:07 (1)	17:00	16:12	16:12	
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		07:51 (1)	07:21	08:18	08:44	
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	16	08:07 (1)	16:58	16:11	16:13	
31	08:16		07:04			05:04		05:37	06:31			07:23			08:44	
	17:04		19:58			21:44		21:27	20:21			16:56			16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case				151						114		43				
Sun reduction				0.27						0.32		0.29				
Oper. time red.				1.00						1.00		1.00				
Wind dir. red.				0.66						0.66		0.66				
Total reduction				0.18						0.21		0.19				
Total, real				27						24		8				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: BJ - H62

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June	
1	08:44	08:14			07:16	07:41 (3)	07:01		07:25 (1)	05:52	07:01 (1)	05:03
	16:15	17:06			18:02	9 07:50 (3)	20:00	9	07:34 (1)	20:56	38 07:39 (1)	21:45
2	08:44	08:12			07:14	07:39 (3)	06:59		07:23 (1)	05:50		05:02
	16:16	17:08			18:04	12 07:51 (3)	20:02	16	07:39 (1)	20:57	35 07:37 (1)	21:47
3	08:44	08:10			07:12	07:36 (3)	06:56		07:20 (1)	05:48		05:01
	16:17	17:10			18:06	14 07:50 (3)	20:04	21	07:41 (1)	20:59	32 07:35 (1)	21:48
4	08:43	08:09			07:09	07:34 (3)	06:54		07:18 (1)	05:46		05:00
	16:18	17:12			18:08	16 07:50 (3)	20:06	25	07:43 (1)	21:01	28 07:33 (1)	21:49
5	08:43	08:07			07:07	07:31 (3)	06:52		07:15 (1)	05:44		04:59
	16:20	17:14			18:10	18 07:49 (3)	20:08	29	07:44 (1)	21:03	25 07:31 (1)	21:50
6	08:43	08:05			07:05	07:29 (3)	06:49		07:13 (1)	05:42		04:59
	16:21	17:16			18:11	20 07:49 (3)	20:09	32	07:45 (1)	21:05	21 07:30 (1)	21:51
7	08:42	08:03			07:02	07:26 (3)	06:47		07:11 (1)	05:40		04:58
	16:22	17:18			18:13	22 07:48 (3)	20:11	36	07:47 (1)	21:06	14 07:26 (1)	21:52
8	08:42	08:01			07:00	07:25 (3)	06:44		07:08 (1)	05:38		04:57
	16:24	17:20			18:15	22 07:47 (3)	20:13	39	07:47 (1)	21:08		21:53
9	08:41	07:59			06:57	07:27 (3)	06:42		07:06 (1)	05:36		04:57
	16:25	17:22			18:17	20 07:47 (3)	20:15	42	07:48 (1)	21:10		21:54
10	08:41	07:57			06:55	07:27 (3)	06:40		07:03 (1)	05:35		04:56
	16:27	17:24			18:19	17 07:44 (3)	20:17	45	07:48 (1)	21:12		21:55
11	08:40	07:55			06:53	07:30 (3)	06:37		07:01 (1)	05:33		04:56
	16:28	17:26			18:21	12 07:42 (3)	20:19	48	07:49 (1)	21:13		21:56
12	08:39	07:53			06:50	07:33 (3)	06:35		07:00 (1)	05:31		04:55
	16:30	17:28			18:23	4 07:37 (3)	20:21	49	07:49 (1)	21:15		21:56
13	08:38	07:51			06:48		06:32		07:00 (1)	05:29		04:55
	16:31	17:30			18:25		20:22	50	07:50 (1)	21:17		21:57
14	08:37	07:49			06:45		06:30		06:58 (1)	05:27		04:55
	16:33	17:32			18:27		20:24	51	07:49 (1)	21:19		21:58
15	08:36	07:47			06:43		06:28		06:58 (1)	05:26		04:55
	16:35	17:34			18:29		20:26	51	07:49 (1)	21:20		21:58
16	08:36	07:45			06:41		06:25		06:58 (1)	05:24		04:55
	16:36	17:36			18:30		20:28	52	07:50 (1)	21:22		21:59
17	08:35	07:43			06:38		06:23		06:57 (1)	05:22		04:54
	16:38	17:38			18:32		20:30	52	07:49 (1)	21:24		21:59
18	08:33	07:41			06:36		06:21		06:57 (1)	05:21		04:54
	16:40	17:40			18:34		20:32	52	07:49 (1)	21:25		22:00
19	08:32	07:39			06:33		06:18		06:57 (1)	05:19		04:54
	16:41	17:42			18:36		20:33	52	07:49 (1)	21:27		22:00
20	08:31	07:37			06:31		06:16		06:57 (1)	05:18		04:54
	16:43	17:44			18:38		20:35	51	07:48 (1)	21:28		22:00
21	08:30	07:34			06:28		06:14		06:57 (1)	05:16		04:55
	16:45	17:46			18:40		20:37	51	07:48 (1)	21:30		22:01
22	08:29	07:32			06:26		06:12		06:56 (1)	05:15		04:55
	16:47	17:48			18:42		20:39	51	07:47 (1)	21:31		22:01
23	08:27	07:30			06:23		06:09		06:56 (1)	05:13		04:55
	16:49	17:50			18:44		20:41	50	07:46 (1)	21:33		22:01
24	08:26	07:28			06:21		06:07		06:57 (1)	05:12		04:55
	16:51	17:52			18:45		20:43	49	07:46 (1)	21:34		22:01
25	08:25	07:25			06:18		06:05		06:57 (1)	05:11		04:56
	16:53	17:54			18:47		20:45	48	07:45 (1)	21:36		22:01
26	08:23	07:23			06:16		06:03		06:58 (1)	05:09		04:56
	16:54	17:56			18:49		20:46	46	07:44 (1)	21:37		22:01
27	08:22	07:21	07:46 (3)		06:14		06:01		06:58 (1)	05:08		04:57
	16:56	17:58	3 07:49 (3)		18:51		20:48	45	07:43 (1)	21:39		22:01
28	08:20	07:19	07:43 (3)		06:11		05:59		06:59 (1)	05:07		04:57
	16:58	18:00	6 07:49 (3)		18:53		20:50	43	07:42 (1)	21:40		22:01
29	08:19				07:09		05:56		07:00 (1)	05:06		04:58
	17:00				19:55		20:52	41	07:41 (1)	21:42		22:01
30	08:17				07:06		05:54		07:00 (1)	05:05		04:58
	17:02				19:57		20:54	40	07:40 (1)	21:43		22:00
31	08:15				07:04					05:04		
	17:04				19:58					21:44		
Potential sun hours	250	273			367		420			494		510
Total, worst case		9			186		1266			193		
Sun reduction		0.23			0.27		0.35			0.38		
Oper. time red.		1.00			1.00		1.00			1.00		
Wind dir. red.		0.65			0.65		0.67			0.67		
Total reduction		0.15			0.18		0.24			0.26		
Total, real		1			33		301			50		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: BJ - H62

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:00 (1) 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:02 (1) 19:02	07:26 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:37 20:14	07:04 (1) 19:00	08:06 (3) 16:50	07:28 16:09
4	05:01 21:59	05:44 21:19	06:38 20:11	07:05 (1) 18:57	08:04 (3) 16:48	07:30 16:08
5	05:02 21:58	05:46 21:18	07:26 (1) 20:09	07:07 (1) 18:55	08:03 (3) 16:46	07:32 16:07
6	05:03 21:58	05:47 21:16	07:20 (1) 20:06	07:43 (1) 18:53	08:24 (3) 16:45	07:34 16:07
7	05:04 21:57	05:49 21:14	07:37 (1) 20:04	07:42 (1) 18:50	08:25 (3) 16:43	07:36 16:06
8	05:05 21:56	05:51 21:12	07:40 (1) 20:01	07:39 (1) 18:48	08:26 (3) 16:41	07:38 16:06
9	05:06 21:56	05:52 21:10	07:41 (1) 19:59	07:37 (1) 18:45	08:27 (3) 16:39	07:40 16:05
10	05:07 21:55	05:54 21:08	07:42 (1) 19:57	07:35 (1) 18:43	08:28 (3) 16:37	07:42 16:05
11	05:08 21:54	05:56 21:06	07:43 (1) 19:54	07:33 (1) 18:41	08:29 (3) 16:36	07:44 16:05
12	05:09 21:53	05:58 21:04	07:44 (1) 19:52	07:31 (1) 18:38	08:30 (3) 16:34	07:46 16:05
13	05:11 21:52	05:59 21:01	07:45 (1) 19:49	07:32 (1) 18:36	08:31 (3) 16:32	07:48 16:05
14	05:12 21:51	06:01 20:59	07:46 (1) 19:47	07:33 (1) 18:34	08:32 (3) 16:31	07:49 16:05
15	05:13 21:50	06:03 20:57	07:47 (1) 19:44	07:34 (1) 18:31	08:33 (3) 16:29	07:51 16:05
16	05:14 21:49	06:05 20:55	07:48 (1) 19:42	07:35 (1) 18:29	08:34 (3) 16:28	07:53 16:05
17	05:16 21:48	06:06 20:53	07:49 (1) 19:39	07:36 (1) 18:27	08:35 (3) 16:26	07:55 16:05
18	05:17 21:46	06:08 20:51	07:50 (1) 19:37	07:37 (1) 18:24	08:36 (3) 16:25	07:57 16:05
19	05:19 21:45	06:10 20:48	07:51 (1) 19:34	07:38 (1) 18:22	08:37 (3) 16:23	07:59 16:05
20	05:20 21:44	06:12 20:46	07:52 (1) 19:32	07:39 (1) 18:20	08:38 (3) 16:22	08:01 16:06
21	05:21 21:42	06:13 20:44	07:53 (1) 19:29	07:40 (1) 18:18	08:39 (3) 16:21	08:02 16:06
22	05:23 21:41	06:15 20:42	07:54 (1) 19:27	07:41 (1) 18:15	08:40 (3) 16:19	08:04 16:07
23	05:24 21:40	06:17 20:39	07:55 (1) 19:24	07:42 (1) 18:13	08:41 (3) 16:18	08:06 16:07
24	05:26 21:38	06:19 20:37	07:56 (1) 19:22	07:43 (1) 18:11	08:42 (3) 16:17	08:08 16:08
25	05:27 21:37	06:21 20:35	07:57 (1) 19:19	07:44 (1) 18:09	08:43 (3) 16:16	08:09 16:08
26	05:29 21:35	06:22 20:33	07:58 (1) 19:17	07:45 (1) 18:07	08:44 (3) 16:15	08:11 16:09
27	05:31 21:33	06:24 20:30	07:59 (1) 19:15	07:46 (1) 18:05	08:45 (3) 16:14	08:13 16:10
28	05:32 21:32	06:26 20:28	08:00 (1) 19:12	07:47 (1) 18:03	08:46 (3) 16:13	08:14 16:11
29	05:34 21:30	06:28 20:26	08:01 (1) 19:10	07:48 (1) 18:01	08:47 (3) 16:12	08:16 16:12
30	05:35 21:28	06:29 20:23	08:02 (1) 19:07	07:49 (1) 17:59	08:48 (3) 16:11	08:18 16:13
31	05:37 21:27	06:31 20:21	08:03 (1) 19:05	07:50 (1) 17:57	08:49 (3) 16:10	08:19 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case		1133		344	197	
Sun reduction		0.34		0.32	0.29	
Oper. time red.		1.00		1.00	1.00	
Wind dir. red.		0.67		0.67	0.65	
Total reduction		0.23		0.22	0.19	
Total, real		261		74	37	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BK - H63

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	05:50 (1) 05:57 (1)	04:59 22:00	05:39 21:25	06:09 (1) 06:11 (1)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47		05:00 22:00	05:41 21:23		06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48		05:01 21:59	05:42 21:21		06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49		05:01 21:59	05:44 21:19		06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50		05:02 21:58	05:46 21:18		06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51		05:03 21:58	05:47 21:16		06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52		05:04 21:57	05:49 21:14		06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53		05:05 21:56	05:51 21:12		06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54		05:06 21:56	05:52 21:10		06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55		05:07 21:55	05:54 21:08		06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	06:00 (1) 06:01 (1)	05:08 21:54	05:58 (1) 06:03 (1)	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:58 (1) 06:01 (1)	05:10 21:53	05:56 (1) 06:05 (1)	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:57 (1) 06:02 (1)	05:11 21:52	05:55 (1) 06:06 (1)	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:55 (1) 06:02 (1)	05:12 21:51	05:54 (1) 06:07 (1)	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:54 (1) 06:03 (1)	05:13 21:50	05:54 (1) 06:09 (1)	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:52 (1) 06:03 (1)	05:15 21:49	05:53 (1) 06:10 (1)	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:51 (1) 06:03 (1)	05:16 21:48	05:53 (1) 06:10 (1)	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:49 (1) 06:03 (1)	05:17 21:46	05:52 (1) 06:11 (1)	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:48 (1) 06:03 (1)	05:19 21:45	05:52 (1) 06:12 (1)	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:46 (1) 06:02 (1)	05:19 21:44	05:52 (1) 06:12 (1)	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:45 (1) 06:03 (1)	05:22 21:42	05:53 (1) 06:12 (1)	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:44 (1) 06:03 (1)	05:23 21:41	05:55 (1) 06:13 (1)	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:43 (1) 06:03 (1)	05:24 21:40	05:56 (1) 06:13 (1)	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:41 (1) 06:01 (1)	05:26 21:38	05:57 (1) 06:13 (1)	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:42 (1) 06:01 (1)	05:28 21:37	05:59 (1) 06:14 (1)	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:43 (1) 06:01 (1)	05:29 21:35	06:00 (1) 06:13 (1)	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:44 (1) 06:00 (1)	05:31 21:33	06:02 (1) 06:14 (1)	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:44 (1) 06:00 (1)	05:32 21:32	06:03 (1) 06:13 (1)	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:45 (1) 05:59 (1)	05:34 21:30	06:05 (1) 06:13 (1)	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:46 (1) 05:58 (1)	05:36 21:28	06:06 (1) 06:12 (1)	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44	04:57 21:57	05:47 (1) 05:57 (1)	05:37 21:27	06:08 (1) 06:12 (1)	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510		512	460		382	328	259	233
Total, worst case					275			7		284		2		
Sun reduction					0.38			0.32		0.32		0.34		
Oper. time red.					1.00			1.00		1.00		1.00		
Wind dir. red.					0.66			0.66		0.66		0.66		
Total reduction					0.25			0.21		0.21		0.23		
Total, real					69			1		61		0		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BL - H64

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:40 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BM - H65

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Assumptions for shadow calculations

Shadow receptor: BN - H66

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	07:25 (1)	05:52	05:03	04:59	05:39	06:33	07:05 (1)	07:26
	16:15	17:06	18:02	20:00	13 07:38 (1)	20:56	21:45	22:00	21:25	20:18	07:43 (1)	19:05
2	08:44	08:12	07:14	06:59	07:23 (1)	05:50	05:02	05:00	05:40	06:35	07:05 (1)	07:28
	16:16	17:08	18:04	20:02	18 07:41 (1)	20:57	21:47	22:00	21:23	20:16	07:43 (1)	19:02
3	08:44	08:10	07:12	06:56	07:20 (1)	05:48	05:01	05:00	05:42	06:37	07:05 (1)	07:30
	16:17	17:10	18:06	20:04	21 07:41 (1)	20:59	21:48	21:59	21:21	20:14	07:43 (1)	19:00
4	08:43	08:09	07:09	06:54	07:18 (1)	05:46	05:00	05:01	05:44	06:38	07:05 (1)	07:32
	16:18	17:12	18:08	20:06	25 07:43 (1)	21:01	21:49	21:59	21:19	20:11	07:41 (1)	18:57
5	08:43	08:07	07:07	06:52	07:31 (1)	05:44	04:59	05:02	05:46	06:40	07:07 (1)	07:33
	16:20	17:14	18:10	20:08	28 07:43 (1)	21:03	21:50	21:58	21:18	20:09	07:41 (1)	18:55
6	08:43	08:05	07:05	06:49	07:29 (1)	05:42	04:59	05:03	05:47	06:42	07:09 (1)	07:35
	16:21	17:16	18:11	20:09	31 07:44 (1)	21:05	21:51	21:58	21:16	20:06	07:40 (1)	18:53
7	08:42	08:03	07:02	06:47	07:27 (1)	05:40	04:58	05:04	05:49	06:44	07:10 (1)	07:37
	16:22	17:18	18:13	20:11	34 07:45 (1)	21:06	21:52	21:57	21:14	20:04	07:38 (1)	18:50
8	08:42	08:01	07:00	06:44	07:24 (1)	05:38	04:57	05:05	05:51	06:45	07:12 (1)	07:39
	16:24	17:20	18:15	20:13	36 07:44 (1)	21:08	21:53	21:56	21:12	20:01	07:37 (1)	18:48
9	08:41	07:59	06:57	06:42	07:22 (1)	05:36	04:57	05:06	05:52	06:47	07:14 (1)	07:41
	16:25	17:22	18:17	20:15	38 07:45 (1)	21:10	21:54	21:56	21:10	20:00	07:36 (1)	18:45
10	08:41	07:57	06:55	06:40	07:19 (1)	05:35	04:56	05:07	05:54	06:49	07:16 (1)	07:43
	16:27	17:24	18:19	20:17	38 07:45 (1)	21:12	21:55	21:55	21:08	20:00	07:34 (1)	18:43
11	08:40	07:55	06:53	06:37	07:18 (1)	05:33	04:56	05:08	05:56	06:51	07:17 (1)	07:44
	16:28	17:26	18:21	20:19	38 07:44 (1)	21:13	21:56	21:54	21:06	20:00	07:31 (1)	18:41
12	08:39	07:53	06:50	06:35	07:18 (1)	05:31	04:56	05:09	05:58	06:52	07:19 (1)	07:46
	16:30	17:28	18:23	20:21	38 07:44 (1)	21:15	21:56	21:53	21:04	20:00	07:28 (1)	18:38
13	08:38	07:51	06:48	06:32	07:06 (1)	05:29	04:55	05:11	05:59	06:54	07:19 (1)	07:48
	16:31	17:30	18:25	20:22	38 07:44 (1)	21:17	21:57	21:52	21:01	20:00	07:18 (1)	18:36
14	08:37	07:49	06:45	06:30	07:05 (1)	05:27	04:55	05:12	06:01	06:56	07:19 (1)	07:50
	16:33	17:32	18:27	20:24	38 07:43 (1)	21:19	21:58	21:51	20:59	20:00	07:18 (1)	18:34
15	08:37	07:47	06:43	06:28	07:06 (1)	05:26	04:55	05:13	06:03	06:58	07:19 (1)	07:52
	16:35	17:34	18:29	20:26	37 07:43 (1)	21:20	21:58	21:50	20:57	20:00	07:18 (1)	18:31
16	08:36	07:45	06:41	06:25	07:06 (1)	05:24	04:55	05:14	06:05	06:59	07:19 (1)	07:54
	16:36	17:36	18:30	20:28	36 07:42 (1)	21:22	21:59	21:49	20:55	20:00	07:18 (1)	18:29
17	08:35	07:43	06:38	06:23	07:06 (1)	05:22	04:54	05:16	06:06	07:01	07:19 (1)	07:56
	16:38	17:38	18:32	20:30	35 07:41 (1)	21:24	21:59	21:48	20:53	20:00	07:18 (1)	18:27
18	08:33	07:41	06:36	06:21	07:06 (1)	05:21	04:54	05:17	06:08	07:03	07:19 (1)	07:58
	16:40	17:40	18:34	20:32	34 07:40 (1)	21:25	22:00	21:46	20:51	20:00	07:18 (1)	18:24
19	08:32	07:39	06:33	06:19	07:07 (1)	05:19	04:54	05:19	06:10	07:05	07:19 (1)	07:59
	16:42	17:42	18:36	20:33	32 07:39 (1)	21:27	22:00	21:45	20:48	20:00	07:18 (1)	18:22
20	08:31	07:37	06:31	06:16	07:08 (1)	05:18	04:54	05:20	06:12	07:07	07:19 (1)	07:59
	16:43	17:44	18:38	20:35	30 07:38 (1)	21:28	22:00	21:44	20:46	21 07:38 (1)	07:18 (1)	18:20
21	08:30	07:34	06:28	06:14	07:09 (1)	05:16	04:55	05:21	06:14	07:08	07:19 (1)	07:58
	16:45	17:46	18:40	20:37	27 07:36 (1)	21:30	22:01	21:42	20:44	25 07:40 (1)	07:18 (1)	18:18
22	08:29	07:32	06:26	06:12	07:10 (1)	05:15	04:55	05:23	06:15	07:13 (1)	07:10	08:05
	16:47	17:48	18:42	20:39	24 07:34 (1)	21:31	22:01	21:41	20:42	27 07:40 (1)	07:12	18:15
23	08:27	07:30	06:23	06:09	07:12 (1)	05:13	04:55	05:24	06:17	07:12 (1)	07:12	08:07
	16:49	17:50	18:44	20:41	20 07:32 (1)	21:33	22:01	21:40	20:39	30 07:42 (1)	07:14	18:13
24	08:26	07:28	06:21	06:07	07:14 (1)	05:12	04:55	05:26	06:19	07:11 (1)	07:14	08:09
	16:51	17:52	18:45	20:43	15 07:29 (1)	21:35	22:01	21:38	20:37	32 07:43 (1)	07:12	18:11
25	08:25	07:26	06:18	06:05	07:18 (1)	05:11	04:56	05:27	06:21	07:10 (1)	07:15	08:11
	16:53	17:54	18:47	20:45	7 07:25 (1)	21:36	22:01	21:37	20:35	34 07:44 (1)	07:19	18:10
26	08:23	07:23	06:16	06:03	07:20 (1)	05:10	04:56	05:29	06:22	07:08 (1)	07:17	08:11
	16:54	17:56	18:49	20:46	20:46	21:37	22:01	21:35	20:33	35 07:43 (1)	07:19	18:10
27	08:22	07:21	06:14	06:01	07:21 (1)	05:08	04:57	05:31	06:24	07:08 (1)	07:19	08:13
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	20:36	07:44 (1)	07:19	18:15
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:08 (1)	07:21	07:17	08:15
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	20:37	07:45 (1)	07:12	18:13
29	08:19	07:19	06:09	05:56	05:06	04:58	05:34	06:28	07:06 (1)	07:23	07:19	08:16
	17:00	07:19	06:09	05:56	21:42	22:01	21:30	20:26	38 07:44 (1)	07:10	07:19	18:12
30	08:17	07:17	06:07	05:54	05:05	04:58	05:35	06:29	07:06 (1)	07:24	07:21	08:18
	17:02	07:17	06:07	05:54	21:43	22:00	21:28	20:23	38 07:44 (1)	07:10	07:21	18:11
31	08:15	07:15	06:04	05:52	05:04	04:57	05:37	06:31	07:06 (1)	07:25	07:22	08:14
	17:04	07:15	06:04	05:52	21:44	22:00	21:27	20:21	38 07:44 (1)	07:10	07:22	18:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case			143	731					416	342	126	
Sun reduction			0.27	0.35					0.34	0.32	0.29	
Oper. time red.			1.00	1.00					1.00	1.00	1.00	
Wind dir. red.			0.65	0.68					0.68	0.67	0.65	
Total reduction			0.18	0.24					0.23	0.22	0.19	
Total, real			25	174				96	74	24		

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BO - H67

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
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15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BP - H68

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
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16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
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25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: BQ - H69

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		10:49 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19		10:45 (2)							
2	16:15	58	15:37 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10		44	15:27 (1)						
	08:44		10:50 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26		08:21		10:44 (2)							
3	16:16	59	15:38 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09		48	15:27 (1)						
	08:44		10:50 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22		10:42 (2)							
4	16:17	59	15:39 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50		16:08		51	15:27 (1)						
	08:43		10:52 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24		10:41 (2)							
5	16:18	58	15:41 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48		16:08		54	15:28 (1)						
	08:43		10:52 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25		10:40 (2)							
6	16:20	59	15:41 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46		16:07		55	15:27 (1)						
	08:43		10:54 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:27		10:40 (2)							
7	16:21	57	15:42 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44		16:07		57	15:28 (1)						
	08:42		10:55 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36		08:28		10:39 (2)							
8	16:22	55	15:42 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43		16:06		59	15:28 (1)						
	08:42		10:56 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38		08:29		10:40 (2)							
9	16:24	53	15:42 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41		16:06		58	15:29 (1)						
	08:41		10:59 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:30		10:39 (2)							
10	16:25	51	15:44 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39		16:05		59	15:28 (1)						
	08:40		11:00 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42		08:32		10:39 (2)							
11	16:26	49	15:44 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37		16:05		60	15:28 (1)						
	08:40		11:03 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44		08:33		10:39 (2)							
12	16:28	45	15:45 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36		16:05		58	15:27 (1)						
	08:39		11:07 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46		15:03 (1)	08:34	10:39 (2)							
13	16:30	36	15:45 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	6	15:09 (1)	16:05	59	15:27 (1)						
	08:38		15:13 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47		15:00 (1)	08:35	10:40 (2)							
14	16:31	32	15:45 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	12	15:12 (1)	16:05	58	15:27 (1)						
	08:37		15:14 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49		14:57 (1)	08:36	10:40 (2)							
15	16:33	32	15:46 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	18	15:15 (1)	16:05	59	15:27 (1)						
	08:36		15:14 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51		14:56 (1)	08:37	10:40 (2)							
16	16:34	32	15:46 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	20	15:16 (1)	16:05	58	15:27 (1)						
	08:35		15:15 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53		14:55 (1)	08:38	10:40 (2)							
17	16:36	32	15:47 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	22	15:17 (1)	16:05	58	15:26 (1)						
	08:34		15:14 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55		14:54 (1)	08:39	10:40 (2)							
18	16:38	32	15:46 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	25	15:19 (1)	16:05	59	15:27 (1)						
	08:33		15:15 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57		14:53 (1)	08:39	10:41 (2)							
19	16:40	32	15:47 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	26	15:19 (1)	16:05	58	15:27 (1)						
	08:32		15:16 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59		14:53 (1)	08:40	10:41 (2)							
20	16:41	31	15:47 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	27	15:20 (1)	16:05	59	15:28 (1)						
	08:31		15:16 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01		14:52 (1)	08:41	10:41 (2)							
21	16:43	30	15:46 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	29	15:21 (1)	16:06	57	15:27 (1)						
	08:30		15:17 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02		14:52 (1)	08:41	10:42 (2)							
22	16:45	30	15:47 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	30	15:22 (1)	16:06	57	15:28 (1)						
	08:29		15:17 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		14:52 (1)	08:42	10:42 (2)							
23	16:47	29	15:46 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	30	15:22 (1)	16:06	57	15:28 (1)						
	08:27		15:19 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		14:52 (1)	08:42	10:43 (2)							
24	16:49	27	15:46 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	31	15:23 (1)	16:07	57	15:29 (1)						
	08:26		15:19 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08		14:52 (1)	08:43	10:43 (2)							
25	16:51	26	15:45 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	32	15:24 (1)	16:08	58	15:29 (1)						
	08:25		15:21 (1)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09		14:52 (1)	08:43	10:44 (2)							
26	16:52	25	15:46 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	32	15:24 (1)	16:08	58	15:30 (1)						
	08:23		15:22 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11		14:53 (1)	08:43	10:45 (2)							
27	16:54	22	15:44 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15	32	15:25 (1)	16:09	58	15:31 (1)						
	08:22		15:24 (1)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13		14:53 (1)	08:44	10:45 (2)							
28	16:56	20	15:44 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	32	15:25 (1)	16:10	59	15:32 (1)						
	08:20		15:26 (1)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14		14:54 (1)	08:44	10:46 (2)							
29	16:58	17	15:43 (1)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	32	15:26 (1)	16:11	58	15:33 (1)						
	08:19		15:28 (1)		07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16		14:53 (1)	08:44	10:47 (2)							
30	17:00	12	15:40 (1)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	32	15:25 (1)	16:11	58	15:34 (1)						
	08:17		15:32 (1)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BR - H70

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44	12:22 (2)	08:14	16:23 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:49 (1)	08:19	12:13 (2)	28	16:17 (1)	16:10	45	12:58 (2)	16:15	15:49 (1)	08:21	12:13 (2)	
2	08:44	12:23 (2)	08:12	16:22 (1)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	15:49 (1)	08:21	12:13 (2)	28	16:17 (1)	16:09	46	12:59 (2)	16:16	15:49 (1)	08:22	12:12 (2)	
3	08:44	12:23 (2)	08:10	16:21 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	15:49 (1)	08:22	12:12 (2)	28	16:17 (1)	16:08	48	13:00 (2)	16:20	15:49 (1)	08:24	12:12 (2)	
4	08:43	12:24 (2)	08:08	16:20 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	15:49 (1)	08:24	12:12 (2)	28	16:17 (1)	16:08	49	13:01 (2)	16:48	15:49 (1)	08:25	12:12 (2)	
5	08:43	12:25 (2)	08:07	16:20 (1)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	15:49 (1)	08:25	12:12 (2)	25	16:14 (1)	16:07	49	13:01 (2)	16:46	15:50 (1)	08:26	12:12 (2)	
6	08:43	12:26 (2)	08:05	16:20 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	15:50 (1)	08:26	12:12 (2)	22	16:12 (1)	16:07	50	13:02 (2)	16:44	15:50 (1)	08:28	12:12 (2)	
7	08:42	12:26 (2)	08:03	16:19 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	15:50 (1)	08:28	12:12 (2)	20	16:10 (1)	16:06	51	13:03 (2)	16:43	15:51 (1)	08:29	12:11 (2)	
8	08:42	12:27 (2)	08:01	16:19 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	15:51 (1)	08:29	12:11 (2)	17	16:08 (1)	16:06	52	13:03 (2)	16:41	15:53 (1)	08:30	12:12 (2)	
9	08:41	12:29 (2)	07:59	16:19 (1)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	16:08 (1)	16:06	12:12 (2)	14	16:07 (1)	16:05	52	13:04 (2)	16:39	15:54 (1)	08:32	12:12 (2)	
10	08:40	12:29 (2)	07:57	16:20 (1)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	16:05 (1)	16:05	12:12 (2)	11	16:05 (1)	16:05	53	13:05 (2)	16:37	15:55 (1)	08:33	12:12 (2)	
11	08:40	12:30 (2)	07:55	16:20 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	16:03 (1)	16:05	12:12 (2)	8	16:03 (1)	16:05	53	13:05 (2)	16:36	15:57 (1)	08:34	12:13 (2)	
12	08:39	12:31 (2)	07:53	16:21 (1)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	16:01 (1)	16:05	12:13 (2)	4	16:01 (1)	16:05	54	13:06 (2)	16:34	15:57 (1)	08:35	12:13 (2)	
13	08:38	12:33 (2)	07:51	16:20 (1)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:47	07:47	16:01 (1)	16:05	12:13 (2)	16:33	15:57 (1)	08:36	54	13:07 (2)	16:32	15:58 (1)	08:36	12:14 (2)	
14	08:37	12:34 (2)	07:49	16:21 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	16:05 (1)	16:05	12:14 (2)	15:49	16:05 (1)	16:05	54	13:08 (2)	16:31	15:59 (1)	08:37	12:13 (2)	
15	08:36	12:35 (2)	07:47	16:22 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	16:05 (1)	16:05	12:13 (2)	15:48	16:05 (1)	16:05	54	13:07 (2)	16:30	15:59 (1)	08:38	12:14 (2)	
16	08:35	12:37 (2)	07:45	16:24 (1)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	16:05 (1)	16:05	12:14 (2)	15:47	16:05 (1)	16:05	54	13:08 (2)	16:29	15:59 (1)	08:39	12:14 (2)	
17	08:34	12:38 (2)	07:43	16:26 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	16:05 (1)	16:05	12:14 (2)	15:46	16:05 (1)	16:05	55	13:09 (2)	16:28	15:59 (1)	08:40	12:15 (2)	
18	08:33	12:40 (2)	07:41	16:28 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	16:05 (1)	16:05	12:15 (2)	15:45	16:05 (1)	16:05	55	13:10 (2)	16:27	15:59 (1)	08:41	12:15 (2)	
19	08:32	12:42 (2)	07:39	16:33 (1)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	16:05 (1)	16:05	12:15 (2)	15:44	16:05 (1)	16:05	55	13:10 (2)	16:26	15:59 (1)	08:42	12:16 (2)	
20	08:31	12:44 (2)	07:37	16:36 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	12:26 (2)	08:41	12:15 (2)	15:43	16:05 (1)	16:05	55	13:10 (2)	16:25	15:59 (1)	08:42	12:16 (2)	
21	08:30	12:47 (2)	07:34	16:38 (1)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	12:27 (2)	08:41	12:16 (2)	15:42	16:05 (1)	16:05	55	13:11 (2)	16:24	15:59 (1)	08:43	12:16 (2)	
22	08:29	12:51 (2)	07:32	16:42 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	12:28 (2)	08:42	12:16 (2)	15:41	16:05 (1)	16:05	55	13:11 (2)	16:23	15:59 (1)	08:44	12:17 (2)	
23	08:27	13:02 (2)	07:30	16:48 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	16:19 (1)	08:06	12:29 (2)	08:42	15:40	16:05 (1)	16:05	55	13:12 (2)	16:22	15:59 (1)	08:43	12:17 (2)	
24	08:26	17:50	07:28	16:49 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	16:19 (1)	08:08	12:29 (2)	08:43	15:39	16:05 (1)	16:05	55	13:12 (2)	16:21	15:59 (1)	08:44	12:17 (2)	
25	08:25	17:52	07:25	16:50 (1)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	13	17:10 (1)	16:17	12:29 (2)	15:38	16:05 (1)	16:05	55	13:12 (2)	16:20	15:59 (1)	08:45	12:18 (2)	
26	08:23	17:54	07:23	16:52 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	17	16:12 (1)	16:16	12:29 (2)	15:37	16:05 (1)	16:05	55	13:13 (2)	16:19	15:59 (1)	08:46	12:18 (2)	
27	08:22	17:56	07:21	16:54 (1)	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	20	16:13 (1)	16:14	12:29 (2)	15:36	16:05 (1)	16:05	55	13:14 (2)	16:18	15:59 (1)	08:47	12:19 (2)	
28	08:20	17:58	07:19	16:56 (1)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	22	16:14 (1)	16:13	12:29 (2)	15:35	16:05 (1)	16:05	55	13:14 (2)	16:17	15:59 (1)	08:48	12:20 (2)	
29	08:19	18:00	07:17	16:58 (1)	06:10	05:57	05:06	04:57	05:33	06:27	07:22	08:18	24	16:15 (1)	16:12	12:29 (2)	15:34	16:05 (1)	16:05	54	13:14 (2)	16:16	15:59 (1)	08:49	12:21 (2)	
30	08:17	16:25 (1)	17:00	16:59 (1)	06:09	05:56	05:06	04:57	05:34	06:28	07:23	08:19	25	16:15 (1)	16:12	12:29 (2)	15:33	16:05 (1)	16:05	54	13:15 (2)	16:15	15:59 (1)	08:50	12:21 (2)	
31	08:15	16:23 (1)	17:04	16:59 (1)	06:08	05:55	05:05	04:58	05:35	06:29	07:24	08:20	27	16:16 (1)	16:11	12:29 (2)	15:32	16:05 (1)	16:05	54	13:15 (2)	16:14	15:59 (1)	08:51	12:21 (2)	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	176	586	1639	0.24	1.00	0.66	0.19	0.17	0.13	0.21	1.00	0.63	0.15	0.13
Total, worst case	917	394											176	586	1639	0.24	1.00	0.66	0.19	0.17	0.13	0.21	1.00	0.63	0.15	0.13
Sun reduction	0.24	0.23											0.24	0.23	0.21	1.00	0.66	0.19	0.17	0.13	0.21	1.00	0.63	0.15	0.13	
Oper. time red.	1.00	1.00											1.00	1.00	1.00	1.00	0.66	0.19	0.17	0.13	0.21	1.00	0.63	0.15	0.13	
Wind dir. red.	0.63	0.66											0.66	0.64	0.63	0.19	0.17	0.13	0.21	0.13	0.21	1.00	0.63	0.15	0.13	
Total reduction	0.15	0.15											0.19	0.17	0.13	0.21	0.66	0.19	0.17	0.13	0.21	1.00	0.63	0.15	0.13	
Total, real	140	60											34	99	213	0.24	1.00	0.66	0.19	0.17	0.13	0.21	1.00	0.63	0.15	0.13

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BS - H71

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	13:32 (2)	08:14	13:54 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	08:44	14:37 (2)	08:12	14:39 (2)	07:06	20:00	20:55	21:45	22:00	21:25	20:18	19:05
3	08:44	13:33 (2)	08:12	13:55 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28
4	08:44	14:38 (2)	08:10	14:37 (2)	07:08	20:02	20:57	21:47	22:00	21:23	20:16	19:02
5	08:43	13:34 (2)	08:08	13:57 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
6	08:43	14:38 (2)	08:06	14:36 (2)	07:10	20:04	20:59	21:48	21:59	21:21	20:13	19:00
7	08:42	13:34 (2)	08:07	13:59 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31
8	08:42	14:39 (2)	08:07	14:02 (2)	07:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57
9	08:41	13:35 (2)	08:05	14:05 (2)	07:05	06:51	05:44	04:59	05:02	05:45	06:40	07:33
10	08:40	13:36 (2)	08:04	14:06 (2)	07:04	20:07	21:03	21:50	21:58	21:17	20:09	18:55
11	08:40	14:40 (2)	08:03	14:29 (2)	07:03	06:49	05:42	04:59	05:03	05:47	06:42	07:35
12	08:39	13:37 (2)	08:03	14:29 (2)	07:02	20:09	21:04	21:51	21:58	21:16	20:06	18:52
13	08:38	13:38 (2)	08:01	14:10 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37
14	08:37	13:39 (2)	08:00	14:25 (2)	07:01	20:11	21:06	21:52	21:57	21:14	20:04	18:50
15	08:36	13:40 (2)	07:59	14:25 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
16	08:35	13:41 (2)	07:58	14:26 (2)	06:59	06:45	05:39	04:56	05:04	05:52	06:47	07:41
17	08:34	13:42 (2)	07:57	14:27 (2)	06:58	06:46	05:40	04:57	05:03	05:53	06:48	07:42
18	08:33	13:43 (2)	07:56	14:28 (2)	06:57	06:47	05:39	04:56	05:02	05:54	06:49	07:43
19	08:32	13:44 (2)	07:55	14:29 (2)	06:56	06:48	05:38	04:55	05:01	05:55	06:50	07:44
20	08:31	13:45 (2)	07:54	14:30 (2)	06:55	06:49	05:37	04:54	05:00	05:56	06:51	07:45
21	08:30	13:46 (2)	07:53	14:31 (2)	06:54	06:50	05:36	04:53	05:00	05:57	06:52	07:46
22	08:29	13:47 (2)	07:52	14:32 (2)	06:53	06:51	05:35	04:52	05:00	05:58	06:53	07:47
23	08:28	13:48 (2)	07:51	14:33 (2)	06:52	06:52	05:34	04:51	05:00	05:59	06:54	07:48
24	08:27	13:49 (2)	07:50	14:34 (2)	06:51	06:53	05:33	04:50	05:00	05:57	06:55	07:49
25	08:26	13:50 (2)	07:49	14:35 (2)	06:50	06:54	05:32	04:49	05:00	05:56	06:56	07:50
26	08:25	13:51 (2)	07:48	14:36 (2)	06:49	06:55	05:31	04:48	05:00	05:55	06:57	07:51
27	08:24	13:52 (2)	07:47	14:37 (2)	06:48	06:56	05:30	04:47	05:00	05:54	06:58	07:52
28	08:23	13:53 (2)	07:46	14:38 (2)	06:47	06:57	05:29	04:46	05:00	05:53	06:59	07:53
29	08:22	13:54 (2)	07:45	14:39 (2)	06:46	06:58	05:28	04:45	05:00	05:52	06:60	07:54
30	08:21	13:55 (2)	07:44	14:40 (2)	06:45	06:59	05:27	04:44	05:00	05:51	06:61	07:55
31	08:20	13:56 (2)	07:43	14:41 (2)	06:44	07:00	05:26	04:43	05:00	05:50	06:62	07:56
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	1895	531										2115
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.65	0.66										0.65
Total reduction	0.16	0.15										0.13
Total, real	298	81										284

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

6918 Kellystown

5 no. turbine Wind Farm, Co. Louth

Jennings O'Donovan

F91 RHH9 Sligo

+353719161416

Kathryn Feeney

Calculated:

28/03/

15

Calculation: Kellystown N163 Worst Case Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44 16:15		08:14 17:06		16:10 (2) 16:34 (2)	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05		07:24 16:54		15:36 (2) 16:13 (2)	08:19 16:10	15:24 (3) 15:34 (3)					
2	08:44 16:16		08:12 17:08	24	16:09 (2) 16:32 (2)	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02		07:26 16:52		15:36 (2) 16:13 (2)	08:21 16:09	15:24 (3) 15:32 (3)					
3	08:44 16:17		08:10 17:10	31	16:08 (2) 16:39 (2)	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00		07:28 16:50		15:36 (2) 16:13 (2)	08:22 16:08	15:26 (3) 15:32 (3)					
4	08:43 16:18		08:08 17:12	33	16:08 (2) 16:41 (2)	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57		07:30 16:48		15:36 (2) 16:12 (2)	08:24 16:08	15:27 (3) 15:32 (3)					
5	08:43 16:19		08:07 17:14	35	16:07 (2) 16:42 (2)	07:09 18:07	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55		07:32 16:46		15:37 (2) 16:12 (2)	08:25 16:07	15:27 (3) 15:30 (3)					
6	08:43 16:21	2	15:42 (3) 15:44 (3)	35	16:05 16:42 (2)	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52		07:34 16:44		15:37 (2) 16:11 (2)	08:26 16:07	15:28 (3) 15:30 (3)					
7	08:42 16:22	3	15:42 (3) 15:45 (3)	35	16:03 (2) 16:42 (2)	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50		07:36 16:43		15:37 (2) 16:10 (2)	08:28 16:06	15:30 (3) 15:32 (3)					
8	08:42 16:24	4	15:42 (3) 15:46 (3)	36	16:01 16:43 (2)	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48		07:38 16:41		15:38 (2) 16:08 (2)	08:29 16:06	15:32 (3) 15:30 (3)					
9	08:41 16:25	7	15:42 (3) 15:49 (3)	36	16:07 (2) 16:43 (2)	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	06:52 21:10	07:41 19:59	07:41 18:45		07:40 16:39		15:40 (2) 16:07 (2)	08:30 16:05	15:30 (3) 15:32 (3)					
10	08:40 16:26	8	15:42 (3) 15:50 (3)	36	16:07 (2) 16:43 (2)	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	07:10 21:08	06:49 19:56	07:42 18:43		07:42 16:37		15:40 (2) 16:05 (2)	08:31 16:05	15:30 (3) 15:32 (3)					
11	08:40 16:28	10	15:42 (3) 15:52 (3)	36	16:07 (2) 16:43 (2)	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40		07:44 16:35		15:41 (2) 16:03 (2)	08:33 16:05	15:30 (3) 15:32 (3)					
12	08:39 16:30	11	15:43 (3) 15:54 (3)	37	16:07 (2) 16:43 (2)	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38		07:46 16:34		15:43 (2) 16:01 (2)	08:34 16:05	15:30 (3) 15:32 (3)					
13	08:38 16:31	12	15:43 (3) 15:55 (3)	38	16:07 (2) 16:42 (2)	06:51 18:25	06:35 20:22	05:31 21:17	04:55 21:57	05:10 21:52	06:45 21:01	07:47 19:49	07:47 18:36		07:47 16:32		15:43 (2) 15:59 (2)	08:35 16:04	15:30 (3) 15:32 (3)					
14	08:37 16:33	14	15:43 (3) 15:57 (3)	38	16:07 (2) 16:42 (2)	06:49 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	07:48 19:47	07:50 18:33		07:49 16:31		15:43 (2) 15:57 (2)	08:36 16:04	15:30 (3) 15:32 (3)					
15	08:36 16:34	16	15:43 (3) 15:59 (3)	39	16:08 (2) 16:43 (2)	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	07:52 19:44	07:52 18:31		07:51 16:29		15:43 (2) 15:56 (2)	08:37 16:04	15:30 (3) 15:32 (3)					
16	08:35 16:36	15	15:43 (3) 16:00 (3)	39	16:08 (2) 16:43 (2)	06:43 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	07:54 19:42	07:54 18:29		07:53 16:27		15:43 (2) 15:54 (2)	08:38 16:05	15:30 (3) 15:32 (3)					
17	08:34 16:38	17	15:43 (3) 16:02 (3)	40	16:10 (2) 16:40 (2)	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26		07:55 16:26		15:43 (2) 15:53 (3)	08:38 16:05	15:30 (3) 15:32 (3)					
18	08:33 16:40	18	15:43 (3) 16:05 (3)	41	16:11 (2) 16:34 (2)	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24		07:57 16:24		15:43 (2) 15:52 (3)	08:39 16:05	15:30 (3) 15:32 (3)					
19	08:32 16:41	19	15:43 (3) 16:07 (3)	42	16:12 (2) 16:37 (2)	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:04	05:18 21:55	06:10 20:48	07:05 19:34	07:59 18:23		07:59 16:23		15:43 (2) 15:52 (3)	08:40 16:04	15:30 (3) 15:32 (3)					
20	08:31 16:43	20	15:43 (3) 16:07 (3)	43	16:13 (2) 16:38 (2)	06:36 18:38	06:19 20:35	05:16 21:28	04:54 22:00	05:19 21:44	06:12 20:46	07:06 19:32	08:01 18:20		16:50 (2) 17:02 (2)		15:43 (2) 15:53 (2)	08:41 16:06	15:30 (3) 15:32 (3)					
21	08:30 16:45	21	15:43 (3) 16:07 (3)	44	16:14 (2) 16:39 (2)	06:38 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17		16:47 (2) 17:05 (2)		15:43 (2) 15:53 (2)	08:42 16:06	15:30 (3) 15:32 (3)					
22	08:29 16:47	22	15:43 (3) 16:07 (3)	45	16:20 (2) 16:45 (2)	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		16:44 (2) 17:07 (2)		15:43 (2) 15:53 (2)	08:43 16:06	15:30 (3) 15:32 (3)					
23	08:27 16:49	23	15:43 (3) 16:07 (3)	46	16:21 (2) 16:46 (2)	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13		16:42 (2) 17:08 (2)		15:43 (2) 15:53 (2)	08:44 16:07	15:30 (3) 15:32 (3)					
24	08:26 16:50	24	15:43 (3) 16:06 (3)	47	16:22 (2) 16:47 (2)	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11		16:41 (2) 17:09 (2)		15:43 (2) 15:53 (2)	08:45 16:08	15:30 (3) 15:32 (3)					
25	08:25 16:52	25	15:43 (3) 16:06 (3)	48	16:23 (2) 16:48 (2)	06:20 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	08:11 17:13		16:40 (2) 17:06 (2)		15:43 (2) 15:53 (2)	08:46 16:08	15:30 (3) 15:32 (3)					
26	08:23 16:54	26	15:43 (3) 16:08 (3)	49	16:24 (2) 16:49 (2)	06:19 18:48	06:03 20:45	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:09 17:14		16:39 (2) 17:15 (2)		15:43 (2) 15:53 (2)	08:47 16:09	15:30 (3) 15:32 (3)					
27	08:22 16:56	27	15:43 (3) 16:09 (3)	50	16:25 (2) 16:50 (2)	06:18 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:33	07:19 19:14	08:13 17:04		16:38 (2) 17:14 (2)		15:43 (2) 15:53 (2)	08:48 16:10	15:30 (3) 15:32 (3)					
28	08:20 16:58	28	15:43 (3) 16:26 (2)	51	16:26 (2) 16:51 (2)	06:18 18:53	06:01 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02		16:37 (2) 17:13 (2)		15:43 (2) 15:53 (2)	08:49 16:11	15:30 (3) 15:32 (3)					
29	08:19 17:00	29	15:43 (3) 16:27 (2)	52	16:27 (2) 16:52 (2)	06:17 18:54	06:02 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	08:17 17:00		16:36 (2) 17:12 (2)		15:43 (2) 15:53 (2)	08:50 16:11	15:30 (3) 15:32 (3)					
30	08:17 17:02	30	15:43 (3) 16:28 (2)	53	16:28 (2) 16:53 (2)	06:16 18:55	06:03 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:18 16:58		16:35 (2) 17:11 (2)		15:43 (2) 15:53 (2)	08:51 16:12	15:30 (3) 15:32 (3)					
31	08:15 17:04	31	15:43 (3) 16:31 (2)	54	16:29 (2) 16:54 (2)	06:15 18:56	06:04 20:55	05:04 21:44	04:57 22:01	05:37 21:27	06:31 20:21	07:22 16:56	08:19 16:12		16:34 (2) 17:10 (2)		15:43 (2) 15:53 (2)	08:52 16:13	15:30 (3) 15:32 (3)					
Potential sun hours	250		273		367	420	494	510	512	460	382	328	345		259		690		34					
Total, worst case	391		666										0.24				0.27		0.21					
Sun reduction	0.24		0.23										1.00				1.00		1.00					
Oper. time red.	1.00		1.00										0.66				0.66		0.66					
Wind dir. red.	0.66		0.66										0.66				0.66		0.66					
Total reduction	0.16		0.15										0.19				0.18		0.14					
Total, real	63		102										67				121		5					

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker (WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker (WTG causing flicker last time)
	Minutes with flicker	
1		
2		
3		
4		
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8		
9		
10		
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31		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BU - H73

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	08:14	15:57 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	15:28 (2)	08:19					07:24	15:28 (2)	08:19		
2	08:44	08:12	15:57 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	15:28 (2)	08:21					07:26	15:28 (2)	08:21		
3	08:44	08:10	15:57 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	15:27 (2)	08:22					07:28	15:27 (2)	08:22		
4	08:43	08:08	16:31 (2)	18:06	20:04	05:46	05:00	05:01	05:44	06:38	07:31	07:30	15:27 (2)	08:24					07:30	15:27 (2)	08:24		
5	08:43	08:07	16:31 (2)	18:07	20:06	05:44	05:01	05:02	05:45	06:40	07:33	07:32	15:26 (2)	08:25					07:32	15:26 (2)	08:25		
6	08:43	08:05	16:31 (2)	18:09	20:07	05:42	05:03	05:04	05:47	06:42	07:35	07:34	15:26 (2)	08:26					07:34	15:26 (2)	08:26		
7	08:42	08:03	16:31 (2)	18:11	20:09	05:40	05:04	05:05	05:49	06:43	07:37	07:36	15:26 (2)	08:28					07:36	15:26 (2)	08:28		
8	08:42	08:01	16:31 (2)	18:13	20:11	05:38	05:05	05:06	05:52	06:45	07:40	07:38	15:26 (2)	08:29					07:38	15:26 (2)	08:29		
9	08:41	07:59	16:31 (2)	18:15	20:13	05:36	05:07	05:08	05:54	06:49	07:42	07:40	15:27 (2)	08:30					07:40	15:27 (2)	08:30		
10	08:40	07:57	16:31 (2)	18:17	20:15	05:34	05:08	05:09	05:56	06:50	07:44	07:42	15:28 (2)	08:32					07:42	15:28 (2)	08:32		
11	08:40	07:55	16:31 (2)	18:19	20:17	05:32	05:10	05:11	05:58	06:53	07:47	07:46	15:28 (2)	08:33					07:46	15:28 (2)	08:33		
12	08:39	07:53	16:31 (2)	18:21	20:19	05:30	05:11	05:12	05:59	06:55	07:49	07:48	15:29 (2)	08:34					07:48	15:29 (2)	08:34		
13	08:38	07:51	16:31 (2)	18:23	20:20	05:29	05:12	05:13	05:59	06:56	07:50	07:47	15:29 (2)	08:35					07:47	15:29 (2)	08:35		
14	08:37	07:49	16:31 (2)	18:25	20:22	05:27	05:13	05:14	05:57	06:51	07:45	07:44	15:30 (2)	08:36					07:44	15:30 (2)	08:36		
15	08:36	07:47	16:31 (2)	18:27	20:24	05:25	05:14	05:15	05:55	06:49	07:43	07:42	15:31 (2)	08:37					07:43	15:31 (2)	08:37		
16	08:35	07:45	16:31 (2)	18:28	20:26	05:24	05:14	05:15	05:54	06:48	07:42	07:41	15:32 (2)	08:38					07:42	15:32 (2)	08:38		
17	08:34	07:43	16:31 (2)	18:30	20:28	05:22	05:15	05:16	05:53	06:47	07:41	07:40	15:33 (2)	08:39					07:41	15:33 (2)	08:39		
18	08:33	07:41	16:31 (2)	18:32	20:30	05:21	05:16	05:17	05:52	06:46	07:40	07:39	15:34 (2)	08:40					07:40	15:34 (2)	08:40		
19	08:32	07:39	16:31 (2)	18:34	20:31	05:20	05:17	05:18	05:51	06:45	07:39	07:38	15:35 (2)	08:41					07:39	15:35 (2)	08:41		
20	08:31	07:36	16:31 (2)	18:36	20:33	05:18	05:18	05:19	05:50	06:44	07:38	07:37	15:36 (2)	08:42					07:38	15:36 (2)	08:42		
21	08:30	07:34	16:31 (2)	18:38	20:35	05:16	05:19	05:20	05:49	06:43	07:37	07:36	15:37 (2)	08:43					07:37	15:37 (2)	08:43		
22	08:29	07:32	16:31 (2)	18:40	20:37	05:15	05:20	05:21	05:48	06:42	07:36	07:35	15:38 (2)	08:44					07:36	15:38 (2)	08:44		
23	08:27	07:30	16:31 (2)	18:42	20:39	05:13	05:21	05:22	05:47	06:41	07:35	07:34	15:39 (2)	08:45					07:35	15:39 (2)	08:45		
24	08:26	07:28	16:31 (2)	18:44	20:41	05:12	05:22	05:23	05:46	06:40	07:34	07:33	15:40 (2)	08:46					07:34	15:40 (2)	08:46		
25	08:25	07:25	16:31 (2)	18:46	20:43	05:11	05:23	05:24	05:45	06:39	07:33	07:32	15:41 (2)	08:47					07:33	15:41 (2)	08:47		
26	08:23	07:23	16:31 (2)	18:48	20:45	05:10	05:24	05:25	05:44	06:38	07:32	07:31	15:42 (2)	08:48					07:32	15:42 (2)	08:48		
27	08:22	07:21	16:31 (2)	18:50	20:47	05:09	05:25	05:26	05:43	06:37	07:31	07:30	15:43 (2)	08:49					07:31	15:43 (2)	08:49		
28	08:20	07:18	16:31 (2)	18:52	20:49	05:08	05:26	05:27	05:42	06:36	07:30	07:29	15:44 (2)	08:50					07:30	15:44 (2)	08:50		
29	08:19	07:16	16:31 (2)	18:54	20:51	05:07	05:27	05:28	05:41	06:35	07:29	07:28	15:45 (2)	08:51					07:29	15:45 (2)	08:51		
30	08:17	07:14	16:31 (2)	18:56	20:53	05:06	05:28	05:29	05:40	06:34	07:28	07:27	15:46 (2)	08:52					07:28	15:46 (2)	08:52		
31	08:15	07:12	16:31 (2)	18:58	20:55	05:05	05:29	05:30	05:39	06:33	07:27	07:26	15:47 (2)	08:53					07:27	15:47 (2)	08:53		
Potential sun hours	250	273	367	420	494	510	512	460	382	328	155	578	259	101	233								
Total, worst case	239	479									155	578											
Sun reduction	0.24	0.23									0.29	0.27											
Oper. time red.	1.00	1.00									1.00	1.00											
Wind dir. red.	0.66	0.66									0.66	0.66											
Total reduction	0.16	0.15									0.19	0.18											
Total, real	38	74									30	101											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BV - H74

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BW - H75

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BX - H76

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: BY - H77

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		09:02 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19		08:54 (2)					08:19	08:54 (2)
	16:15		17:06	17	09:19 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10		08:55 (2)		1			16:10	08:55 (2)
2	08:44		08:12		09:03 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26		08:21							08:21	
	16:16		17:08	14	09:17 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09							16:09	
3	08:44		08:10		09:06 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22							08:22	
	16:17		17:10		09:15 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:15	19:00	16:50		16:08							16:08	
4	08:43		08:09	9		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24							08:24	
	16:18		17:12			18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48		16:08							16:08	
5	08:43		08:07			07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25							08:25	
	16:20		17:14			18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46		16:07							16:07	
6	08:43		08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:27							08:27	
	16:21		17:16			18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44		16:07							16:07	
7	08:42		08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36		08:28							08:28	
	16:22		17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43		16:06							16:06	
8	08:42		08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38		08:29		08:36 (2)					08:29	
	16:24		17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	10	08:46 (2)		16:06					16:06	
9	08:41		07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:34 (2)		08:30 (2)					08:30	
	16:25		17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	14	08:48 (2)		16:05					16:05	
10	08:41		07:57			06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42		08:32 (2)		08:32 (2)					08:32	
	16:27		17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	18	08:50 (2)		16:05					16:05	
11	08:40		09:12 (2)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44		08:31 (2)		08:33					08:33	
	16:28	1	09:13 (2)	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	20	08:51 (2)		16:05					16:05	
12	08:39		09:11 (2)	07:53		06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46		08:30 (2)		08:34					08:34	
	16:30	3	09:14 (2)	17:28		18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	22	08:52 (2)		16:05					16:05	
13	08:38		09:10 (2)	07:51		06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48		08:30 (2)		08:35					08:35	
	16:31	5	09:15 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	23	08:53 (2)		16:05					16:05	
14	08:37		09:09 (2)	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49		08:29 (2)		08:36					08:36	
	16:33	7	09:16 (2)	17:32		18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	24	08:53 (2)		16:05					16:05	
15	08:37		09:08 (2)	07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51		08:29 (2)		08:37					08:37	
	16:34	9	09:17 (2)	17:34		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	25	08:54 (2)		16:05					16:05	
16	08:36		09:07 (2)	07:45		06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53		08:29 (2)		08:38					08:38	
	16:36	11	09:18 (2)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	25	08:54 (2)		16:05					16:05	
17	08:35		09:05 (2)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55		08:29 (2)		08:39					08:39	
	16:38	13	09:18 (2)	17:38		18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	26	08:55 (2)		16:05					16:05	
18	08:33		09:04 (2)	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57		08:29 (2)		08:39					08:39	
	16:40	15	09:19 (2)	17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	26	08:55 (2)		16:05					16:05	
19	08:32		09:03 (2)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59		08:31 (2)		08:40					08:40	
	16:41	17	09:20 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	24	08:55 (2)		16:05					16:05	
20	08:31		09:01 (2)	07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01		08:33 (2)		08:41					08:41	
	16:43	19	09:20 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	23	08:56 (2)		16:06					16:06	
21	08:30		09:00 (2)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02		08:35 (2)		08:41					08:41	
	16:45	21	09:21 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	21	08:56 (2)		16:06					16:06	
22	08:29		08:59 (2)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		08:37 (2)		08:42					08:42	
	16:47	23	09:22 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	19	08:56 (2)		16:07					16:07	
23	08:27		08:57 (2)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		08:39 (2)		08:42					08:42	
	16:49	24	09:21 (2)	17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	17	08:56 (2)		16:07					16:07	
24	08:26		08:55 (2)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08		08:41 (2)		08:43					08:43	
	16:51	26	09:21 (2)	17:52		18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	15	08:56 (2)		16:08					16:08	
25	08:25		08:56 (2)	07:25		06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:09		08:43 (2)		08:43					08:43	
	16:52	26	09:22 (2)	17:54		18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	13	08:56 (2)		16:08					16:08	
26	08:23		08:56 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11		08:45 (2)		08:44					08:44	
	16:54	25	09:21 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	11	08:56 (2)		16:09					16:09	
27	08:22		08:57 (2)	07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13		08:47 (2)		08:44					08:44	
	16:56	25	09:22 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	16:14	9	08:56 (2)		16:10					16:10	
28	08:20		08:57 (2)	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:15		08:49 (2)		08:44					08:44	
	16:58	25	09:22 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	7	08:56 (2)		16:11					16:11	
29	08:19		08:58 (2)			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16		08:50 (2)		08:44					08:44	
	17:00	23	09:21 (2)			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	5	08:55 (2)		16:11					16:11	
30	08:17		08:58 (2)			07:06	05:54	05:05	04:															

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: BZ - H78

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	12:22 (1)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	16:15	24 12:46 (1)	17:06	08:51 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05
3	08:44	12:23 (1)	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28
4	16:16	23 12:46 (1)	17:08	08:52 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
5	08:44	12:24 (1)	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
6	16:17	21 12:45 (1)	17:10	08:53 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
7	08:43	12:26 (1)	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32
8	16:18	19 12:45 (1)	17:12	08:53 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
9	08:43	12:28 (1)	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33
10	16:20	15 12:43 (1)	17:14	08:54 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55
11	08:43	12:31 (1)	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35
12	16:21	11 12:42 (1)	17:16	08:54 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53
13	08:42	12:36 (1)	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37
14	16:22	2 12:38 (1)	17:18	08:55 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
15	08:42		08:01	08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
16	16:24		17:20	08:55 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48
17	08:41		07:59	08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
18	16:25		17:22	08:55 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45
19	08:40		07:57	08:25 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43
20	16:27		17:24	08:55 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43
21	08:40		07:55	08:25 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
22	16:28		17:26	08:55 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41
23	08:39		07:53	08:26 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46
24	16:30		17:28	08:55 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38
25	08:38		07:51	08:27 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48
26	16:31		17:30	08:54 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36
27	08:37		07:49	08:26 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
28	16:33		17:32	08:53 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33
29	08:36		07:47	08:28 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52
30	16:34		17:34	08:52 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31
31	08:36		07:45	08:29 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54
1	16:36		17:36	08:51 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29
2	08:35		07:43	08:30 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56
3	16:38		17:38	08:50 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27
4	08:33		07:41	08:32 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57
5	16:40		17:40	08:47 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24
6	08:32		07:39	08:35 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
7	16:41		17:42	9 08:44 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22
8	08:31		07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
9	16:43		17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20
10	08:30		07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03
11	16:45		17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18
12	08:29		07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05
13	16:47		17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15
14	08:27		07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07
15	16:49		17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13
16	08:26		07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09
17	16:51		17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11
18	08:25		07:25		06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11
19	16:52		17:54		18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09
20	08:23		07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13
21	16:54		17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07
22	08:22		07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15
23	16:56		17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04
24	08:20		07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17
25	16:58		18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02
26	08:19				07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19
27	17:00				19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00
28	08:17		08:45 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20
29	17:02	2	08:47 (2)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00
30	08:15		08:44 (2)		07:04		05:04		05:37	06:31		07:22
31	17:04	6	08:50 (2)		19:58		21:44		21:27	20:21		16:56
Potential sun hours	250		273		367		420		494		510	
Total, worst case		123		409								
Sun reduction		0.24		0.23								
Oper. time red.		1.00		1.00								
Wind dir. red.		0.62		0.62								
Total reduction		0.15		0.14								
Total, real		19		59								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Assumptions for shadow calculations

Shadow receptor: CA - H79

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	12:02 (1) 08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (2) 08:19
2	16:15 37	12:39 (1) 17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	20 08:14 (2) 16:10
3	08:44	12:03 (1) 08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	07:56 (2) 08:21
4	16:16 37	12:40 (1) 17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	17 08:13 (2) 16:09
5	08:44	12:04 (1) 08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	07:58 (2) 08:22
6	16:17 35	12:39 (1) 17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	14 08:12 (2) 16:08
7	08:43	12:05 (1) 08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:00 (2) 08:24
8	16:18 34	12:39 (1) 17:12	2 08:38 (2) 18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	12 08:12 (2) 16:08
9	08:43	12:06 (1) 08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:02 (2) 08:25
10	16:20 33	12:39 (1) 17:14	6 08:40 (2) 18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	9 08:11 (2) 16:07
11	08:43	12:08 (1) 08:05	08:32 (2) 17:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:04 (2) 08:27
12	16:21 31	12:39 (1) 17:16	9 08:41 (2) 18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	5 08:09 (2) 16:07
13	08:42	12:09 (1) 08:03	08:30 (2) 17:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:06 (2) 08:28
14	16:22 29	12:38 (1) 17:18	12 08:42 (2) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	2 08:08 (2) 16:06
15	08:42	12:10 (1) 08:01	08:28 (2) 17:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:09 (2) 08:29
16	16:24 27	12:37 (1) 17:20	15 08:43 (2) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06 34 12:27 (1)
17	08:41	12:12 (1) 07:59	08:26 (2) 17:02	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40
18	16:25 25	12:37 (1) 17:22	18 08:44 (2) 18:17	20:15	21:10	21:54	21:56	21:10	20:00	18:45	16:39	16:05 35 12:28 (1)
19	08:40	12:14 (1) 07:57	08:24 (2) 17:05	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42
20	16:27 22	12:36 (1) 17:24	20 08:44 (2) 18:19	20:17	21:12	21:55	21:55	21:08	20:00	18:43	16:37	16:05 36 12:29 (1)
21	08:40	12:16 (1) 07:55	08:22 (2) 17:03	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44
22	16:28 18	12:34 (1) 17:26	23 08:45 (2) 18:21	20:19	21:13	21:56	21:54	21:06	20:00	18:41	16:36	16:05 37 12:29 (1)
23	08:39	12:19 (1) 07:53	08:20 (2) 17:00	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46
24	16:30 13	12:32 (1) 17:28	25 08:45 (2) 18:23	20:21	21:15	21:56	21:53	21:04	20:00	18:38	16:34	16:05 38 12:30 (1)
25	08:38	12:14 (1) 07:51	08:18 (2) 17:04	06:52	06:37	05:33	04:56	05:11	05:59	06:54	07:48	07:48
26	16:31	17:30	27 08:45 (2) 18:25	20:22	21:17	21:57	21:52	21:01	20:00	18:36	16:32	16:05 39 12:31 (1)
27	08:37	17:49	08:15 (2) 17:05	06:50	06:35	05:31	04:55	05:12	06:01	06:56	07:50	07:49
28	16:33	17:32	29 08:44 (2) 18:27	20:24	21:18	21:58	21:51	20:59	20:00	18:33	16:31	16:05 40 12:32 (1)
29	08:36	17:47	08:15 (2) 17:04	06:48	06:33	05:29	04:53	05:13	06:03	06:58	07:52	07:51
30	16:35	17:34	29 08:44 (2) 18:29	20:26	21:20	21:58	21:50	20:57	20:00	18:31	16:29	16:05 39 12:33 (1)
31	08:36	17:45	08:16 (2) 17:06	06:25	06:24	05:54	05:14	06:05	06:59	07:54	07:53	08:38
32	16:36	17:36	28 08:44 (2) 18:30	20:28	21:22	21:59	21:49	20:55	20:00	18:29	16:28	16:05 40 12:33 (1)
33	08:35	17:43	08:16 (2) 17:08	06:23	06:22	05:54	05:16	06:06	07:01	07:56	07:55	08:39
34	16:38	17:38	28 08:44 (2) 18:32	20:30	21:24	21:59	21:48	20:53	20:00	18:27	16:26	16:05 41 12:34 (1)
35	08:33	17:41	08:17 (2) 17:09	06:21	06:21	05:54	05:17	06:08	07:03	07:57	07:57	08:39
36	16:40	17:40	26 08:43 (2) 18:34	20:32	21:25	22:00	21:46	20:51	20:00	18:24	16:25	16:05 41 12:35 (1)
37	08:32	17:39	08:17 (2) 17:11	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:40
38	16:41	17:42	25 08:42 (2) 18:36	20:33	21:27	22:00	21:45	20:48	20:00	18:22	11 09:06 (2) 16:23	16:05 41 12:36 (1)
39	08:31	17:37	08:19 (2) 17:13	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:52 (2) 08:01
40	16:43	17:44	22 08:41 (2) 18:38	20:35	21:28	22:00	21:44	20:46	20:00	18:20	16 09:08 (2) 16:22	16:06 41 12:35 (1)
41	08:30	17:34	08:20 (2) 17:14	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:50 (2) 08:02
42	16:45	17:46	19 08:39 (2) 18:40	20:37	21:30	22:01	21:42	20:44	20:00	18:18	20 09:10 (2) 16:20	16:06 41 12:36 (1)
43	08:29	17:32	08:22 (2) 17:16	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:49 (2) 08:04
44	16:47	17:48	14 08:36 (2) 18:42	20:39	21:31	22:01	21:41	20:42	20:00	18:15	22 09:11 (2) 16:19	16:07 41 12:37 (1)
45	08:27	17:30	08:25 (2) 17:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:47 (2) 08:06	08:42
46	16:49	17:50	8 08:33 (2) 18:43	20:41	21:33	22:01	21:40	20:39	20:00	18:13	25 09:12 (2) 16:18	16:07 41 12:37 (1)
47	08:26	17:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:46 (2) 08:08	08:43
48	16:51	17:52	18:45	20:43	21:34	22:01	21:38	20:37	20:00	18:11	27 09:13 (2) 16:17	16:08 42 12:38 (1)
49	08:25	17:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	07:46 (2) 08:09	08:43
50	16:52	17:54	18:47	20:44	21:36	22:01	21:37	20:35	20:00	18:09	27 09:14 (2) 16:16	16:08 41 12:38 (1)
51	08:23	17:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	29 08:15 (2) 16:13	16:08 41 12:38 (1)
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	20:00	18:07	29 08:14 (2) 16:15	16:09 41 12:39 (1)
53	08:22	17:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	30 08:14 (2) 16:14	16:10 40 12:39 (1)
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	20:00	18:15	30 08:14 (2) 16:14	16:10 40 12:39 (1)
55	08:20	17:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	29 08:14 (2) 16:13	16:11 40 12:39 (1)
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	20:00	18:12	29 08:14 (2) 16:13	16:11 40 12:39 (1)
57	08:19	17:10	07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	27 08:14 (2) 16:12	16:11 39 12:39 (1)
58	17:00	17:55	19:55	20:52	21:42	22:01	21:30	20:25	20:00	18:10	27 08:14 (2) 16:12	16:11 39 12:39 (1)
59	08:17	17:06	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	25 08:15 (2) 16:11	16:12 39 12:40 (1)
60	17:02	17:56	19:56	20:54	21:43	22:00	21:28	20:23	20:00	18:15	13 12:13 (1) 16:12	16:12 39 12:40 (1)
61	08:15	17:04	07:04	06:04	05:04	04:57	05:37	06:31	07:22	07:18	22 08:14 (2) 16:11	16:13 38 12:39 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	341	385									92	1130
Sun reduction	0.24	0.23									0.27	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.62	0.63									0.63	0.62
Total reduction	0.15	0.15									0.17	0.13
Total, real	51	56									15	145

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CB - H80

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		11:44 (1)	08:14		07:16	07:01	05:52		05:03	04:59	05:39	06:33	07:26		07:24		07:54 (2)	08:19		11:39 (1)			
	16:15	39	12:23 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	13	08:07 (2)	16:10	22	12:01 (1)				
2	08:44		11:46 (1)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		07:56 (2)	08:21		11:39 (1)				
	16:16	38	12:24 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	10	08:06 (2)	16:09	25	12:04 (1)				
3	08:44		11:46 (1)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		07:58 (2)	08:22		11:37 (1)				
	16:17	37	12:23 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	7	08:05 (2)	16:08	28	12:05 (1)				
4	08:43		11:47 (1)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		08:00 (2)	08:24		11:37 (1)				
	16:18	36	12:23 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	3	08:03 (2)	16:08	30	12:07 (1)				
5	08:43		11:48 (1)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32			08:25		11:36 (1)				
	16:20	35	12:23 (1)	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46			16:07	31	12:07 (1)				
6	08:43		11:50 (1)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34			08:27		11:36 (1)				
	16:21	33	12:23 (1)	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:44			16:07	33	12:09 (1)				
7	08:42		11:51 (1)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36			08:28		11:35 (1)				
	16:22	31	12:22 (1)	17:18	4	08:34 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43		16:06	35	12:10 (1)				
8	08:42		11:52 (1)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38			08:29		11:36 (1)				
	16:24	30	12:22 (1)	17:20	7	08:35 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41		16:06	35	12:11 (1)				
9	08:41		11:54 (1)	07:59		07:00	06:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		08:30		11:35 (1)			
	16:25	28	12:22 (1)	17:22	10	08:36 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39		16:05	37	12:12 (1)				
10	08:41		11:55 (1)	07:57		07:00	08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42		08:32		11:35 (1)			
	16:27	26	12:21 (1)	17:24	13	08:37 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37		16:05	38	12:13 (1)				
11	08:40		11:57 (1)	07:55		07:00	08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44		08:33		11:35 (1)			
	16:28	22	12:19 (1)	17:26	16	08:38 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36		16:05	38	12:13 (1)				
12	08:39		11:59 (1)	07:53		07:00	08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46		08:34		11:35 (1)			
	16:30	19	12:18 (1)	17:28	19	08:39 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34		16:05	40	12:15 (1)				
13	08:38		12:02 (1)	07:51		07:00	08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48		08:35		11:35 (1)			
	16:31	13	12:15 (1)	17:30	21	08:39 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32		16:05	41	12:16 (1)				
14	08:37			07:49		07:00	08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49		08:36		11:36 (1)			
	16:33			17:32	23	08:38 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33		16:31		16:05	40	12:16 (1)				
15	08:36			07:47		07:00	08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51		08:37		11:36 (1)			
	16:35			17:34	26	08:39 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29		16:05	41	12:17 (1)				
16	08:36			07:45		07:00	08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54		07:53		08:38		09:53 (3)			
	16:36			17:36	28	08:39 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28		16:05	46	12:17 (1)				
17	08:35			07:43		07:00	08:10 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55		08:39		09:52 (3)			
	16:38			17:38	29	08:39 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	3	08:57 (2)	16:26		16:05	48	12:18 (1)			
18	08:33			07:41		07:00	08:11 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57		08:39		09:52 (3)			
	16:40			17:40	27	08:38 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	13	09:01 (2)	16:25		16:05	50	12:19 (1)			
19	08:32			07:39		07:00	08:11 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		08:46 (2)	16:23		16:05	50	12:19 (1)		
	16:41			17:42	26	08:37 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	18	09:04 (2)	16:23		16:05	50	12:19 (1)			
20	08:31			07:37		07:00	08:12 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		08:44 (2)	16:21		16:05	51	12:19 (1)		
	16:43			17:44	24	08:36 (2)	18:35	20:35	21:28	22:00	21:44	20:46	19:32	18:20	21	09:05 (2)	16:22		16:06	51	12:19 (1)			
21	08:30			07:34		07:00	08:13 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		08:43 (2)	16:20		16:05	51	12:20 (1)		
	16:45			17:46	23	08:36 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	23	09:06 (2)	16:20		16:06	51	12:20 (1)			
22	08:29			07:32		07:00	08:13 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:42 (2)	16:18		16:05	51	12:21 (1)		
	16:47			17:48	20	08:33 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	25	09:07 (2)	16:19		16:07	51	12:20 (1)			
23	08:27			07:30		07:00	08:15 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:41 (2)	16:17		16:04	52	12:21 (1)		
	16:49			17:50	17	08:32 (2)	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	27	09:08 (2)	16:18		16:07	51	12:21 (1)			
24	08:26			07:28		07:00	08:18 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:40 (2)	16:17		16:04	52	12:21 (1)		
	16:51			17:52	11	08:29 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	28	09:08 (2)	16:17		16:08	50	12:21 (1)			
25	08:25			07:25		07:00	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11		07:40 (2)	16:19		16:04	52	12:21 (1)			
	16:52			17:54		07:00	08:17	20:45	21:36	22:01	21:37	20:35	19:19	17:09	28	08:08 (2)	16:16		16:08	51	12:22 (1)			
26	08:23			07:23		07:00	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13		07:41 (2)	16:11		16:04	52	12:22 (1)			
	16:54			17:56		07:00	08:19	20:46	21:37	22:01	21:35	20:33	19:17	17:07	27	08:08 (2)	16:15		16:09	48	12:23 (1)			
27	08:22			07:21		07:00	06:17	06:04	05:10	04:56	05:28	06:24	07:19	07:15		07:43 (2)	16:13		16:08	48	12:23 (1)			
	16:56			17:58		07:00	08:15	20:48	21:39	22:01	21:33	20:30	19:15	17:04	25	08:08 (2)	16:14		16:10	47	12:23 (1)			
28	08:20			07:19		07:00	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17		07:45 (2)	16:14		16:04	47	12:23 (1)			
	16:58			18:00		07:00	08:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	23	08:08 (2)	16:13		16:11	42	12:23 (1)			
29	08:19					07:00	07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19		07:47 (2)	16:16		11:43 (1)	08:44		11:42 (1)		
	17:00					07:00	19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	20	08:07 (2)	16:12	12	11:55 (1)	16:11	41	12:23 (1)		
30	08:17					07:00	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20		07:50 (2)	16:18		11:41 (1)	08:44		11:43 (1)		
	17:02					07:00	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	18	08:08 (2)	16:11	18						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CC - H81

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	14:51 (4)	08:14	16:26 (3)	07:16	17:09 (2)	07:01	05:52	05:03		
	16:15	29 15:20 (4)	17:06	8 16:34 (3)	18:02	25 17:34 (2)	20:00	20:55	21:45		
2	08:44	14:52 (4)	08:12	16:26 (3)	07:14		17:07 (2)	06:59	05:02		
	16:16	28 15:20 (4)	17:08	11 16:37 (3)	18:04	29 17:36 (2)	20:02	20:57	21:46		
3	08:44	14:52 (4)	08:10	16:26 (3)	07:12		17:07 (2)	06:56	05:01		
	16:17	28 15:20 (4)	17:10	13 16:39 (3)	18:06	31 17:38 (2)	20:04	20:59	21:48		
4	08:43	14:54 (4)	08:08	16:25 (3)	07:09		17:07 (2)	06:54	05:00		
	16:18	26 15:20 (4)	17:12	16 16:41 (3)	18:07	34 17:41 (2)	20:06	21:01	21:49		
5	08:43	14:54 (4)	08:07	16:26 (3)	07:07		17:06 (2)	06:51	05:44		
	16:19	26 15:20 (4)	17:14	17 16:43 (3)	18:09	36 17:42 (2)	20:07	21:03	21:50		
6	08:43	14:55 (4)	08:05	16:26 (3)	07:04		17:06 (2)	06:49	05:42		
	16:21	25 15:20 (4)	17:16	19 16:45 (3)	18:11	37 17:43 (2)	20:09	21:04	21:51		
7	08:42	14:56 (4)	08:03	16:26 (3)	07:02		17:05 (2)	06:47	05:40		
	16:22	24 15:20 (4)	17:18	21 16:47 (3)	18:13	38 17:43 (2)	20:11	21:06	21:52		
8	08:42	14:57 (4)	08:01	16:27 (3)	07:00		17:05 (2)	06:44	05:38		
	16:24	23 15:20 (4)	17:20	22 16:49 (3)	18:15	38 17:43 (2)	20:13	21:08	21:53		
9	08:41	14:58 (4)	07:59	16:28 (3)	06:57		17:05 (2)	06:42	05:36		
	16:25	22 15:20 (4)	17:22	21 16:49 (3)	18:17	37 17:42 (2)	20:15	21:10	21:54		
10	08:40	14:59 (4)	07:57	16:29 (3)	06:55		17:05 (2)	06:39	05:34		
	16:26	21 15:20 (4)	17:24	19 16:48 (3)	18:19	37 17:42 (2)	20:17	21:11	21:55		
11	08:40	15:01 (4)	07:55	16:30 (3)	06:53		17:06 (2)	06:37	05:33		
	16:28	18 15:19 (4)	17:26	17 16:47 (3)	18:21	35 17:41 (2)	20:19	21:13	21:55		
12	08:39	15:02 (4)	07:53	16:32 (3)	06:50		17:06 (2)	06:35	05:31		
	16:30	16 15:18 (4)	17:28	13 16:45 (3)	18:23	34 17:40 (2)	20:20	21:15	21:56		
13	08:38	15:04 (4)	07:51	16:34 (3)	06:48		17:07 (2)	06:32	05:29		
	16:31	13 15:17 (4)	17:30	8 16:42 (3)	18:25	32 17:39 (2)	20:22	21:17	21:57		
14	08:37	15:07 (4)	07:49		06:45		17:07 (2)	06:30	05:27		
	16:33	9 15:16 (4)	17:32		18:27	30 17:37 (2)	20:24	21:18	21:58		
15	08:36		07:47		06:43		17:09 (2)	06:28	05:26		
	16:34		17:34		18:28	27 17:36 (2)	20:26	21:20	21:58		
16	08:35		07:45		06:40		17:10 (2)	06:25	05:24		
	16:36		17:36		18:30	24 17:34 (2)	20:28	21:22	21:59		
17	08:34		07:43		06:38		17:12 (2)	06:23	05:22		
	16:38		17:38		18:32	20 17:32 (2)	20:30	21:23	21:59		
18	08:33		07:41		06:35		17:15 (2)	06:21	05:21		
	16:40		17:40		18:34	13 17:28 (2)	20:31	21:25	22:00		
19	08:32		07:39		06:33		06:18	05:19	04:54		
	16:41		17:42		18:36		20:33	21:27	22:00		
20	08:31		07:36		06:31		06:16	05:18	04:54		
	16:43		17:44		18:38		20:35	21:28	22:00		
21	08:30		07:34		06:28		06:14	05:16	04:54		
	16:45		17:46		18:40		20:37	21:30	22:01		
22	08:29		07:32		06:26		06:12	05:15	04:55		
	16:47		17:48		18:42		20:39	21:31	22:01		
23	08:27		07:30		17:21 (2)	06:23	06:09	05:13	04:55		
	16:49		17:50	1	17:22 (2)	18:43	20:41	21:33	22:01		
24	08:26		07:28		17:17 (2)	06:21	06:07	05:12	04:55		
	16:50		17:52	7	17:24 (2)	18:45	20:43	21:34	22:01		
25	08:24		07:25		17:14 (2)	06:18	06:05	05:11	04:55		
	16:52		17:54	12	17:26 (2)	18:47	20:44	21:36	22:01		
26	08:23		07:23		17:13 (2)	06:16	06:03	05:09	04:56		
	16:54		17:56	15	17:28 (2)	18:49	20:46	21:37	22:01		
27	08:22		07:21		17:12 (2)	06:13	06:00	05:08	04:56		
	16:56		17:58	19	17:31 (2)	18:51	20:48	21:39	22:01		
28	08:20		07:18		17:10 (2)	06:11	05:58	05:07	04:57		
	16:58		18:00	22	17:32 (2)	18:53	20:50	21:40	22:01		
29	08:19	16:27 (3)			07:08		05:56	05:06	04:57		
	17:00	1 16:28 (3)			19:54		20:52	21:41	22:01		
30	08:17	16:26 (3)			07:06		05:54	05:05	04:58		
	17:02	3 16:29 (3)			19:56		20:54	21:43	22:00		
31	08:15	16:26 (3)			07:04			05:04			
	17:04	5 16:31 (3)			19:58			21:44			
Potential sun hours	250		273		367		420	494	510		
Total, worst case	317		281		557						
Sun reduction	0.24		0.23		0.27						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.65		0.66		0.68						
Total reduction	0.16		0.15		0.18						
Total, real	50		43		102						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: CC - H81

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:45 (2) 18:18 (2)	07:24 16:54	15:58 (3) 16:18 (3)	08:19 16:10	14:43 (4) 15:01 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:44 (2) 18:19 (2)	07:26 16:52	15:57 (3) 16:18 (3)	08:21 16:09	14:42 (4) 15:02 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:44 (2) 18:19 (2)	07:28 16:50	15:56 (3) 16:19 (3)	08:22 16:08	14:42 (4) 15:03 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:43 (2) 18:20 (2)	07:30 16:48	15:56 (3) 16:17 (3)	08:24 16:08	14:42 (4) 15:05 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:42 (2) 18:20 (2)	07:32 16:46	15:55 (3) 16:15 (3)	08:25 16:07	14:41 (4) 15:05 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:42 (2) 18:20 (2)	07:34 16:44	15:55 (3) 16:12 (3)	08:26 16:07	14:41 (4) 15:07 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:41 (2) 18:19 (2)	07:36 16:43	15:55 (3) 16:10 (3)	08:28 16:06	14:41 (4) 15:07 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:41 (2) 18:18 (2)	07:38 16:41	15:55 (3) 16:08 (3)	08:29 16:06	14:41 (4) 15:07 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:41 (2) 18:16 (2)	07:40 16:39	15:57 (3) 16:07 (3)	08:30 16:05	14:41 (4) 15:09 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:41 (2) 18:14 (2)	07:42 16:37	15:57 (3) 16:05 (3)	08:31 16:05	14:41 (4) 15:09 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:41 (2) 18:11 (2)	07:44 16:35	15:58 (3) 16:03 (3)	08:33 16:05	14:41 (4) 15:10 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:42 (2) 18:09 (2)	07:45 16:34	15:58 (3) 16:01 (3)	08:34 16:05	14:41 (4) 15:10 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:42 (2) 18:07 (2)	07:47 16:32	16:08 (3) 16:05	08:35 16:05	14:42 (4) 15:11 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:43 (2) 18:04 (2)	07:49 16:31	08:36 16:04	14:42 (4) 16:04	15:11 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:44 (2) 18:02 (2)	07:51 16:29	08:37 16:04	14:42 (4) 15:12 (4)	
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:46 (2) 17:59 (2)	07:53 16:27	08:38 16:05	14:43 (4) 15:12 (4)	
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:47 (2) 17:57 (2)	07:55 16:26	08:38 16:05	14:43 (4) 15:13 (4)	
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:50 (2) 17:55 (2)	07:57 16:24	08:39 16:05	14:44 (4) 15:14 (4)	
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:59 (2) 18:22	07:59 16:23	08:40 16:05	14:45 (4) 15:15 (4)	
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	18:00 16:22	08:01 16:22	08:41 16:06	14:44 (4) 15:15 (4)	
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	18:02 16:20	08:02 16:20	08:41 16:06	14:45 (4) 15:16 (4)	
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	18:04 16:19	08:04 16:19	08:42 16:06	14:45 (4) 15:16 (4)	
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	18:06 16:18	08:06 16:18	08:42 16:07	14:46 (4) 15:17 (4)	
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	18:08 16:17	08:08 16:17	08:43 16:08	14:46 (4) 15:17 (4)	
25	05:27 21:36	06:20 20:35	07:15 19:19	17:59 (2) 18:09 (2)	07:11 17:09	08:09 16:16	08:43 16:08	14:47 (4) 15:17 (4)	
26	05:29 21:35	06:22 20:32	07:17 19:17	17:55 (2) 18:13 (2)	07:13 17:06	08:11 16:14	08:43 16:09	14:47 (4) 15:17 (4)	
27	05:30 21:33	06:24 20:30	07:19 19:14	17:52 (2) 18:15 (2)	07:15 17:04	08:13 16:13	08:44 16:10	14:48 (4) 15:18 (4)	
28	05:32 21:32	06:26 20:28	07:21 19:12	17:50 (2) 18:17 (2)	07:16 17:02	08:14 16:12	14:47 (4) 14:56 (4)	08:44 16:10	14:49 (4) 15:19 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	17:49 (2) 18:18 (2)	07:18 17:00	08:16 16:12	14:44 (4) 14:57 (4)	08:44 16:11	14:50 (4) 15:19 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:46 (2) 18:18 (2)	07:20 16:58	08:18 16:14	14:43 (4) 14:59 (4)	08:44 16:12	14:49 (4) 15:18 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	15:58 (3) 16:16 (3)	08:44 16:13	14:50 (4) 16:13	08:44 15:19 (4)	
Potential sun hours	512	460	382	328	259	233			
Total, worst case			139	550	214	867			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.68	0.68	0.65	0.65			
Total reduction			0.22	0.20	0.17	0.13			
Total, real			30	109	37	116			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CD - H82

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:04 (5)	07:16		16:42 (4)	07:01			05:52		19:39 (2)	05:03			
	16:15			17:06	6 16:10 (5)	18:02	12	16:54 (4)	20:00			20:55	28	20:07 (2)	21:45			
2	08:44			08:12		07:14			06:59			05:50		19:40 (2)	05:02			
	16:16			17:08		18:04			20:02			20:57	26	20:06 (2)	21:46			
3	08:44			08:10	16:37 (4)	07:12		17:36 (3)	06:56			05:48		19:41 (2)	05:01			
	16:17			17:10	2 16:39 (4)	18:06	2	17:38 (3)	20:04			20:59	23	20:04 (2)	21:48			
4	08:43			08:08	16:36 (4)	07:09		17:35 (3)	06:54			05:46		19:42 (2)	05:00			
	16:18			17:12	5 16:41 (4)	18:07	6	17:41 (3)	20:06			21:01	20	20:02 (2)	21:49			
5	08:43			08:07	16:34 (4)	07:07		17:33 (3)	06:51			05:44		19:44 (2)	04:59			
	16:19			17:14	9 16:43 (4)	18:09	9	17:42 (3)	20:07			21:03	16	20:00 (2)	21:50			
6	08:43			08:05	16:33 (4)	07:04		17:33 (3)	06:49			05:42		19:46 (2)	04:59			
	16:21			17:16	12 16:45 (4)	18:11	12	17:45 (3)	20:09			21:04	11	19:57 (2)	21:51			
7	08:42			08:03	16:32 (4)	07:02		17:32 (3)	06:47			05:40			04:58			
	16:22			17:18	15 16:47 (4)	18:13	14	17:46 (3)	20:11			21:06			21:52			
8	08:42			08:01	16:32 (4)	07:00		17:32 (3)	06:44			05:38			04:57			
	16:24			17:20	18 16:50 (4)	18:15	16	17:48 (3)	20:13			21:08			21:53			
9	08:41			07:59	16:31 (4)	06:57		17:31 (3)	06:42			05:36			04:57			
	16:25			17:22	21 16:52 (4)	18:17	19	17:50 (3)	20:15			21:10			21:54			
10	08:40			07:57	16:30 (4)	06:55		17:31 (3)	06:39			05:34			04:56			
	16:26			17:24	24 16:54 (4)	18:19	21	17:52 (3)	20:17			21:11			21:55			
11	08:40			07:55	16:30 (4)	06:52		17:32 (3)	06:37			05:33			04:56			
	16:28			17:26	26 16:56 (4)	18:21	23	17:55 (3)	20:19			21:13			21:55			
12	08:39		15:52 (5)	07:53	16:29 (4)	06:50		17:32 (3)	06:35		19:48 (2)	05:31			04:55			
	16:30	2	15:54 (5)	17:28	29 16:58 (4)	18:23	22	17:54 (3)	20:20	5	19:53 (2)	21:15			21:56			
13	08:38		15:52 (5)	07:51	16:29 (4)	06:48		17:33 (3)	06:32		19:45 (2)	05:29			04:55			
	16:31	3	15:55 (5)	17:30	31 17:00 (4)	18:25	21	17:54 (3)	20:22	9	19:54 (2)	21:17			21:57			
14	08:37		15:52 (5)	07:49	16:29 (4)	06:45		17:34 (3)	06:30		19:43 (2)	05:27			04:55			
	16:33	5	15:57 (5)	17:32	33 17:02 (4)	18:27	18	17:52 (3)	20:24	13	19:56 (2)	21:18			21:58			
15	08:36		15:52 (5)	07:47	16:29 (4)	06:43		17:36 (3)	06:28		19:42 (2)	05:26			04:54			
	16:34	7	15:59 (5)	17:34	36 17:05 (4)	18:28	14	17:50 (3)	20:26	16	19:58 (2)	21:20			21:58			
16	08:35		15:51 (5)	07:45	16:29 (4)	06:40		17:38 (3)	06:25		19:41 (2)	05:24			04:54			
	16:36	9	16:00 (5)	17:36	38 17:07 (4)	18:30	8	17:46 (3)	20:28	19	20:00 (2)	21:22			21:59			
17	08:34		15:51 (5)	07:43	16:29 (4)	06:38			06:23		19:39 (2)	05:22			04:54			
	16:38	12	16:03 (5)	17:38	40 17:09 (4)	18:32			20:30	22	20:01 (2)	21:23			21:59			
18	08:33		15:51 (5)	07:41	16:28 (4)	06:35			06:21		19:38 (2)	05:21			04:54			
	16:40	14	16:05 (5)	17:40	41 17:09 (4)	18:34			20:31	25	20:03 (2)	21:25			22:00			
19	08:32		15:52 (5)	07:39	16:29 (4)	06:33			06:18		19:38 (2)	05:19			04:54			
	16:41	15	16:07 (5)	17:42	40 17:09 (4)	18:36			20:33	27	20:05 (2)	21:27			22:00			
20	08:31		15:51 (5)	07:36	16:29 (4)	06:31			06:16		19:37 (2)	05:18			04:54			
	16:43	17	16:08 (5)	17:44	39 17:08 (4)	18:38			20:35	30	20:07 (2)	21:28			22:00			
21	08:30		15:52 (5)	07:34	16:30 (4)	06:28			06:14		19:36 (2)	05:16			04:54			
	16:45	19	16:11 (5)	17:46	38 17:08 (4)	18:40			20:37	32	20:08 (2)	21:30			22:01			
22	08:29		15:52 (5)	07:32	16:30 (4)	06:26			06:12		19:36 (2)	05:15			04:55			
	16:47	20	16:12 (5)	17:48	37 17:07 (4)	18:42			20:39	34	20:10 (2)	21:31			22:01			
23	08:27		15:53 (5)	07:30	16:31 (4)	06:23			06:09		19:36 (2)	05:13			04:55			
	16:49	22	16:15 (5)	17:50	35 17:06 (4)	18:43			20:41	35	20:11 (2)	21:33			22:01			
24	08:26		15:53 (5)	07:28	16:32 (4)	06:21			06:07		19:36 (2)	05:12			04:55			
	16:50	23	16:16 (5)	17:52	33 17:05 (4)	18:45			20:43	35	20:11 (2)	21:34			22:01			
25	08:24		15:54 (5)	07:25	16:33 (4)	06:18			06:05		19:36 (2)	05:11			04:55			
	16:52	23	16:17 (5)	17:54	30 17:03 (4)	18:47			20:44	35	20:11 (2)	21:36			22:01			
26	08:23		15:54 (5)	07:23	16:35 (4)	06:16			06:03		19:36 (2)	05:09			04:56			
	16:54	22	16:16 (5)	17:56	27 17:02 (4)	18:49			20:46	35	20:11 (2)	21:37			22:01			
27	08:22		15:55 (5)	07:21	16:37 (4)	06:13			06:01		19:36 (2)	05:08			04:56			
	16:56	21	16:16 (5)	17:58	23 17:00 (4)	18:51			20:48	34	20:10 (2)	21:39			22:01			
28	08:20		15:56 (5)	07:18	16:38 (4)	06:11			05:58		19:37 (2)	05:07			04:57			
	16:58	20	16:16 (5)	18:00	19 16:57 (4)	18:53			20:50	33	20:10 (2)	21:40			22:01			
29	08:18		15:57 (5)			07:08			05:56		19:37 (2)	05:06			04:57			
	17:00	18	16:15 (5)			19:54			20:52	32	20:09 (2)	21:41			22:01			
30	08:17		15:58 (5)			07:06			05:54		19:38 (2)	05:05			04:58			
	17:02	16	16:14 (5)			19:56			20:54	30	20:08 (2)	21:43			22:00			
31	08:15		16:00 (5)			07:04					05:04							
	17:04	12	16:12 (5)			19:58					21:44							
Potential sun hours	250			273		367		420			494				510			
Total, worst case		300		707		217		501		124								
Sun reduction		0.24		0.23		0.27		0.35		0.38								
Oper. time red.		1.00		1.00		1.00		1.00		1.00								
Wind dir. red.		0.66		0.66		0.68		0.65		0.65								
Total reduction		0.16		0.15		0.18		0.23		0.25								
Total, real		48		108		40		115		31								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: CD - H82

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:11 (3) 16:54	16:00 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:10 (3) 16:52	16:01 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:09 (3) 16:50	16:01 (4) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:09 (3) 16:48	16:02 (4) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:09 (3) 16:46	16:03 (4) 16:07
6	05:03 21:58	05:47 21:15	20:00 (2) 20:06	07:35 18:52	18:09 (3) 16:44	16:04 (4) 16:07
7	05:04 21:57	05:49 21:13	19:56 (2) 20:04	07:37 18:50	18:08 (3) 16:43	16:06 (4) 16:06
8	05:05 21:56	05:50 21:12	19:53 (2) 20:01	07:39 18:48	18:08 (3) 16:41	16:07 (4) 16:06
9	05:06 21:55	05:52 21:10	19:51 (2) 19:59	07:41 18:45	18:08 (3) 16:39	16:08 (4) 16:05
10	05:07 21:55	05:54 21:07	19:49 (2) 19:56	07:42 18:43	18:09 (3) 16:37	15:34 (5) 16:05
11	05:08 21:54	05:56 21:05	19:48 (2) 19:54	07:44 18:40	18:10 (3) 16:35	15:32 (5) 16:05
12	05:09 21:53	05:57 21:03	19:47 (2) 19:51	07:46 18:38	18:11 (3) 16:34	15:44 (5) 16:05
13	05:10 21:52	05:59 21:01	19:45 (2) 19:49	07:48 18:36	17:14 (4) 16:32	15:29 (5) 16:05
14	05:12 21:51	06:01 20:59	19:45 (2) 19:47	07:50 18:33	17:10 (4) 16:31	15:28 (5) 16:04
15	05:13 21:50	06:03 20:57	19:44 (2) 19:44	07:52 18:31	17:08 (4) 16:29	15:28 (5) 16:05
16	05:14 21:49	06:04 20:55	19:43 (2) 19:42	07:54 18:29	17:06 (4) 16:27	15:27 (5) 16:05
17	05:16 21:47	06:06 20:53	19:43 (2) 19:39	07:55 18:26	17:05 (4) 16:26	15:27 (5) 16:05
18	05:17 21:46	06:08 20:51	19:43 (2) 19:37	07:57 18:24	17:03 (4) 16:24	15:27 (5) 16:05
19	05:18 21:45	06:10 20:48	19:41 (2) 19:34	07:59 18:22	17:02 (4) 16:23	15:27 (5) 16:05
20	05:20 21:44	06:12 20:46	19:42 (2) 19:32	08:01 18:20	17:01 (4) 16:22	15:27 (5) 16:06
21	05:21 21:42	06:13 20:44	19:42 (2) 19:29	08:03 18:17	17:00 (4) 16:20	15:27 (5) 16:06
22	05:23 21:41	06:15 20:42	19:41 (2) 19:27	08:05 18:15	17:00 (4) 16:19	15:27 (5) 16:06
23	05:24 21:39	06:17 20:39	19:41 (2) 19:24	08:07 18:13	16:59 (4) 16:18	15:28 (5) 16:07
24	05:26 21:38	06:19 20:37	19:42 (2) 19:22	08:09 18:11	16:59 (4) 16:17	15:28 (5) 16:08
25	05:27 21:36	06:20 20:35	19:41 (2) 19:19	07:11 17:09	15:58 (4) 16:16	15:29 (5) 16:08
26	05:29 21:35	06:22 20:32	19:42 (2) 19:17	07:13 17:06	15:58 (4) 16:14	15:30 (5) 16:09
27	05:30 21:33	06:24 20:30	19:43 (2) 19:14	07:15 18:22 (3)	15:58 (4) 16:13	15:31 (5) 16:10
28	05:32 21:32	06:26 20:28	19:43 (2) 19:12	07:16 18:17 (3)	15:58 (4) 16:12	15:32 (5) 16:11
29	05:34 21:30	06:27 20:25	19:44 (2) 19:09	07:18 18:15 (3)	15:58 (4) 16:12	15:32 (5) 16:11
30	05:35 21:28	06:29 20:23	19:46 (2) 19:07	07:20 18:12 (3)	15:58 (4) 16:11	15:33 (5) 16:12
31	05:37 21:26	06:31 20:21	19:47 (2) 19:52 (2)	07:22 16:56	15:59 (4) 16:25 (4)	15:35 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		631	53	774	411	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.68	0.66	0.66	
Total reduction		0.22	0.22	0.19	0.18	
Total, real		140	11	150	72	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CE - H83

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:23 (5)	07:16	17:15 (4)	07:01	05:52	20:05 (2)	05:03		
	16:15	17:06	12 16:35 (5)	18:02	19 17:34 (4)	20:00	20:55	21 20:26 (2)	21:45		
2	08:44	08:12	16:23 (5)	07:14	17:13 (4)	06:59	05:50	20:04 (2)	05:02		
	16:16	17:08	14 16:37 (5)	18:04	23 17:36 (4)	20:02	20:57	23 20:27 (2)	21:46		
3	08:43	08:10	16:22 (5)	07:12	17:13 (4)	06:56	05:48	20:04 (2)	05:01		
	16:17	17:10	17 16:39 (5)	18:06	25 17:38 (4)	20:04	20:59	25 20:29 (2)	21:48		
4	08:43	08:08	16:22 (5)	07:09	17:12 (4)	06:54	05:46	20:03 (2)	05:00		
	16:18	17:12	19 16:41 (5)	18:07	29 17:41 (4)	20:06	21:01	27 20:30 (2)	21:49		
5	08:43	08:07	16:22 (5)	07:07	17:11 (4)	06:51	05:44	20:03 (2)	04:59		
	16:19	17:14	21 16:43 (5)	18:09	31 17:42 (4)	20:07	21:03	29 20:32 (2)	21:50		
6	08:42	08:05	16:22 (5)	07:04	17:11 (4)	06:49	05:42	20:03 (2)	04:59		
	16:21	17:16	23 16:45 (5)	18:11	34 17:45 (4)	20:09	21:04	30 20:33 (2)	21:51		
7	08:42	08:03	16:23 (5)	07:02	17:10 (4)	06:47	05:40	20:03 (2)	04:58		
	16:22	17:18	23 16:46 (5)	18:13	36 17:46 (4)	20:11	21:06	32 20:35 (2)	21:52		
8	08:42	08:01	16:23 (5)	07:00	17:11 (4)	06:44	05:38	20:03 (2)	04:57		
	16:24	17:20	23 16:46 (5)	18:15	37 17:48 (4)	20:13	21:08	31 20:34 (2)	21:53		
9	08:41	07:59	16:24 (5)	06:57	17:10 (4)	06:42	05:36	20:03 (2)	04:57		
	16:25	17:22	22 16:46 (5)	18:17	39 17:49 (4)	20:15	21:10	31 20:34 (2)	21:54		
10	08:40	07:57	16:25 (5)	06:55	17:10 (4)	06:39	05:34	20:03 (2)	04:56		
	16:26	17:24	20 16:45 (5)	18:19	39 17:49 (4)	20:17	21:11	30 20:33 (2)	21:55		
11	08:40	07:55	16:26 (5)	06:52	17:11 (4)	06:37	05:33	20:04 (2)	04:56		
	16:28	17:26	18 16:44 (5)	18:21	37 17:48 (4)	20:19	21:13	29 20:33 (2)	21:55		
12	08:39	07:53	16:27 (5)	06:50	17:11 (4)	06:35	05:31	20:04 (2)	04:55		
	16:30	17:28	15 16:42 (5)	18:23	36 17:47 (4)	20:20	21:15	29 20:33 (2)	21:56		
13	08:38	07:51	16:29 (5)	06:48	17:12 (4)	06:32	05:29	20:04 (2)	04:55		
	16:31	17:30	11 16:40 (5)	18:25	35 17:47 (4)	20:22	21:17	28 20:32 (2)	21:57		
14	08:37	07:49	06:45	18:25	35 17:47 (4)	20:22	05:27	20:06 (2)	04:55		
	16:33	17:32	18:27	33 17:45 (4)	20:24	21:18	25 20:31 (2)	21:57			
15	08:36	07:47	06:43	18:28	34 17:13 (4)	06:28	05:26	20:06 (2)	04:55		
	16:34	17:34	18:28	34 18:02 (3)	20:26	21:20	24 20:30 (2)	21:58			
16	08:35	07:45	06:40	18:30	35 17:14 (4)	06:25	05:24	20:08 (2)	04:54		
	16:36	17:36	18:30	35 18:04 (3)	20:28	21:22	22 20:30 (2)	21:59			
17	08:34	07:43	06:38	18:32	34 17:16 (4)	06:23	05:22	20:08 (2)	04:54		
	16:38	17:38	18:32	34 18:06 (3)	20:30	21:23	20 20:28 (2)	21:59			
18	08:33	07:41	06:35	18:34	32 17:17 (4)	06:21	05:21	20:10 (2)	04:54		
	16:40	17:40	18:34	32 18:07 (3)	20:31	21:25	17 20:27 (2)	22:00			
19	08:32	07:39	06:33	18:36	28 17:21 (4)	06:18	05:19	20:12 (2)	04:54		
	16:41	17:42	18:36	28 18:10 (3)	20:33	21:27	14 20:26 (2)	22:00			
20	08:31	07:36	06:31	18:38	17 17:54 (3)	06:16	05:18	20:13 (2)	04:54		
	16:43	17:44	18:38	17 18:11 (3)	20:35	21:28	11 20:24 (2)	22:00			
21	08:30	07:34	06:28	18:40	19 17:54 (3)	06:14	05:16		04:54		
	16:45	17:46	18:40	19 18:13 (3)	20:37	21:30		22:01			
22	08:28	07:32	06:26	18:43	21 17:54 (3)	06:12	05:15		04:55		
	16:47	17:48	18:41	21 18:15 (3)	20:39	21:31		22:01			
23	08:27	07:30	06:23	18:45	20 17:55 (3)	06:09	05:13		04:55		
	16:49	17:50	18:43	22 18:17 (3)	20:41	21:33		22:01			
24	08:26	07:28	06:21	18:47	18 17:55 (3)	06:07	05:12		04:55		
	16:50	17:52	18:45	20 18:15 (3)	20:42	21:34		22:01			
25	08:24	07:25	17:21 (4)	06:18	17:56 (3)	06:05	20:12 (2)	05:11		04:55	
	16:52	17:54	5 17:26 (4)	06:17	18 18:14 (3)	20:44	3 20:15 (2)	21:36		22:01	
26	08:23	07:23	17:19 (4)	06:16	17:57 (3)	06:03	20:10 (2)	05:09		04:56	
	16:54	17:56	9 17:28 (4)	06:14	14 18:11 (3)	20:46	7 20:17 (2)	21:37		22:01	
27	08:22	07:21	17:18 (4)	06:13	18:00 (3)	06:01	20:08 (2)	05:08		04:56	
	16:56	17:58	13 17:31 (4)	06:11	8 18:08 (3)	20:48	11 20:19 (2)	21:39		22:01	
28	08:20	16:25 (5)	07:18	17:16 (4)	06:11	05:58	20:07 (2)	05:07		04:57	
	16:58	1 16:26 (5)	18:00	16 17:32 (4)	18:53	20:50	14 20:21 (2)	21:40		22:01	
29	08:18	16:24 (5)		07:08		05:56	20:06 (2)	05:06		04:57	
	17:00	4 16:28 (5)		19:54		20:52	16 20:22 (2)	21:41		22:01	
30	08:17	16:23 (5)		07:06		05:54	20:05 (2)	05:05		04:58	
	17:02	7 16:30 (5)		19:56		20:53	19 20:24 (2)	21:43		22:00	
31	08:15	16:23 (5)		07:04				05:04			
	17:04	9 16:32 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case		21	281	755		70		498			
Sun reduction		0.24	0.23	0.27		0.35		0.38			
Oper. time red.		1.00	1.00	1.00		1.00		1.00			
Wind dir. red.		0.66	0.66	0.68		0.65		0.65			
Total reduction		0.16	0.15	0.18		0.23		0.25			
Total, real		3	43	139		16		122			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CE - H83

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:14 (2)	06:33		07:26	17:50 (4)	07:24	15:54 (5)	08:19	
	22:00	21:25	29 20:43 (2)	20:18		19:05	36 18:26 (4)	16:54	21 16:15 (5)	16:10	
2	04:59	05:40	20:14 (2)	06:35		07:28	17:49 (4)	07:26	15:54 (5)	08:21	
	22:00	21:23	30 20:44 (2)	20:16		19:02	37 18:26 (4)	16:52	21 16:15 (5)	16:09	
3	05:00	05:42	20:13 (2)	06:36		07:30	17:49 (4)	07:28	15:53 (5)	08:22	
	21:59	21:21	31 20:44 (2)	20:13		19:00	37 18:26 (4)	16:50	23 16:16 (5)	16:08	
4	05:01	05:44	20:13 (2)	06:38		07:31	17:48 (4)	07:30	15:52 (5)	08:24	
	21:59	21:19	31 20:44 (2)	20:11		18:57	39 18:27 (4)	16:48	24 16:16 (5)	16:08	
5	05:02	05:45	20:13 (2)	06:40		07:33	17:48 (4)	07:32	15:52 (5)	08:25	
	21:58	21:17	31 20:44 (2)	20:09		18:55	38 18:26 (4)	16:46	23 16:15 (5)	16:07	
6	05:03	05:47	20:13 (2)	06:42		07:35	17:47 (4)	07:34	15:52 (5)	08:26	
	21:58	21:15	31 20:44 (2)	20:06		18:52	37 18:24 (4)	16:44	20 16:12 (5)	16:07	
7	05:04	05:49	20:13 (2)	06:43		07:37	17:46 (4)	07:36	15:52 (5)	08:28	
	21:57	21:13	30 20:43 (2)	20:04		18:50	35 18:21 (4)	16:43	18 16:10 (5)	16:06	
8	05:05	05:50	20:12 (2)	06:45		07:39	17:46 (4)	07:38	15:52 (5)	08:29	
	21:56	21:12	29 20:41 (2)	20:01		18:48	32 18:18 (4)	16:41	16 16:08 (5)	16:06	
9	05:06	05:52	20:13 (2)	06:47		07:41	17:46 (4)	07:40	15:52 (5)	08:30	
	21:55	21:10	26 20:39 (2)	19:59		18:45	30 18:16 (4)	16:39	14 16:06 (5)	16:05	
10	05:07	05:54	20:12 (2)	06:49		07:42	17:47 (4)	07:42	15:54 (5)	08:31	
	21:55	21:07	25 20:37 (2)	19:56		18:43	27 18:14 (4)	16:37	11 16:05 (5)	16:05	
11	05:08	05:56	20:13 (2)	06:50		07:44	17:47 (4)	07:44	15:54 (5)	08:33	
	21:54	21:05	22 20:35 (2)	19:54		18:40	24 18:11 (4)	16:35	9 16:03 (5)	16:05	
12	05:09	05:57	20:13 (2)	06:52		07:46	17:48 (4)	07:45	15:55 (5)	08:34	
	21:53	21:03	21 20:34 (2)	19:51		18:38	21 18:09 (4)	16:34	6 16:01 (5)	16:05	
13	05:10	05:59	20:13 (2)	06:54		07:48	17:48 (4)	07:47	15:56 (5)	08:35	
	21:52	21:01	18 20:31 (2)	19:49		18:36	19 18:07 (4)	16:32	3 15:59 (5)	16:05	
14	05:12	06:01	20:14 (2)	06:56		07:50	17:49 (4)	07:49	15:57 (5)	08:36	
	21:51	20:59	15 20:29 (2)	19:47		18:33	15 18:04 (4)	16:31	1 15:58 (5)	16:04	
15	05:13	06:03	20:15 (2)	06:58		07:52	17:50 (4)	07:51		08:37	
	21:50	20:57	13 20:28 (2)	19:44		18:31	12 18:02 (4)	16:29		16:05	
16	05:14	06:04	20:15 (2)	06:59		07:54	17:52 (4)	07:53		08:38	
	21:49	20:55	10 20:25 (2)	19:42	6 18:51 (3)	18:29	7 17:59 (4)	16:27		16:05	
17	05:16	06:06	20:17 (2)	07:01		07:55	17:54 (4)	07:55		08:38	
	21:47	20:53	6 20:23 (2)	19:39	13 18:59 (3)	18:26	3 17:57 (4)	16:26		16:05	
18	05:17	06:08	20:19 (2)	07:03		07:57		07:57		08:39	
	21:46	20:50	3 20:22 (2)	19:37	17 19:01 (3)	18:24		16:24		16:05	
19	05:18	06:10		07:05		07:59		07:59		08:40	
	21:45	20:48		19:34	20 19:02 (3)	18:22		16:23		16:05	
20	05:20	06:12		07:06		08:01		08:00		08:41	
	21:44	20:46		19:32	22 19:03 (3)	18:20		16:22		16:06	
21	05:21	06:13		07:08		08:03		08:02		08:41	
	21:42	20:44		19:29	21 19:01 (3)	18:17		16:20		16:06	
22	05:23	06:15		07:10		08:05		08:04		08:42	
	21:41	20:42		19:27	19 18:58 (3)	18:15		16:19		16:06	
23	05:24	20:26 (2)	06:17	07:12		08:07		08:06		08:42	
	21:39	7 20:33 (2)	20:39	19:24	17 18:56 (3)	18:13		16:18		16:07	
24	05:26	20:23 (2)	06:19	07:13		08:09		08:08		08:43	
	21:38	12 20:35 (2)	20:37	19:22	26 18:54 (3)	18:11		16:17		16:08	
25	05:27	20:22 (2)	06:20	07:15		07:11		08:09		08:43	
	21:36	15 20:37 (2)	20:35	19:19	31 18:51 (3)	17:09		16:16		16:08	
26	05:29	20:20 (2)	06:22	07:17		07:13		08:11		08:43	
	21:35	18 20:38 (2)	20:32	19:17	33 18:48 (3)	17:06		16:14		16:09	
27	05:30	20:18 (2)	06:24	07:19		07:15		08:13		08:44	
	21:33	21 20:39 (2)	20:30	19:14	35 18:46 (3)	17:04		16:13		16:10	
28	05:32	20:18 (2)	06:26	07:21		07:16	16:03 (5)	08:14		08:44	
	21:32	23 20:41 (2)	20:28	19:12	34 18:44 (3)	17:02	2 16:05 (5)	16:12		16:11	
29	05:34	20:16 (2)	06:27	07:22		07:18	15:58 (5)	08:16		08:44	
	21:30	25 20:41 (2)	20:25	19:09	33 18:41 (3)	17:00	12 16:10 (5)	16:12		16:11	
30	05:35	20:16 (2)	06:29	07:24		07:20	15:56 (5)	08:18		08:44	
	21:28	26 20:42 (2)	20:23	19:07	34 18:25 (4)	16:58	16 16:12 (5)	16:11		16:12	
31	05:37	20:16 (2)	06:31			07:22	15:55 (5)			08:44	
	21:26	27 20:43 (2)	20:21			16:56	18 16:13 (5)			16:13	
Potential sun hours	512		460		382		328		259		233
Total, worst case		174		401		361		497		210	
Sun reduction		0.32		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.65		0.65		0.68		0.68		0.66	
Total reduction		0.21		0.22		0.22		0.20		0.17	
Total, real		36		88		78		98		37	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CF - H84

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:18 (5)	07:16	17:08 (4)	07:01	05:52	20:05 (2)	05:03		
	16:15	17:06	16:35 (5)	18:02	17:34 (4)	20:00	20:55	21	20:26 (2)	21:45	
2	08:44	08:12	16:18 (5)	07:14	17:07 (4)	06:59	05:50		20:04 (2)	05:02	
	16:16	17:08	16:37 (5)	18:04	17:36 (4)	20:02	20:57	23	20:27 (2)	21:46	
3	08:43	08:10	16:18 (5)	07:12	17:07 (4)	06:56	05:48		20:03 (2)	05:01	
	16:17	17:10	16:39 (5)	18:06	17:38 (4)	20:04	20:59	26	20:29 (2)	21:48	
4	08:43	08:08	16:18 (5)	07:09	17:07 (4)	06:54	05:46		20:03 (2)	05:00	
	16:18	17:12	16:41 (5)	18:07	17:41 (4)	20:06	21:01	27	20:30 (2)	21:49	
5	08:43	08:07	16:19 (5)	07:07	17:06 (4)	06:51	05:44		20:03 (2)	04:59	
	16:19	17:14	16:43 (5)	18:09	17:42 (4)	20:07	21:03	29	20:32 (2)	21:50	
6	08:42	08:05	16:19 (5)	07:04	17:06 (4)	06:49	05:42		20:02 (2)	04:59	
	16:21	17:16	16:42 (5)	18:11	17:45 (4)	20:09	21:04	31	20:33 (2)	21:51	
7	08:42	08:03	16:20 (5)	07:02	17:05 (4)	06:47	05:40		20:03 (2)	04:58	
	16:22	17:18	16:42 (5)	18:13	17:46 (4)	20:11	21:06	33	20:36 (2)	21:52	
8	08:42	08:01	16:20 (5)	07:00	17:06 (4)	06:44	05:38		20:03 (2)	04:57	
	16:24	17:20	16:41 (5)	18:15	17:46 (4)	20:13	21:08	32	20:35 (2)	21:53	
9	08:41	07:59	16:21 (5)	06:57	17:05 (4)	06:42	05:36		20:03 (2)	04:57	
	16:25	17:22	16:41 (5)	18:17	17:45 (4)	20:15	21:10	32	20:35 (2)	21:54	
10	08:40	07:57	16:23 (5)	06:55	17:06 (4)	06:39	05:34		20:03 (2)	04:56	
	16:26	17:24	16:40 (5)	18:19	17:44 (4)	20:17	21:11	31	20:34 (2)	21:55	
11	08:40	07:55	16:25 (5)	06:52	17:07 (4)	06:37	05:33		20:04 (2)	04:56	
	16:28	17:26	16:38 (5)	18:21	17:44 (4)	20:19	21:13	31	20:35 (2)	21:55	
12	08:39	07:53	16:27 (5)	06:50	17:07 (4)	06:35	05:31		20:04 (2)	04:55	
	16:30	17:28	16:34 (5)	18:23	17:42 (4)	20:20	21:15	30	20:34 (2)	21:56	
13	08:38	07:51		06:48	17:08 (4)	06:32	05:29		20:04 (2)	04:55	
	16:31	17:30		18:25	17:42 (4)	20:22	21:17	29	20:33 (2)	21:57	
14	08:37	07:49		06:45	17:09 (4)	06:30	05:27		20:05 (2)	04:55	
	16:33	17:32		18:27	18:00 (3)	20:24	21:18	28	20:33 (2)	21:57	
15	08:36	07:47		06:43	17:10 (4)	06:28	05:26		20:05 (2)	04:55	
	16:34	17:34		18:28	18:02 (3)	20:26	21:20	27	20:32 (2)	21:58	
16	08:35	07:45		06:40	17:11 (4)	06:25	05:24		20:07 (2)	04:54	
	16:36	17:36		18:30	18:04 (3)	20:28	21:22	24	20:31 (2)	21:59	
17	08:34	07:43		06:38	17:14 (4)	06:23	05:22		20:07 (2)	04:54	
	16:38	17:38		18:32	18:06 (3)	20:30	21:23	23	20:30 (2)	21:59	
18	08:33	07:41		06:35	17:17 (4)	06:21	05:21		20:08 (2)	04:54	
	16:40	17:40		18:34	18:07 (3)	20:31	21:25	21	20:29 (2)	22:00	
19	08:32	07:39		06:33	17:53 (3)	06:18	05:19		20:10 (2)	04:54	
	16:41	17:42		18:36	18:10 (3)	20:33	21:27	19	20:29 (2)	22:00	
20	08:31	07:36		06:31	17:52 (3)	06:16	05:18		20:11 (2)	04:54	
	16:43	17:44		18:38	18:11 (3)	20:35	21:28	16	20:27 (2)	22:00	
21	08:30	07:34		06:28	17:52 (3)	06:14	05:16		20:13 (2)	04:54	
	16:45	17:46		18:40	18:13 (3)	20:37	21:30	12	20:25 (2)	22:01	
22	08:28	07:32		06:26	17:52 (3)	06:12	05:15		20:16 (2)	04:55	
	16:47	17:48		18:41	18:15 (3)	20:39	21:31	7	20:23 (2)	22:01	
23	08:27	07:30	17:16 (4)	06:23	17:53 (3)	06:09	05:13			04:55	
	16:49	17:50	6	17:22 (4)	18:15 (3)	20:41	21:33			22:01	
24	08:26	07:28	17:15 (4)	06:21	17:53 (3)	06:07	05:12			04:55	
	16:50	17:52	9	17:24 (4)	18:13 (3)	20:42	21:34			22:01	
25	08:24	07:25	17:12 (4)	06:18	17:55 (3)	06:05	05:11			04:55	
	16:52	17:54	14	17:26 (4)	18:11 (3)	20:44	21:36			22:01	
26	08:23	07:23	17:11 (4)	06:16	17:58 (3)	06:03	20:10 (2)	05:09		04:56	
	16:54	16:21 (5)	17:56	17:28 (4)	18:09 (3)	20:46	7	20:17 (2)	21:37	22:01	
27	08:22	16:19 (5)	07:21	06:13		06:01	20:09 (2)	05:08		04:56	
	16:56	4	16:23 (5)	17:58		20:48	10	20:19 (2)	21:39	22:01	
28	08:20	16:19 (5)	07:18	06:11		05:58		20:07 (2)	05:07	04:57	
	16:58	7	16:26 (5)	18:00		20:50	14	20:21 (2)	21:40	22:01	
29	08:18	16:19 (5)		07:08		05:56		20:06 (2)	05:06	04:57	
	17:00	9	16:28 (5)			20:52	16	20:22 (2)	21:41	22:01	
30	08:17	16:18 (5)		07:06		05:54		20:05 (2)	05:05	04:58	
	17:02	12	16:30 (5)			20:53	19	20:24 (2)	21:43	22:00	
31	08:15	16:18 (5)		07:04				05:04			
	17:04	14	16:32 (5)					21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case	47		316	770		69		552			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.64		0.64			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	8		49	141		16		136			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CF - H84

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:14 (2)	06:33		07:26	17:46 (4)	07:24	15:52 (5)	08:19	
	22:00	21:25	30 20:44 (2)	20:18		19:05	35 18:21 (4)	16:54	17	16:09 (5)	16:10
2	04:59	05:40	20:14 (2)	06:35		07:28	17:45 (4)	07:26	15:51 (5)	08:21	
	22:00	21:23	31 20:45 (2)	20:16		19:02	37 18:22 (4)	16:52	19	16:10 (5)	16:09
3	05:00	05:42	20:13 (2)	06:36		07:30	17:44 (4)	07:28	15:50 (5)	08:22	
	21:59	21:21	32 20:45 (2)	20:13		19:00	38 18:22 (4)	16:50	21	16:11 (5)	16:08
4	05:01	05:44	20:13 (2)	06:38		07:31	17:44 (4)	07:30	15:49 (5)	08:24	
	21:59	21:19	32 20:45 (2)	20:11		18:57	38 18:22 (4)	16:48	23	16:12 (5)	16:08
5	05:02	05:45	20:12 (2)	06:40		07:33	17:43 (4)	07:32	15:49 (5)	08:25	
	21:58	21:17	33 20:45 (2)	20:09		18:55	40 18:23 (4)	16:46	23	16:12 (5)	16:07
6	05:03	05:47	20:12 (2)	06:42		07:35	17:43 (4)	07:34	15:48 (5)	08:26	
	21:58	21:15	33 20:45 (2)	20:06		18:52	40 18:23 (4)	16:44	24	16:12 (5)	16:07
7	05:04	05:49	20:13 (2)	06:43		07:37	17:41 (4)	07:36	15:48 (5)	08:28	
	21:57	21:13	30 20:43 (2)	20:04		18:50	40 18:21 (4)	16:43	22	16:10 (5)	16:06
8	05:05	05:50	20:12 (2)	06:45		07:39	17:41 (4)	07:38	15:48 (5)	08:29	
	21:56	21:12	29 20:41 (2)	20:01		18:48	37 18:18 (4)	16:41	20	16:08 (5)	16:06
9	05:06	05:52	20:13 (2)	06:47		07:41	17:41 (4)	07:40	15:48 (5)	08:30	
	21:55	21:10	26 20:39 (2)	19:59		18:45	35 18:16 (4)	16:39	18	16:06 (5)	16:05
10	05:07	05:54	20:12 (2)	06:49		07:42	17:41 (4)	07:42	15:49 (5)	08:31	
	21:55	21:07	25 20:37 (2)	19:56		18:43	33 18:14 (4)	16:37	16	16:05 (5)	16:05
11	05:08	05:56	20:13 (2)	06:50		07:44	17:41 (4)	07:44	15:49 (5)	08:33	
	21:54	21:05	22 20:35 (2)	19:54		18:40	30 18:11 (4)	16:35	14	16:03 (5)	16:05
12	05:09	05:57	20:13 (2)	06:52		07:46	17:41 (4)	07:45	15:50 (5)	08:34	
	21:53	21:03	21 20:34 (2)	19:51		18:38	28 18:09 (4)	16:34	11	16:01 (5)	16:05
13	05:10	05:59	20:13 (2)	06:54		07:48	17:42 (4)	07:47	15:51 (5)	08:35	
	21:52	21:01	18 20:31 (2)	19:49		18:36	25 18:07 (4)	16:32	8	15:59 (5)	16:05
14	05:12	06:01	20:14 (2)	06:56		07:50	17:42 (4)	07:49	15:51 (5)	08:36	
	21:51	20:59	15 20:29 (2)	19:47		18:33	22 18:04 (4)	16:31	7	15:58 (5)	16:04
15	05:13	06:03	20:15 (2)	06:58		07:52	17:43 (4)	07:51	15:52 (5)	08:37	
	21:50	20:57	13 20:28 (2)	19:44		18:31	19 18:02 (4)	16:29	4	15:56 (5)	16:05
16	05:14	06:04	20:16 (2)	06:59		07:54	17:44 (4)	07:53	15:53 (5)	08:38	
	21:49	20:55	9 20:25 (2)	19:42		18:29	15 17:59 (4)	16:27	1	15:54 (5)	16:05
17	05:16	06:06	20:17 (2)	07:01	18:46 (3)	07:55	17:45 (4)	07:55			08:38
	21:47	20:53	6 20:23 (2)	19:39	10 18:56 (3)	18:26	12 17:57 (4)	16:26			16:05
18	05:17	06:08	20:19 (2)	07:03	18:43 (3)	07:57	17:46 (4)	07:57			08:39
	21:46	20:50	3 20:22 (2)	19:37	15 18:58 (3)	18:24	9 17:55 (4)	16:24			16:05
19	05:18	06:10		07:05	18:41 (3)	07:59	17:48 (4)	07:59			08:40
	21:45	20:48		19:34	19 19:00 (3)	18:22	4 17:52 (4)	16:23			16:05
20	05:20	06:12		07:06	18:40 (3)	08:01		08:00			08:41
	21:44	20:46		19:32	21 19:01 (3)	18:20		16:22			16:06
21	05:21	06:13		07:08	18:38 (3)	08:03		08:02			08:41
	21:42	20:44		19:29	23 19:01 (3)	18:17		16:20			16:06
22	05:23	20:24 (2)	06:15	07:10	18:37 (3)	08:05		08:04			08:42
	21:41	20:34 (2)	20:42	19:27	21 18:58 (3)	18:15		16:19			16:06
23	05:24	20:23 (2)	06:17	07:12	18:37 (3)	08:07		08:06			08:42
	21:39	20:37 (2)	20:39	19:24	19 18:56 (3)	18:13		16:18			16:07
24	05:26	20:21 (2)	06:19	07:13	18:36 (3)	08:09		08:08			08:43
	21:38	20:38 (2)	20:37	19:22	18 18:54 (3)	18:11		16:17			16:08
25	05:27	20:20 (2)	06:20	07:15	18:01 (4)	07:11		08:09			08:43
	21:36	20:40 (2)	20:35	19:19	25 18:51 (3)	17:09		16:16			16:08
26	05:29	20:18 (2)	06:22	07:17	17:57 (4)	07:13		08:11			08:43
	21:35	20:40 (2)	20:32	19:17	30 18:48 (3)	17:06		16:14			16:09
27	05:30	20:17 (2)	06:24	07:19	17:54 (4)	07:15		08:13			08:44
	21:33	20:41 (2)	20:30	19:14	33 18:46 (3)	17:04		16:13			16:10
28	05:32	20:17 (2)	06:26	07:21	17:52 (4)	07:16		08:14			08:44
	21:32	20:42 (2)	20:28	19:12	35 18:44 (3)	17:02		16:12			16:11
29	05:34	20:15 (2)	06:27	07:22	17:50 (4)	07:18		08:16			08:44
	21:30	20:42 (2)	20:25	19:09	34 18:41 (3)	17:00		16:12			16:11
30	05:35	20:15 (2)	06:29	07:24	17:48 (4)	07:20	15:56 (5)	08:18			08:44
	21:28	20:43 (2)	20:23	19:07	33 18:38 (3)	16:58	9 16:05 (5)	16:11			16:12
31	05:37	20:15 (2)	06:31			07:22	15:53 (5)				08:44
	21:26	20:44 (2)	20:21			16:56	14 16:07 (5)				16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case		216		408		336		560		248	
Sun reduction		0.32		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.64		0.64		0.68		0.68		0.66	
Total reduction		0.21		0.22		0.22		0.20		0.17	
Total, real		45		90		73		111		43	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CG - H85

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44		08:14	16:14 (5)	07:16		17:02 (4)	07:01	05:52	20:04 (2)	05:03
	16:15		17:06	21 16:35 (5)	18:02	32	17:34 (4)	20:00	20:55	22 20:26 (2)	21:45
2	08:44		08:12	16:14 (5)	07:14		17:01 (4)	06:59	05:50	20:04 (2)	05:02
	16:16		17:08	23 16:37 (5)	18:04	35	17:36 (4)	20:02	20:57	23 20:27 (2)	21:46
3	08:43		08:10	16:14 (5)	07:12		17:01 (4)	06:56	05:48	20:03 (2)	05:01
	16:17		17:10	25 16:39 (5)	18:06	37	17:38 (4)	20:04	20:59	26 20:29 (2)	21:48
4	08:43		08:08	16:14 (5)	07:09		17:01 (4)	06:54	05:46	20:03 (2)	05:00
	16:18		17:12	24 16:38 (5)	18:07	40	17:41 (4)	20:06	21:01	27 20:30 (2)	21:49
5	08:43		08:07	16:15 (5)	07:07		17:00 (4)	06:51	05:44	20:02 (2)	04:59
	16:19		17:14	23 16:38 (5)	18:09	42	17:42 (4)	20:07	21:03	30 20:32 (2)	21:50
6	08:42		08:05	16:15 (5)	07:04		17:00 (4)	06:49	05:42	20:02 (2)	04:59
	16:21		17:16	22 16:37 (5)	18:11	42	17:42 (4)	20:09	21:04	31 20:33 (2)	21:51
7	08:42		08:03	16:16 (5)	07:02		17:00 (4)	06:47	05:40	20:02 (2)	04:58
	16:22		17:18	21 16:37 (5)	18:13	41	17:41 (4)	20:11	21:06	34 20:36 (2)	21:52
8	08:42		08:01	16:18 (5)	07:00		17:01 (4)	06:44	05:38	20:02 (2)	04:57
	16:24		17:20	18 16:36 (5)	18:15	40	17:41 (4)	20:13	21:08	34 20:36 (2)	21:53
9	08:41		07:59	16:19 (5)	06:57		17:00 (4)	06:42	05:36	20:02 (2)	04:57
	16:25		17:22	15 16:34 (5)	18:17	39	17:39 (4)	20:15	21:10	34 20:36 (2)	21:54
10	08:40		07:57	16:22 (5)	06:55		17:01 (4)	06:39	05:34	20:02 (2)	04:56
	16:26		17:24	10 16:32 (5)	18:19	38	17:39 (4)	20:17	21:11	33 20:35 (2)	21:55
11	08:40		07:55		06:52		17:03 (4)	06:37	05:33	20:03 (2)	04:56
	16:28		17:26		18:21	35	17:38 (4)	20:19	21:13	32 20:35 (2)	21:55
12	08:39		07:53		06:50		17:03 (4)	06:35	05:31	20:03 (2)	04:55
	16:30		17:28		18:23	33	17:36 (4)	20:20	21:15	32 20:35 (2)	21:56
13	08:38		07:51		06:48		17:04 (4)	06:32	05:29	20:03 (2)	04:55
	16:31		17:30		18:25	34	17:58 (3)	20:22	21:17	31 20:34 (2)	21:57
14	08:37		07:49		06:45		17:05 (4)	06:30	05:27	20:04 (2)	04:55
	16:33		17:32		18:27	35	18:00 (3)	20:24	21:18	30 20:34 (2)	21:58
15	08:36		07:47		06:43		17:08 (4)	06:28	05:26	20:04 (2)	04:55
	16:34		17:34		18:28	32	18:02 (3)	20:26	21:20	29 20:33 (2)	21:58
16	08:35		07:45		06:40		17:10 (4)	06:25	05:24	20:05 (2)	04:54
	16:36		17:36		18:30	30	18:04 (3)	20:28	21:22	28 20:33 (2)	21:59
17	08:34		07:43		06:38		17:15 (4)	06:23	05:22	20:05 (2)	04:54
	16:38		17:38		18:32	23	18:06 (3)	20:30	21:23	26 20:31 (2)	21:59
18	08:33		07:41		06:35		17:50 (3)	06:21	05:21	20:07 (2)	04:54
	16:40		17:40		18:34	17	18:07 (3)	20:31	21:25	24 20:31 (2)	22:00
19	08:32		07:39		06:33		17:50 (3)	06:18	05:19	20:08 (2)	04:54
	16:41		17:42		18:36	20	18:10 (3)	20:33	21:27	22 20:30 (2)	22:00
20	08:31		07:36	17:13 (4)	06:31		17:50 (3)	06:16	05:18	20:09 (2)	04:54
	16:43		17:44	3 17:16 (4)	18:38	21	18:11 (3)	20:35	21:28	20 20:29 (2)	22:00
21	08:30		07:34	17:11 (4)	06:28		17:50 (3)	06:14	05:16	20:11 (2)	04:54
	16:45		17:46	7 17:18 (4)	18:40	23	18:13 (3)	20:37	21:30	17 20:28 (2)	22:01
22	08:29		07:32	17:08 (4)	06:26		17:50 (3)	06:12	05:15	20:12 (2)	04:55
	16:47		17:48	11 17:19 (4)	18:42	23	18:13 (3)	20:39	21:31	15 20:27 (2)	22:01
23	08:27		07:30	17:07 (4)	06:23		17:51 (3)	06:09	05:13	20:14 (2)	04:55
	16:49		17:50	15 17:22 (4)	18:43	21	18:12 (3)	20:41	21:33	10 20:24 (2)	22:01
24	08:26	16:15 (5)	07:28	17:06 (4)	06:21		17:52 (3)	06:07	05:12		04:55
	16:50	2 16:17 (5)	17:52	18 17:24 (4)	18:45	18	18:10 (3)	20:42	21:34		22:01
25	08:24	16:15 (5)	07:25	17:04 (4)	06:18		17:54 (3)	06:05	20:12 (2)		04:55
	16:52	4 16:19 (5)	17:54	22 17:26 (4)	18:47	14	18:08 (3)	20:44	20:15 (2)		22:01
26	08:23	16:14 (5)	07:23	17:04 (4)	06:16		17:58 (3)	06:03	20:10 (2)		04:56
	16:54	7 16:21 (5)	17:56	24 17:28 (4)	18:49	7	18:05 (3)	20:46	20:17 (2)		22:01
27	08:22	16:13 (5)	07:21	17:03 (4)	06:13			06:01	20:09 (2)		04:56
	16:56	10 16:23 (5)	17:58	28 17:31 (4)	18:51			20:48	20:19 (2)		22:01
28	08:20	16:14 (5)	07:18	17:02 (4)	06:11			05:58	20:07 (2)		04:57
	16:58	12 16:26 (5)	18:00	30 17:32 (4)	18:53			20:50	20:21 (2)		22:01
29	08:18	16:13 (5)			07:08			05:56	20:06 (2)		04:57
	17:00	15 16:28 (5)			19:54			20:52	20:22 (2)		22:01
30	08:17	16:13 (5)			07:06			05:54	20:05 (2)		04:58
	17:02	17 16:30 (5)			19:56			20:53	20:24 (2)		22:00
31	08:15	16:13 (5)			07:04				05:04		
	17:04	19 16:32 (5)			19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case		86		360		772		69		610	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.67		0.68		0.64		0.64	
Total reduction		0.16		0.16		0.18		0.23		0.25	
Total, real		14		56		142		16		150	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CG - H85

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:13 (2)	06:33		07:26	17:42 (4)	07:24	15:51 (5)	08:19	
	22:00	21:25	32	20:45 (2)	20:18	19:05	33	18:36 (3)	16:54	11	16:02 (5)
2	04:59	05:40	20:13 (2)	06:35		07:28	17:41 (4)	07:26	15:49 (5)	08:21	
	22:00	21:23	33	20:46 (2)	20:16	19:02	34	18:15 (4)	16:52	15	16:04 (5)
3	05:00	05:42	20:12 (2)	06:36		07:30	17:40 (4)	07:28	15:47 (5)	08:22	
	21:59	21:21	33	20:45 (2)	20:13	19:00	36	18:16 (4)	16:50	19	16:06 (5)
4	05:01	05:44	20:12 (2)	06:38		07:31	17:39 (4)	07:30	15:46 (5)	08:24	
	21:59	21:19	34	20:46 (2)	20:11	18:57	38	18:17 (4)	16:48	20	16:06 (5)
5	05:02	05:45	20:12 (2)	06:40		07:33	17:38 (4)	07:32	15:45 (5)	08:25	
	21:58	21:17	33	20:45 (2)	20:09	18:55	39	18:17 (4)	16:46	22	16:07 (5)
6	05:03	05:47	20:12 (2)	06:42		07:35	17:37 (4)	07:34	15:44 (5)	08:26	
	21:58	21:15	33	20:45 (2)	20:06	18:52	41	18:18 (4)	16:44	24	16:08 (5)
7	05:04	05:49	20:12 (2)	06:43		07:37	17:36 (4)	07:36	15:44 (5)	08:28	
	21:57	21:13	31	20:43 (2)	20:04	18:50	41	18:17 (4)	16:43	24	16:08 (5)
8	05:05	05:51	20:12 (2)	06:45		07:39	17:35 (4)	07:38	15:44 (5)	08:29	
	21:56	21:12	29	20:41 (2)	20:01	18:48	42	18:17 (4)	16:41	24	16:08 (5)
9	05:06	05:52	20:12 (2)	06:47		07:41	17:35 (4)	07:40	15:43 (5)	08:30	
	21:55	21:10	27	20:39 (2)	19:59	18:45	41	18:16 (4)	16:39	23	16:06 (5)
10	05:07	05:54	20:12 (2)	06:49		07:42	17:35 (4)	07:42	15:44 (5)	08:31	
	21:55	21:07	25	20:37 (2)	19:56	18:43	39	18:14 (4)	16:37	21	16:05 (5)
11	05:08	05:56	20:12 (2)	06:50		07:44	17:35 (4)	07:44	15:45 (5)	08:33	
	21:54	21:05	23	20:35 (2)	19:54	18:40	36	18:11 (4)	16:35	18	16:03 (5)
12	05:09	05:57	20:13 (2)	06:52		07:46	17:35 (4)	07:45	15:45 (5)	08:34	
	21:53	21:03	21	20:34 (2)	19:51	18:38	34	18:09 (4)	16:34	16	16:01 (5)
13	05:10	05:59	20:13 (2)	06:54		07:48	17:35 (4)	07:47	15:45 (5)	08:35	
	21:52	21:01	18	20:31 (2)	19:49	18:36	32	18:07 (4)	16:32	14	15:59 (5)
14	05:12	06:01	20:14 (2)	06:56		07:50	17:35 (4)	07:49	15:46 (5)	08:36	
	21:51	20:59	15	20:29 (2)	19:47	18:33	29	18:04 (4)	16:31	12	15:58 (5)
15	05:13	06:03	20:15 (2)	06:58		07:52	17:35 (4)	07:51	15:46 (5)	08:37	
	21:50	20:57	13	20:28 (2)	19:44	18:31	27	18:02 (4)	16:29	10	15:56 (5)
16	05:14	06:04	20:15 (2)	06:59		07:54	17:36 (4)	07:53	15:47 (5)	08:38	
	21:49	20:55	10	20:25 (2)	19:42	18:29	23	17:59 (4)	16:27	7	15:54 (5)
17	05:16	06:06	20:17 (2)	07:01	18:47 (3)	07:55	17:37 (4)	07:55	15:48 (5)	08:38	
	21:47	20:53	6	20:23 (2)	19:39	3	18:50 (3)	18:26	20	17:57 (4)	16:26
18	05:17	06:08	20:19 (2)	07:03	18:42 (3)	07:57	17:38 (4)	07:57	15:49 (5)	08:39	
	21:46	20:50	3	20:22 (2)	19:37	13	18:55 (3)	18:24	17	17:55 (4)	16:24
19	05:18	06:10		07:05	18:40 (3)	07:59	17:39 (4)	07:59	15:51 (5)	08:40	
	21:45	20:48		19:34	18:57 (3)	18:22	13	17:52 (4)	16:23		16:05
20	05:20	20:26 (2)	06:12	07:06	18:38 (3)	08:01	17:40 (4)	08:00			08:41
	21:44	7	20:33 (2)	20:46	19:32	20	18:58 (3)	18:20	10	17:50 (4)	16:22
21	05:21	20:23 (2)	06:13	07:08	18:36 (3)	08:03	17:41 (4)	08:02			08:41
	21:42	12	20:35 (2)	20:44	19:29	22	18:58 (3)	18:17	7	17:48 (4)	16:20
22	05:23	20:21 (2)	06:15	07:10	18:35 (3)	08:05	17:44 (4)	08:04			08:42
	21:41	16	20:37 (2)	20:42	19:27	23	18:58 (3)	18:15	1	17:45 (4)	16:19
23	05:24	20:20 (2)	06:17	07:12	18:35 (3)	08:07		08:06			08:42
	21:39	19	20:39 (2)	20:39	19:24	21	18:56 (3)	18:13			16:18
24	05:26	20:19 (2)	06:19	07:13	18:34 (3)	08:09		08:08			08:43
	21:38	21	20:40 (2)	20:37	19:22	20	18:54 (3)	18:11			16:17
25	05:27	20:18 (2)	06:20	07:15	18:33 (3)	07:11		08:09			08:43
	21:36	23	20:41 (2)	20:35	19:19	18	18:51 (3)	17:09			16:16
26	05:29	20:17 (2)	06:22	07:17	18:33 (3)	07:13		08:11			08:43
	21:35	25	20:42 (2)	20:32	19:17	15	18:48 (3)	17:06			16:14
27	05:30	20:15 (2)	06:24	07:19	17:53 (4)	07:15		08:13			08:44
	21:33	27	20:42 (2)	20:30	19:14	28	18:46 (3)	17:04			16:13
28	05:32	20:15 (2)	06:26	07:21	17:49 (4)	07:16		08:14			08:44
	21:32	28	20:43 (2)	20:28	19:12	33	18:44 (3)	17:02			16:12
29	05:34	20:14 (2)	06:27	07:22	17:47 (4)	07:18		08:16			08:44
	21:30	29	20:43 (2)	20:25	19:09	33	18:41 (3)	17:00			16:12
30	05:35	20:14 (2)	06:29	07:24	17:44 (4)	07:20		08:18			08:44
	21:28	30	20:44 (2)	20:23	19:07	33	18:38 (3)	16:58			16:11
31	05:37	20:14 (2)	06:31					15:54 (5)			08:44
	21:26	31	20:45 (2)	20:21				16:56	3	15:57 (5)	16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case		268		419		299		636		286	
Sun reduction		0.32		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.64		0.64		0.67		0.68		0.66	
Total reduction		0.21		0.22		0.22		0.20		0.18	
Total, real		56		92		65		126		50	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CH - H86

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:08 (5)	07:16	16:53 (4)	07:01	05:52	20:05 (2)	05:03		
	16:15	17:06	25 16:33 (5)	18:02	41 17:34 (4)	20:00	20:55	21 20:26 (2)	21:45		
2	08:44	08:12	16:08 (5)	07:14	16:52 (4)	06:59	05:50	20:04 (2)	05:02		
	16:16	17:08	25 16:33 (5)	18:04	44 17:36 (4)	20:02	20:57	23 20:27 (2)	21:46		
3	08:44	08:10	16:09 (5)	07:12	16:52 (4)	06:56	05:48	20:03 (2)	05:01		
	16:17	17:10	23 16:32 (5)	18:06	44 17:36 (4)	20:04	20:59	26 20:29 (2)	21:48		
4	08:43	08:08	16:10 (5)	07:09	16:53 (4)	06:54	05:46	20:03 (2)	05:00		
	16:18	17:12	22 16:32 (5)	18:07	43 17:36 (4)	20:06	21:01	27 20:30 (2)	21:49		
5	08:43	08:07	16:11 (5)	07:07	16:53 (4)	06:51	05:44	20:02 (2)	04:59		
	16:19	17:14	20 16:31 (5)	18:09	42 17:35 (4)	20:07	21:03	30 20:32 (2)	21:50		
6	08:42	08:05	16:12 (5)	07:04	16:53 (4)	06:49	05:42	20:02 (2)	04:59		
	16:21	17:16	18 16:30 (5)	18:11	42 17:35 (4)	20:09	21:04	31 20:33 (2)	21:51		
7	08:42	08:03	16:13 (5)	07:02	16:53 (4)	06:47	05:40	20:02 (2)	04:58		
	16:22	17:18	15 16:28 (5)	18:13	41 17:34 (4)	20:11	21:06	34 20:36 (2)	21:52		
8	08:42	08:01	16:16 (5)	07:00	16:54 (4)	06:44	05:38	20:02 (2)	04:57		
	16:24	17:20	10 16:26 (5)	18:15	39 17:33 (4)	20:13	21:08	35 20:37 (2)	21:53		
9	08:41	07:59		06:57	16:54 (4)	06:42	05:36	20:02 (2)	04:57		
	16:25	17:22		18:17	37 17:31 (4)	20:15	21:10	35 20:37 (2)	21:54		
10	08:40	07:57		06:55	16:56 (4)	06:39	05:34	20:01 (2)	04:56		
	16:26	17:24		18:19	34 17:30 (4)	20:17	21:11	36 20:37 (2)	21:55		
11	08:40	07:55		06:52	16:57 (4)	06:37	05:33	20:02 (2)	04:56		
	16:28	17:26		18:21	33 17:55 (3)	20:19	21:13	35 20:37 (2)	21:55		
12	08:39	07:53		06:50	16:58 (4)	06:35	05:31	20:02 (2)	04:55		
	16:30	17:28		18:23	33 17:56 (3)	20:20	21:15	34 20:36 (2)	21:56		
13	08:38	07:51		06:48	17:00 (4)	06:32	05:29	20:02 (2)	04:55		
	16:31	17:30		18:25	32 17:58 (3)	20:22	21:17	34 20:36 (2)	21:57		
14	08:37	07:49		06:45	17:02 (4)	06:30	05:27	20:03 (2)	04:55		
	16:33	17:32		18:27	31 18:00 (3)	20:24	21:18	33 20:36 (2)	21:58		
15	08:36	07:47		06:43	17:06 (4)	06:28	05:26	20:03 (2)	04:55		
	16:34	17:34		18:28	25 18:02 (3)	20:26	21:20	32 20:35 (2)	21:58		
16	08:35	07:45		06:40	17:48 (3)	06:25	05:24	20:04 (2)	04:54		
	16:36	17:36		18:30	16 18:04 (3)	20:28	21:22	31 20:35 (2)	21:59		
17	08:34	07:43		17:05 (4)	06:38	17:48 (3)	06:23	05:22	20:04 (2)	04:54	
	16:38	17:38	4	17:09 (4)	18:32	18 18:06 (3)	20:30	21:23	30 20:34 (2)	21:59	
18	08:33	07:41		17:02 (4)	06:35	17:47 (3)	06:21	05:21	20:05 (2)	04:54	
	16:40	17:40	9	17:11 (4)	18:34	20 18:07 (3)	20:31	21:25	29 20:34 (2)	22:00	
19	08:32	07:39		17:00 (4)	06:33	17:47 (3)	06:18	05:19	20:06 (2)	04:54	
	16:41	17:42	13	17:13 (4)	18:36	23 18:10 (3)	20:33	21:27	27 20:33 (2)	22:00	
20	08:31	07:36		16:59 (4)	06:31	17:47 (3)	06:16	05:18	20:07 (2)	04:54	
	16:43	17:44	17	17:16 (4)	18:38	24 18:11 (3)	20:35	21:28	25 20:32 (2)	22:00	
21	08:30	16:08 (5)	07:34	16:58 (4)	06:28	17:48 (3)	06:14	05:16	20:08 (2)	04:54	
	16:45	3 16:11 (5)	17:46	17:18 (4)	18:40	23 18:11 (3)	20:37	21:30	24 20:32 (2)	22:01	
22	08:29	16:07 (5)	07:32	16:57 (4)	06:26	17:48 (3)	06:12	05:15	20:09 (2)	04:55	
	16:47	5 16:12 (5)	17:48	17:19 (4)	18:42	21 18:09 (3)	20:39	21:31	22 20:31 (2)	22:01	
23	08:27	16:07 (5)	07:30	16:56 (4)	06:23	17:50 (3)	06:09	05:13	20:10 (2)	04:55	
	16:49	8 16:15 (5)	17:50	17:22 (4)	18:43	18 18:08 (3)	20:41	21:33	19 20:29 (2)	22:01	
24	08:26	16:07 (5)	07:28	16:55 (4)	06:21	17:51 (3)	06:07	05:12	20:11 (2)	04:55	
	16:50	10 16:17 (5)	17:52	17:24 (4)	18:45	15 18:06 (3)	20:43	21:34	17 20:28 (2)	22:01	
25	08:24	16:07 (5)	07:25	16:54 (4)	06:18	17:54 (3)	06:05	05:11	20:13 (2)	04:55	
	16:52	12 16:19 (5)	17:54	17:26 (4)	18:47	9 18:03 (3)	20:44	05:11	14 20:27 (2)	22:01	
26	08:23	16:06 (5)	07:23	16:54 (4)	06:16		06:03	20:11 (2)	05:09	20:16 (2)	04:56
	16:54	15 16:21 (5)	17:56	17:28 (4)	18:49		20:46	6 20:17 (2)	21:37	9 20:25 (2)	22:01
27	08:22	16:06 (5)	07:21	16:54 (4)	06:13		06:01	20:09 (2)	05:08		04:56
	16:56	17 16:23 (5)	17:58	17:31 (4)	18:51		20:48	10 20:19 (2)	21:39		22:01
28	08:20	16:07 (5)	07:18	16:53 (4)	06:11		05:58	20:08 (2)	05:07		04:57
	16:58	19 16:26 (5)	18:00	17:32 (4)	18:53		20:50	13 20:21 (2)	21:40		22:01
29	08:18	16:07 (5)		07:08			05:56	20:07 (2)	05:06		04:57
	17:00	21 16:28 (5)		19:54			20:52	15 20:22 (2)	21:41		22:01
30	08:17	16:07 (5)		07:06			05:54	20:06 (2)	05:05		04:58
	17:02	23 16:30 (5)		19:56			20:53	18 20:24 (2)	21:43		22:00
31	08:15	16:07 (5)		07:04				05:04			
	17:04	25 16:32 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case		158		440		748			713		
Sun reduction		0.24		0.23		0.27			0.38		
Oper. time red.		1.00		1.00		1.00			1.00		
Wind dir. red.		0.66		0.67		0.67			0.64		
Total reduction		0.16		0.16		0.18			0.25		
Total, real		25		69		137			175		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CH - H86

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:12 (2)	06:33		07:26	17:38 (4)	07:24		08:19	
	22:00	21:25	35	20:47 (2)	20:18	19:05	33	18:36 (3)	16:54		16:10
2	04:59	05:40	20:12 (2)	06:35		07:28	17:36 (4)	07:26		15:50 (5)	08:21
	22:00	21:23	36	20:48 (2)	20:16	19:02	33	18:33 (3)	16:52	1	15:51 (5)
3	05:00	05:42	20:12 (2)	06:36		07:30	17:34 (4)	07:28		15:45 (5)	08:22
	21:59	21:21	35	20:47 (2)	20:13	19:00	34	18:08 (4)	16:50	11	15:56 (5)
4	05:01	05:44	20:12 (2)	06:38		07:31	17:33 (4)	07:30		15:43 (5)	08:24
	21:59	21:19	35	20:47 (2)	20:11	18:57	36	18:09 (4)	16:48	15	15:58 (5)
5	05:02	05:45	20:11 (2)	06:40		07:33	17:31 (4)	07:32		15:41 (5)	08:25
	21:58	21:17	35	20:46 (2)	20:09	18:55	39	18:10 (4)	16:46	19	16:00 (5)
6	05:03	05:47	20:12 (2)	06:42		07:35	17:30 (4)	07:34		15:40 (5)	08:26
	21:58	21:15	33	20:45 (2)	20:06	18:52	40	18:10 (4)	16:44	21	16:01 (5)
7	05:04	05:49	20:12 (2)	06:43		07:37	17:29 (4)	07:36		15:39 (5)	08:28
	21:57	21:13	31	20:43 (2)	20:04	18:50	41	18:10 (4)	16:43	22	16:01 (5)
8	05:05	05:51	20:12 (2)	06:45		07:39	17:28 (4)	07:38		15:39 (5)	08:29
	21:56	21:12	29	20:41 (2)	20:01	18:48	42	18:10 (4)	16:41	23	16:02 (5)
9	05:06	05:52	20:12 (2)	06:47		07:41	17:27 (4)	07:40		15:38 (5)	08:30
	21:55	21:10	27	20:39 (2)	19:59	18:45	43	18:10 (4)	16:39	24	16:02 (5)
10	05:07	05:54	20:12 (2)	06:49		07:42	17:27 (4)	07:42		15:39 (5)	08:31
	21:55	21:07	25	20:37 (2)	19:56	18:43	43	18:10 (4)	16:37	25	16:04 (5)
11	05:08	05:56	20:13 (2)	06:50		07:44	17:26 (4)	07:44		15:39 (5)	08:33
	21:54	21:05	22	20:35 (2)	19:54	18:40	44	18:10 (4)	16:35	24	16:03 (5)
12	05:09	05:57	20:13 (2)	06:52		07:46	17:26 (4)	07:45		15:38 (5)	08:34
	21:53	21:03	21	20:34 (2)	19:51	18:38	43	18:09 (4)	16:34	23	16:01 (5)
13	05:10	05:59	20:13 (2)	06:54		07:48	17:26 (4)	07:47		15:38 (5)	08:35
	21:52	21:01	18	20:31 (2)	19:49	18:36	41	18:07 (4)	16:32	21	15:59 (5)
14	05:12	06:01	20:14 (2)	06:56		07:50	17:26 (4)	07:49		15:39 (5)	08:36
	21:51	20:59	15	20:29 (2)	19:47	18:33	38	18:04 (4)	16:31	19	15:58 (5)
15	05:13	06:03	20:16 (2)	06:58		07:52	17:26 (4)	07:51		15:39 (5)	08:37
	21:50	20:57	12	20:28 (2)	19:44	18:31	36	18:02 (4)	16:29	17	15:56 (5)
16	05:14	06:04	20:16 (2)	06:59		07:54	17:26 (4)	07:53		15:39 (5)	08:38
	21:49	20:55	9	20:25 (2)	19:42	18:29	33	17:59 (4)	16:27	15	15:54 (5)
17	05:16	20:27 (2)	06:06	20:18 (2)	07:01	07:55	17:27 (4)	07:55		15:40 (5)	08:38
	21:47	5	20:32 (2)	20:53	5	18:26	30	17:57 (4)	16:26	12	15:52 (5)
18	05:17	20:24 (2)	06:08	20:23 (2)	19:39	07:57	17:27 (4)	07:57		15:41 (5)	08:39
	21:46	11	20:35 (2)	20:51	1	18:49 (3)	18:24	28	17:55 (4)	16:24	10
19	05:18	20:22 (2)	06:10	20:22 (2)	19:37	7	18:39 (3)	07:59		15:41 (5)	08:40
	21:45	15	20:37 (2)	20:48		14	18:53 (3)	18:22	25	17:52 (4)	16:23
20	05:20	20:21 (2)	06:12	20:21 (2)	19:39		18:36 (3)	08:01		15:42 (5)	08:41
	21:44	18	20:39 (2)	20:46		18	18:54 (3)	18:20	22	17:50 (4)	16:22
21	05:21	20:20 (2)	06:13	20:20 (2)	19:37		18:34 (3)	08:03		15:43 (5)	08:41
	21:42	20	20:40 (2)	20:44		21	18:55 (3)	18:17	19	17:48 (4)	16:20
22	05:23	20:18 (2)	06:15	20:18 (2)	19:37		18:33 (3)	08:05		15:44 (5)	08:42
	21:41	23	20:41 (2)	20:42		23	18:56 (3)	18:15	15	17:45 (4)	16:19
23	05:24	20:18 (2)	06:17	20:18 (2)	19:37		18:32 (3)	08:07		15:45 (5)	08:42
	21:39	24	20:42 (2)	20:39		24	18:56 (3)	18:13	12	17:43 (4)	16:18
24	05:26	20:16 (2)	06:19	20:16 (2)	19:37		18:31 (3)	08:09		15:46 (5)	08:43
	21:38	27	20:43 (2)	20:37		23	18:54 (3)	18:11	8	17:41 (4)	16:17
25	05:27	20:16 (2)	06:20	20:16 (2)	19:37		18:30 (3)	07:11		15:47 (5)	08:43
	21:36	28	20:44 (2)	20:35		21	18:51 (3)	17:09	3	16:38 (4)	16:16
26	05:29	20:15 (2)	06:22	20:15 (2)	19:37		18:29 (3)	07:13		15:49 (5)	08:43
	21:35	29	20:44 (2)	20:32		19	18:48 (3)	17:06		15:50 (5)	08:44
27	05:30	20:14 (2)	06:24	20:14 (2)	19:37		18:29 (3)	07:15		15:51 (5)	08:44
	21:33	30	20:44 (2)	20:30		17	18:46 (3)	17:04		15:52 (5)	08:44
28	05:32	20:14 (2)	06:26	20:14 (2)	19:37		17:50 (4)	07:16		15:53 (5)	08:44
	21:32	32	20:46 (2)	20:28		21	18:44 (3)	17:02		15:54 (5)	08:44
29	05:34	20:13 (2)	06:27	20:13 (2)	19:37		17:44 (4)	07:18		15:55 (5)	08:44
	21:30	33	20:46 (2)	20:25		29	18:41 (3)	17:00		15:56 (5)	08:44
30	05:35	20:13 (2)	06:29	20:13 (2)	19:37		17:40 (4)	07:20		15:57 (5)	08:44
	21:28	33	20:46 (2)	20:23		32	18:38 (3)	16:58		15:58 (5)	08:44
31	05:37	20:13 (2)	06:31	20:13 (2)	19:37		17:40 (4)	07:22		15:59 (5)	08:44
	21:26	34	20:47 (2)	20:21			16:56			15:59 (5)	08:44
Potential sun hours	512		460		382		328		259		233
Total, worst case		362		424		269		781		318	
Sun reduction		0.32		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.64		0.64		0.67		0.67		0.66	
Total reduction		0.21		0.22		0.22		0.20		0.18	
Total, real		75		93		58		154		56	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CI - H87

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CJ - H88

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:22 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CK - H89

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
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Total reduction												
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CL - H90

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	05:03 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CM - H91

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CN - H92

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CO - H93

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CP - H94

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CQ - H95

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CR - H96

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CS - H97

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case							7					
Sun reduction							0.32					
Oper. time red.							1.00					
Wind dir. red.							0.61					
Total reduction							0.19					
Total, real							1					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CT - H98

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
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11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:00	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CU - H99

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:04	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:07
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:11 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:00	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CV - H100

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:00	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: CW - H101

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:17 (4) 21:24 (4)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:18 (4) 21:24 (4)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	21:17 (4) 21:23 (4)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:13 (4) 21:14 (4)	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	21:14 (4) 21:15 (4)	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:13 (4) 21:16 (4)	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:12 (4) 21:16 (4)	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:13 (4) 21:17 (4)	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:12 (4) 21:18 (4)	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:12 (4) 21:19 (4)	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:13 (4) 21:20 (4)	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:12 (4) 21:20 (4)	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:12 (4) 21:21 (4)	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:13 (4) 21:22 (4)	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:13 (4) 21:22 (4)	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:13 (4) 21:23 (4)	05:14 21:48	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:13 (4) 21:23 (4)	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:13 (4) 21:24 (4)	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:14 (4) 21:24 (4)	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:14 (4) 21:24 (4)	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:14 (4) 21:24 (4)	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:15 (4) 21:25 (4)	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:15 (4) 21:25 (4)	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:15 (4) 21:25 (4)	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:15 (4) 21:25 (4)	05:27 21:36	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:15 (4) 21:25 (4)	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:15 (4) 21:24 (4)	05:30 21:33	06:24 20:30	07:19 19:14	08:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:16 (4) 21:25 (4)	05:32 21:31	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:58 22:00	21:17 (4) 21:25 (4)	05:34 21:30	06:27 20:25	07:22 19:09	08:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	21:16 (4) 21:24 (4)	05:35 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26		06:31 20:21		17:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case						213							
Sun reduction						0.32							
Oper. time red.						1.00							
Wind dir. red.						0.61							
Total reduction						0.19							
Total, real						41							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: CX - H102

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	19:53 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:55	21	20:14 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50		19:54 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	19	20:13 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48		19:55 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	16	20:11 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46		19:57 (5)	05:00	05:01	05:44	06:38	07:31	07:30	08:23	
	16:18	17:12	18:07	20:06	21:01	12	20:09 (5)	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44		20:00 (5)	04:59	05:02	05:45	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:02	6	20:06 (5)	21:50	21:58	21:17	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42			04:59	05:03	05:47	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04		21:51	21:57	21:15	20:06	18:52	16:44	16:07		
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:13	20:04	18:50	16:43	16:06		
8	08:41	08:01	07:00	06:44	05:38		04:57	05:05	05:51	20:08 (5)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:11	8	20:16 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	20:06 (5)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	13	20:19 (5)	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	20:03 (5)	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	17	20:20 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:02 (5)	06:50	07:44	07:43	08:33	
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	19	20:21 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:57	20:02 (5)	06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	20	20:22 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	20:00 (5)	06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	22	20:22 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	20:00 (5)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	23	20:23 (5)	19:47	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	19:59 (5)	06:58	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	25	20:24 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	19:58 (5)	06:59	07:54	07:53	08:37	
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	25	20:23 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06	19:58 (5)	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	25	20:23 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	19:58 (5) 05:21		04:54	05:17	06:08	19:58 (5)	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	5 20:03 (5) 21:25		21:59	21:46	20:50	24	20:22 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	19:57 (5) 05:19		04:54	05:18	06:10	19:58 (5)	07:05	07:59	07:59	08:40	
	16:41	17:42	18:36	20:33	8 20:05 (5) 21:27		22:00	21:45	20:48	21	20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:56 (5) 05:18		04:54	05:20	06:12	19:58 (5)	07:06	08:01	08:00	08:41	
	16:43	17:44	18:38	20:35	11 20:07 (5) 21:28		22:00	21:43	20:46	19	20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:54 (5) 05:16		04:54	05:21	06:13	19:59 (5)	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	14 20:08 (5) 21:30		22:00	21:42	20:44	16	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:53 (5) 05:15		04:55	05:23	06:15	19:58 (5)	07:10	08:05	08:04	08:42	
	16:47	17:48	18:41	20:39	17 20:10 (5) 21:31		22:01	21:41	20:42	14	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:52 (5) 05:13		04:55	05:24	06:17	19:59 (5)	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	20 20:12 (5) 21:33		22:01	21:39	20:39	11	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:52 (5) 05:12		04:55	05:26	06:19	20:01 (5)	07:13	08:09	08:07	08:43	
	16:51	17:52	18:45	20:42	21 20:13 (5) 21:34		22:01	21:38	20:37	8	20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:52 (5) 05:11		04:56	05:27	06:20	20:01 (5)	07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	23 20:15 (5) 21:36		22:01	21:36	20:35	5	20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:52 (5) 05:09		04:56	05:29	06:22		07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	25 20:17 (5) 21:37		22:01	21:35	20:32		19:17	17:06	16:15	16:09	
27	08:21	07:21	06:13	06:01	19:52 (5) 05:08		04:56	05:30	06:24		07:19	07:14	08:13	08:43	
	16:56	17:58	18:51	20:48	25 20:17 (5) 21:39		22:01	21:33	20:30		19:14	17:04	16:13	16:10	
28	08:20	07:18	06:11	05:58	19:52 (5) 05:07		04:57	05:32	06:26		07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	24 20:16 (5) 21:40		22:01	21:32	20:28		19:12	17:02	16:13	16:11	
29	08:18		07:08	05:56	19:52 (5) 05:06		04:58	05:34	06:28		07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	23 20:15 (5) 21:41		22:00	21:30	20:25		19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	19:53 (5) 05:05		04:58	05:35	06:29		07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	22 20:15 (5) 21:43		22:00	21:28	20:23		19:07	16:58	16:11	16:12	
31	08:15		07:04		05:04			05:37	06:31			07:22		08:44	
	17:04		19:58		21:44			21:26	20:21			16:56		16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233	
Total, worst case				238	74				315						
Sun reduction				0.35	0.38				0.34						
Oper. time red.				1.00	1.00				1.00						
Wind dir. red.				0.65	0.65				0.65						
Total reduction				0.23	0.25				0.22						
Total, real				54	18				70						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CY - H103

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:04 (5) 20:26 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:16 (5) 20:36 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	20:03 (5) 20:27 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:16 (5) 20:37 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	20:03 (5) 20:29 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:14 (5) 20:38 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	20:03 (5) 20:30 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:14 (5) 20:38 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	20:02 (5) 20:30 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:13 (5) 20:38 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:02 (5) 20:29 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:13 (5) 20:39 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:03 (5) 20:29 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:13 (5) 20:40 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:04 (5) 20:29 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:12 (5) 20:39 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:04 (5) 20:28 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:12 (5) 20:39 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:04 (5) 20:27 (5)	04:56 21:54	05:07 21:54	05:54 21:07	20:11 (5) 20:37 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:06 (5) 20:27 (5)	04:56 21:55	05:08 21:54	05:56 21:05	20:12 (5) 20:35 (5)	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:06 (5) 20:25 (5)	04:55 21:56	05:09 21:53	05:58 21:03	20:12 (5) 20:34 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:07 (5) 20:24 (5)	04:55 21:57	05:11 21:52	05:59 21:01	20:12 (5) 20:31 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:09 (5) 20:23 (5)	04:55 21:57	05:12 21:51	06:01 20:59	20:13 (5) 20:29 (5)	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:10 (5) 20:21 (5)	04:55 21:58	05:13 21:50	06:03 20:57	20:13 (5) 20:28 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	20:14 (5) 20:25 (5)	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	20:15 (5) 20:23 (5)	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25		04:54 21:59	05:17 21:46	06:08 20:50	20:17 (5) 20:22 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27		04:54 22:00	05:18 21:45	06:10 20:48	20:18 (5) 20:19 (5)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28		04:54 22:00	05:20 21:43	06:12 20:46		07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30		04:54 22:00	05:21 21:42	06:13 20:44		07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31		04:55 22:01	05:23 21:41	06:15 20:42		07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33		04:55 22:01	05:24 21:39	06:17 20:39		07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 20:13 (5)		04:55 22:01	05:26 21:38	06:19 20:37		07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 20:15 (5)		04:56 22:01	05:27 21:36	06:20 20:35		07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 20:17 (5)		04:56 22:01	05:29 21:35	06:22 20:32		07:17 19:17	07:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 20:19 (5)		04:56 22:01	05:30 21:33	06:24 20:30		07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 20:21 (5)		04:57 22:01	05:32 21:32	06:26 20:28	20:23 (5) 20:30 (5)	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 20:22 (5)		04:58 22:00	05:34 21:30	06:28 20:25	20:21 (5) 20:33 (5)	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 20:24 (5)		04:58 22:00	05:35 21:28	06:29 20:15	20:19 (5) 20:34 (5)	06:29 20:23	07:24 19:07	08:17 16:58	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44			05:37 21:26	06:31 18	20:18 (5) 20:36 (5)	06:21 20:21	07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case						334					367			
Sun reduction					0.35	0.38			0.32		0.34			
Oper. time red.					1.00	1.00			1.00		1.00			
Wind dir. red.					0.65	0.65			0.65		0.65			
Total reduction					0.23	0.25			0.21		0.22			
Total, real					18	82		11			81			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: CZ - H104

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	20:02 (5)	05:03	04:59	05:39	20:12 (5)	06:33	07:26	07:24	08:19
2	16:15	17:06	18:02	20:00	20:55	24	20:26 (5)	21:45	22:00	21:25	28	20:40 (5)	20:18	19:05
	08:44	08:12	07:14	06:59	05:50		20:02 (5)	05:02	05:00	05:40		20:12 (5)	06:35	07:28
	16:16	17:08	18:04	20:02	20:57	25	20:27 (5)	21:46	22:00	21:23	29	20:41 (5)	20:16	19:02
3	08:43	08:10	07:11	06:56	05:48		20:01 (5)	05:01	05:00	05:42		20:11 (5)	06:36	07:30
	16:17	17:10	18:06	20:04	20:59	28	20:29 (5)	21:48	21:59	21:21	30	20:41 (5)	20:13	19:00
4	08:43	08:08	07:09	06:54	05:46		20:01 (5)	05:00	05:01	05:44		20:11 (5)	06:38	07:31
	16:18	17:12	18:07	20:06	21:01	29	20:30 (5)	21:49	21:59	21:19		20:41 (5)	20:11	18:57
5	08:43	08:07	07:07	06:51	05:44		20:01 (5)	04:59	05:02	05:45		20:10 (5)	06:40	07:33
	16:20	17:14	18:09	20:07	21:03	31	20:32 (5)	21:50	21:58	21:17	31	20:41 (5)	20:09	18:55
6	08:42	08:05	07:04	06:49	05:42		20:00 (5)	04:59	05:03	05:47		20:10 (5)	06:42	07:35
	16:21	17:16	18:11	20:09	21:04	31	20:31 (5)	21:51	21:57	21:15	31	20:41 (5)	20:06	18:52
7	08:42	08:03	07:02	06:47	05:40		20:01 (5)	04:58	05:04	05:49		20:11 (5)	06:43	07:37
	16:22	17:18	18:13	20:11	21:06	31	20:32 (5)	21:52	21:57	21:13	31	20:42 (5)	20:04	18:50
8	08:41	08:01	07:00	06:44	05:38		20:01 (5)	04:57	05:05	05:51		20:10 (5)	06:45	07:39
	16:24	17:20	18:15	20:13	21:08	30	20:31 (5)	21:53	21:56	21:11	31	20:41 (5)	20:01	18:48
9	08:41	07:59	06:57	06:42	05:36		20:01 (5)	04:57	05:06	05:52		20:10 (5)	06:47	07:41
	16:25	17:22	18:17	20:15	21:10	30	20:31 (5)	21:54	21:55	21:09	29	20:39 (5)	19:59	18:45
10	08:40	07:57	06:55	06:39	05:34		20:01 (5)	04:56	05:07	05:54		20:10 (5)	06:49	07:42
	16:27	17:24	18:19	20:17	21:11	29	20:30 (5)	21:55	21:54	21:07	27	20:37 (5)	19:56	18:43
11	08:40	07:55	06:52	06:37	05:33		20:02 (5)	04:56	05:08	05:56		20:10 (5)	06:50	07:44
	16:28	17:26	18:21	20:18	21:13	28	20:30 (5)	21:55	21:54	21:05	25	20:35 (5)	19:54	18:40
12	08:39	07:53	06:50	06:35	05:31		20:02 (5)	04:55	05:09	05:58		20:11 (5)	06:52	07:46
	16:30	17:28	18:23	20:20	21:15	28	20:30 (5)	21:56	21:53	21:03	23	20:34 (5)	19:51	18:38
13	08:38	07:51	06:48	06:32	05:29		20:02 (5)	04:55	05:11	05:59		20:11 (5)	06:54	07:48
	16:31	17:30	18:25	20:22	21:17	27	20:29 (5)	21:57	21:52	21:01	20	20:31 (5)	19:49	18:36
14	08:37	07:49	06:45	06:30	05:27		20:03 (5)	04:55	05:12	06:01		20:12 (5)	06:56	07:50
	16:33	17:32	18:27	20:24	21:18	25	20:28 (5)	21:57	21:51	20:59	17	20:29 (5)	19:47	18:33
15	08:36	07:47	06:43	06:28	05:26		20:04 (5)	04:55	05:13	06:03		20:13 (5)	06:58	07:52
	16:34	17:34	18:28	20:26	21:20	23	20:27 (5)	21:58	21:50	20:57	15	20:28 (5)	19:44	18:31
16	08:35	07:45	06:40	06:25	05:24		20:05 (5)	04:54	05:14	06:05		20:13 (5)	06:59	07:54
	16:36	17:36	18:30	20:28	21:22	22	20:27 (5)	21:59	21:48	20:55	12	20:25 (5)	19:42	18:29
17	08:34	07:43	06:38	06:23	05:22		20:06 (5)	04:54	05:16	06:06		20:15 (5)	07:01	07:55
	16:38	17:38	18:32	20:30	21:23	19	20:25 (5)	21:59	21:47	20:53	8	20:23 (5)	19:39	18:26
18	08:33	07:41	06:35	06:21	05:21		20:08 (5)	04:54	05:17	06:08		20:17 (5)	07:03	07:57
	16:40	17:40	18:34	20:31	21:25	16	20:24 (5)	21:59	21:46	20:50	5	20:22 (5)	19:37	18:24
19	08:32	07:39	06:33	06:18	05:19		20:10 (5)	04:54	05:18	06:10		07:05	07:59	07:59
	16:41	17:42	18:36	20:33	21:27	13	20:23 (5)	22:00	21:45	20:48		19:34	18:22	16:23
20	08:31	07:36	06:31	06:16	05:18		20:12 (5)	04:54	05:20	06:12		07:06	08:01	08:00
	16:43	17:44	18:38	20:35	21:28	8	20:20 (5)	22:00	21:43	20:46		19:32	18:20	16:22
21	08:30	07:34	06:28	06:14	05:16			04:54	05:21	06:13		07:08	08:03	08:02
	16:45	17:46	18:40	20:37	21:30			22:00	21:42	20:44		19:29	18:17	16:20
22	08:28	07:32	06:26	06:12	05:15			04:55	05:23	06:15		07:10	08:05	08:04
	16:47	17:48	18:42	20:39	21:31			22:01	21:41	20:42		19:27	18:15	16:19
23	08:27	07:30	06:23	06:09	05:13			04:55	05:24		20:25 (5)	06:17	07:12	08:07
	16:49	17:50	18:43	20:41	21:33			22:01	21:39	4	20:29 (5)	06:19	19:24	18:13
24	08:26	07:28	06:21	06:07	05:12			04:55	05:26		20:21 (5)	06:19	19:23	18:09
	16:51	17:52	18:45	20:42	21:34			22:01	21:38	11	20:32 (5)	06:20	19:22	18:11
25	08:24	07:25	06:18	06:05	5	20:10 (5)	05:11	04:56	05:27		20:19 (5)	06:20	07:15	07:11
	16:52	17:54	18:47	20:44	20:15 (5)	21:36	22:01	21:36	15	20:34 (5)	06:20	19:19	17:09	16:16
26	08:23	07:23	06:16	06:03	20:08 (5)	05:09	04:56	05:29		20:18 (5)	06:22	07:17	07:13	08:11
	16:54	17:56	18:49	20:46	9	20:17 (5)	21:37	22:01	17	20:35 (5)	06:22	19:17	17:07	16:15
27	08:21	07:21	06:13	06:01	20:06 (5)	05:08	04:56	05:31		20:17 (5)	06:24	19:19	07:14	08:13
	16:56	17:58	18:51	20:48	13	20:19 (5)	21:39	22:01	20	20:33 (5)	06:24	19:14	17:04	16:14
28	08:20	07:18	06:11	05:58	20:05 (5)	05:07	04:57	05:32		20:15 (5)	06:26	07:21	07:16	08:14
	16:58	18:00	18:53	20:50	16	20:21 (5)	21:40	22:01	23	20:38 (5)	06:28	19:12	17:02	16:13
29	08:18		07:09	05:56	20:04 (5)	05:06	04:58	05:34		20:15 (5)	06:28	07:22	07:18	08:16
	17:00		19:54	20:52	18	20:22 (5)	21:41	22:00	24	20:39 (5)	06:25	19:09	17:00	16:12
30	08:17		07:06	05:54	20:03 (5)	05:05	04:58	05:35		20:14 (5)	06:29	07:24	07:20	08:17
	17:02		19:56	20:53	21	20:24 (5)	21:43	22:00	25	20:39 (5)	06:23		16:58	16:11
31	08:15		07:04			05:04				20:13 (5)	06:31		07:22	08:17
	17:04		19:58			21:44			27	20:40 (5)	06:21		16:56	16:13
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259		233
Total, worst case				82	497			166		422				
Sun reduction				0.35	0.38			0.32		0.34				
Oper. time red.				1.00	1.00			1.00		1.00				
Wind dir. red.				0.65	0.65			0.65		0.65				
Total reduction				0.23	0.25			0.21		0.22				
Total, real				19	122			35		93				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DA - H105

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	21:00 (5)	04:59	21:02 (5)	05:39	06:33	07:26	07:24	08:19
2	08:44	08:12	07:14	06:59	05:50	05:02	21:00 (5)	05:00	21:03 (5)	05:40	06:35	07:28	07:26	08:21
3	08:43	08:10	07:12	06:56	05:48	05:01	21:12 (5)	05:00	21:24 (5)	05:23	06:36	07:30	07:28	08:22
4	08:43	08:08	07:09	06:54	05:46	05:00	21:13 (5)	05:01	21:23 (5)	05:21	06:38	07:31	07:30	08:24
5	08:43	08:07	07:07	06:51	05:44	05:00	21:14 (5)	05:02	21:23 (5)	05:19	06:40	07:33	07:32	08:25
6	08:42	08:05	07:04	06:49	05:42	05:00	21:15 (5)	05:03	21:23 (5)	05:17	06:42	07:35	07:34	08:26
7	08:42	08:03	07:02	06:47	05:40	05:00	21:16 (5)	05:04	21:22 (5)	05:15	06:43	07:37	07:36	08:28
8	08:41	08:01	07:00	06:44	05:38	05:00	21:16 (5)	05:05	21:22 (5)	05:13	06:45	07:39	07:38	08:29
9	08:41	07:59	06:57	06:42	05:36	05:00	21:17 (5)	05:06	21:21 (5)	05:11	06:47	07:41	07:40	08:30
10	08:40	07:57	06:55	06:39	05:34	05:00	21:19 (5)	05:07	21:21 (5)	05:09	06:49	07:42	07:42	08:31
11	08:40	07:55	06:52	06:37	05:33	05:00	21:19 (5)	05:08	21:20 (5)	05:07	06:50	07:44	07:44	08:33
12	08:39	07:53	06:50	06:35	05:31	05:00	21:20 (5)	05:09	21:19 (5)	05:05	06:52	07:46	07:45	08:34
13	08:38	07:51	06:48	06:32	05:29	05:00	21:21 (5)	05:11	21:09 (5)	05:05	06:54	07:48	07:47	08:35
14	08:37	07:49	06:45	06:30	05:27	05:00	21:21 (5)	05:12	21:17 (5)	05:01	06:56	07:50	07:49	08:36
15	08:36	07:47	06:43	06:28	05:26	05:00	21:21 (5)	05:13	21:16 (5)	05:00	06:57	07:52	07:51	08:37
16	08:35	07:45	06:40	06:25	05:24	05:00	21:22 (5)	05:14	21:15 (5)	05:00	06:59	07:54	07:53	08:38
17	08:34	07:43	06:38	06:23	05:22	05:00	21:23 (5)	05:16	21:15 (5)	05:00	07:01	07:55	07:55	08:38
18	08:33	07:41	06:35	06:21	05:21	05:00	21:23 (5)	05:17	21:03 (5)	05:00	07:03	07:57	07:57	08:39
19	08:32	07:39	06:33	06:18	05:19	05:00	21:24 (5)	05:18	21:05 (5)	05:00	07:05	07:59	07:59	08:40
20	08:31	07:36	06:31	06:16	05:18	05:00	21:24 (5)	05:20	21:06 (5)	05:00	07:06	08:01	08:00	08:41
21	08:30	07:34	06:28	06:14	05:16	05:00	21:24 (5)	05:21	21:07 (5)	05:00	07:08	08:03	08:02	08:41
22	08:28	07:32	06:26	06:12	05:15	05:00	21:25 (5)	05:23	21:08 (5)	05:00	07:10	08:05	08:04	08:42
23	08:27	07:30	06:23	06:09	05:13	05:00	21:25 (5)	05:24	21:09 (5)	05:00	07:12	08:07	08:06	08:42
24	08:26	07:28	06:21	06:07	05:12	05:00	21:25 (5)	05:26	21:10 (5)	05:00	07:13	08:09	08:07	08:43
25	08:24	07:25	06:18	06:05	05:11	05:00	21:26 (5)	05:27	21:11 (5)	05:00	07:15	08:11	08:09	08:43
26	08:23	07:23	06:16	06:03	05:09	05:00	21:26 (5)	05:29	21:12 (5)	05:00	07:17	08:13	08:11	08:43
27	08:22	07:21	06:13	06:01	05:08	05:00	21:27 (5)	05:31	21:13 (5)	05:00	07:19	08:14	08:13	08:44
28	08:20	07:18	06:11	05:58	05:07	21:04 (5)	21:01 (5)	05:32	21:14 (5)	05:00	07:21	08:16	08:14	08:44
29	08:18	18:00	07:09	05:56	05:06	21:06 (5)	21:02 (5)	05:34	21:15 (5)	05:00	07:23	08:17	08:15	08:44
30	08:17		07:06	05:54	05:05	21:07 (5)	21:03 (5)	05:35	21:16 (5)	05:00	07:24	08:18	08:16	08:44
31	08:15		07:04	05:52	05:04	21:08 (5)	21:04 (5)	05:37	21:17 (5)	05:00	07:26	08:19	08:17	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case					21	645		217						
Sun reduction					0.38	0.32		0.32						
Oper. time red.					1.00	1.00		1.00						
Wind dir. red.					0.61	0.61		0.61						
Total reduction					0.23	0.19		0.20						
Total, real					5	125		43						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DB - H106

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DC - H107

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DD - H108

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June			
1	08:44	08:14	07:16				07:01	18:44 (5)	05:52		05:03	20:40 (3)		
	16:15	17:06	18:02				20:00	37	19:21 (5)	20:55	21:45	28	21:08 (3)	
2	08:44	08:12	07:14				06:59	18:44 (5)	05:50		05:02	20:41 (3)		
	16:16	17:08	18:04				20:02	36	19:20 (5)	20:57	21:46	28	21:09 (3)	
3	08:43	08:10	07:12				06:56	18:44 (5)	05:48		05:01	20:41 (3)		
	16:17	17:10	18:06				20:04	36	19:20 (5)	20:59	21:48	28	21:09 (3)	
4	08:43	08:08	07:09				06:54	18:45 (5)	05:46		05:00	20:42 (3)		
	16:18	17:12	18:07				20:06	34	19:19 (5)	21:01	21:49	26	21:08 (3)	
5	08:43	08:07	07:07				06:51	18:45 (5)	05:44		04:59	20:43 (3)		
	16:20	17:14	18:09				20:07	32	19:17 (5)	21:03	21:50	26	21:09 (3)	
6	08:42	08:05	07:04				06:49	18:47 (5)	05:42		04:59	20:43 (3)		
	16:21	17:16	18:11				20:09	29	19:16 (5)	21:04	21:51	25	21:08 (3)	
7	08:42	08:03	07:02				06:47	18:47 (5)	05:40		04:58	20:43 (3)		
	16:22	17:18	18:13				20:11	27	19:14 (5)	21:06	21:52	25	21:08 (3)	
8	08:41	08:01	07:00				06:44	18:49 (5)	05:38		04:57	20:43 (3)		
	16:24	17:20	18:15				20:13	23	19:12 (5)	21:08	21:53	25	21:08 (3)	
9	08:41	07:59	06:57				06:42	18:51 (5)	05:36		04:57	20:44 (3)		
	16:25	17:22	18:17				20:15	19	19:10 (5)	21:10	21:54	24	21:08 (3)	
10	08:40	07:57	06:55				06:39	18:54 (5)	05:34		04:56	20:44 (3)		
	16:27	17:24	18:19				20:17	12	19:06 (5)	21:11	21:55	24	21:08 (3)	
11	08:40	07:55	06:52				06:37		05:33		04:56	20:45 (3)		
	16:28	17:26	18:21				20:19		21:13		21:55	23	21:08 (3)	
12	08:39	07:53	06:50				06:35		05:31		04:55	20:46 (3)		
	16:30	17:28	18:23				20:20		21:15		21:56	22	21:08 (3)	
13	08:38	07:51	06:48				06:32		05:29		04:55	20:45 (3)		
	16:31	17:30	18:25				20:22		21:17		21:57	23	21:08 (3)	
14	08:37	07:49	06:45				06:30		05:27	20:43 (3)	04:55	20:46 (3)		
	16:33	17:32	18:27				20:24		21:18	4	20:47 (3)	21:57	22	21:08 (3)
15	08:36	07:47	06:43				06:28		05:26	20:42 (3)	04:55	20:46 (3)		
	16:34	17:34	18:28				20:26		21:20	6	20:48 (3)	21:58	22	21:08 (3)
16	08:35	07:45	06:40				06:25		05:24	20:42 (3)	04:54	20:47 (3)		
	16:36	17:36	18:30				20:28		21:22	8	20:50 (3)	21:59	21	21:08 (3)
17	08:34	07:43	06:38				06:23		05:22	20:40 (3)	04:54	20:47 (3)		
	16:38	17:38	18:32				20:30		21:23	11	20:51 (3)	21:59	21	21:08 (3)
18	08:33	07:41	06:35		18:00 (5)	20:31	06:21		05:21	20:40 (3)	04:54	20:47 (3)		
	16:40	17:40	18:34	7	18:07 (5)	20:31	21:25	13	20:53 (3)	22:00	21:58	21	21:08 (3)	
19	08:32	07:39	06:33		17:57 (5)	20:33	06:18		05:19	20:40 (3)	04:54	20:48 (3)		
	16:41	17:42	18:36	13	18:10 (5)	20:33	21:27	14	20:54 (3)	22:00	21:58	20	21:08 (3)	
20	08:31	07:36	06:31		17:54 (5)	20:33	06:16		05:18	20:39 (3)	04:54	20:48 (3)		
	16:43	17:44	18:38	17	18:11 (5)	20:35	21:28	16	20:55 (3)	22:00	21:58	20	21:08 (3)	
21	08:30	07:34	06:28		17:52 (5)	20:37	06:14		05:16	20:39 (3)	04:54	20:48 (3)		
	16:45	17:46	18:40	21	18:13 (5)	20:37	21:30	18	20:57 (3)	22:00	21:58	20	21:08 (3)	
22	08:28	07:32	06:26		17:50 (5)	20:39	06:12		05:15	20:40 (3)	04:55	20:49 (3)		
	16:47	17:48	18:42	25	18:15 (5)	20:39	21:31	19	20:59 (3)	22:01	21:59	20	21:09 (3)	
23	08:27	07:30	06:23		17:49 (5)	20:41	06:09		05:13	20:39 (3)	04:55	20:49 (3)		
	16:49	17:50	18:43	28	18:17 (5)	20:41	21:33	20	20:59 (3)	22:01	21:59	20	21:09 (3)	
24	08:26	07:28	06:21		17:47 (5)	20:42	06:07		05:12	20:39 (3)	04:55	20:49 (3)		
	16:51	17:52	18:45	31	18:18 (5)	20:42	21:34	22	21:01 (3)	22:01	21:58	20	21:09 (3)	
25	08:24	07:25	06:18		17:47 (5)	20:44	06:05		05:11	20:39 (3)	04:56	20:49 (3)		
	16:52	17:54	18:47	34	18:21 (5)	20:44	21:36	23	21:02 (3)	22:01	21:58	21	21:10 (3)	
26	08:23	07:23	06:16		17:47 (5)	20:46	06:03		05:09	20:39 (3)	04:56	20:49 (3)		
	16:54	17:56	18:49	36	18:23 (5)	20:46	21:37	25	21:04 (3)	22:01	21:58	21	21:10 (3)	
27	08:22	07:21	06:13		17:45 (5)	20:48	06:01		05:08	20:39 (3)	04:56	20:49 (3)		
	16:56	17:58	18:51	38	18:23 (5)	20:48	21:39	26	21:05 (3)	22:01	21:58	21	21:10 (3)	
28	08:20	07:18	06:11		17:45 (5)	20:50	05:58		05:07	20:40 (3)	04:57	20:49 (3)		
	16:58	18:00	18:53	38	18:23 (5)	20:50	21:40	26	21:06 (3)	22:01	21:58	22	21:11 (3)	
29	08:18		07:09		18:44 (5)	20:52	05:56		05:06	20:40 (3)	04:58	20:50 (3)		
	17:00		19:54	38	19:22 (5)	20:52	21:41	27	21:07 (3)	22:01	21:58	22	21:12 (3)	
30	08:17		07:06		18:44 (5)	20:53	05:54		05:05	20:40 (3)	04:58	20:49 (3)		
	17:02		19:56	39	19:23 (5)	20:53	21:43	28	21:08 (3)	22:00	21:58	23	21:12 (3)	
31	08:15		07:04		18:44 (5)		05:04		21:43	20:40 (3)				
	17:04		19:58	37	19:21 (5)		21:44	28	21:08 (3)					
Potential sun hours	250	273	367			402	420		494		510	684		
Total, worst case						0.27	0.35		0.38		0.32			
Sun reduction						1.00	1.00		1.00		1.00			
Oper. time red.						0.68	0.68		0.63		0.63			
Wind dir. red.						0.18	0.24		0.24		0.20			
Total reduction						74	68		80		137			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DD - H108

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:49 (3)	05:39	06:33		07:26		07:24		08:19	
	22:00	23	21:12 (3)	21:25	20:18		19:05		16:54		16:10
2	05:00	20:49 (3)	05:40	06:35		18:52 (5)		07:28		07:26	
	22:00	24	21:13 (3)	21:23	20:16	13	19:05 (5)	19:02		16:52	
3	05:00	20:49 (3)	05:42	06:36		18:49 (5)		07:30		07:28	
	21:59	24	21:13 (3)	21:21	20:13	19	19:08 (5)	19:00		16:50	
4	05:01	20:49 (3)	05:44	06:38		18:46 (5)		07:31		07:30	
	21:59	24	21:13 (3)	21:19	20:11	23	19:09 (5)	18:57		16:48	
5	05:02	20:49 (3)	05:45	06:40		18:44 (5)		07:33		07:32	
	21:58	25	21:14 (3)	21:17	20:09	27	19:11 (5)	18:55		16:46	
6	05:03	20:49 (3)	05:47	06:42		18:43 (5)		07:35		07:34	
	21:57	25	21:14 (3)	21:15	20:06	29	19:12 (5)	18:52		16:44	
7	05:04	20:49 (3)	05:49	06:43		18:41 (5)		07:37		07:36	
	21:57	26	21:15 (3)	21:13	20:04	31	19:12 (5)	18:50		16:43	
8	05:05	20:49 (3)	05:51	06:45		18:40 (5)		07:39		07:38	
	21:56	26	21:15 (3)	21:11	20:01	33	19:13 (5)	18:48		16:41	
9	05:06	20:49 (3)	05:52	06:47		18:39 (5)		07:41		07:40	
	21:55	27	21:16 (3)	21:09	19:59	35	19:14 (5)	18:45		16:39	
10	05:07	20:49 (3)	05:54	06:49		18:37 (5)		07:42		07:42	
	21:55	27	21:16 (3)	21:07	19:56	36	19:13 (5)	18:43		16:37	
11	05:08	20:49 (3)	05:56	06:50		18:36 (5)		07:44		07:44	
	21:54	27	21:16 (3)	21:05	19:54	38	19:14 (5)	18:40		16:36	
12	05:09	20:49 (3)	05:58	06:52		18:36 (5)		07:46		07:45	
	21:53	28	21:17 (3)	21:03	19:51	38	19:14 (5)	18:38		16:34	
13	05:11	20:49 (3)	05:59	06:54		18:36 (5)		07:48		07:47	
	21:52	28	21:17 (3)	21:01	19:49	38	19:14 (5)	18:36		16:32	
14	05:12	20:48 (3)	06:01	06:56		18:35 (5)		07:50		07:49	
	21:51	28	21:16 (3)	20:59	19:47	38	19:13 (5)	18:33		16:31	
15	05:13	20:48 (3)	06:03	06:58		18:35 (5)		07:52		07:51	
	21:50	27	21:15 (3)	20:57	19:44	38	19:13 (5)	18:31		16:29	
16	05:14	20:49 (3)	06:05	06:59		18:35 (5)		07:54		07:53	
	21:49	26	21:15 (3)	20:55	19:42	37	19:12 (5)	18:29		16:27	
17	05:16	20:49 (3)	06:06	07:01		18:34 (5)		07:55		07:55	
	21:47	25	21:14 (3)	20:53	19:39	37	19:11 (5)	18:26		16:26	
18	05:17	20:49 (3)	06:08	07:03		18:34 (5)		07:57		07:57	
	21:46	23	21:12 (3)	20:50	19:37	34	19:08 (5)	18:24		16:25	
19	05:18	20:48 (3)	06:10	07:05		18:35 (5)		07:59		07:59	
	21:45	23	21:11 (3)	20:48	19:34	31	19:06 (5)	18:22		16:23	
20	05:20	20:49 (3)	06:12	07:06		18:36 (5)		08:01		08:00	
	21:44	21	21:10 (3)	20:46	19:32	28	19:04 (5)	18:20		16:22	
21	05:21	20:49 (3)	06:13	07:08		18:35 (5)		08:03		08:02	
	21:42	20	21:09 (3)	20:44	19:29	26	19:01 (5)	18:17		16:20	
22	05:23	20:49 (3)	06:15	07:10		18:37 (5)		08:05		08:04	
	21:41	18	21:07 (3)	20:42	19:27	22	18:59 (5)	18:15		16:19	
23	05:24	20:50 (3)	06:17	07:12		18:38 (5)		08:07		08:06	
	21:39	17	21:07 (3)	20:39	19:24	18	18:56 (5)	18:13		16:18	
24	05:26	20:50 (3)	06:19	07:13		18:40 (5)		08:09		08:08	
	21:38	15	21:05 (3)	20:37	19:22	14	18:54 (5)	18:11		16:17	
25	05:27	20:51 (3)	06:20	07:15		18:41 (5)		07:11		08:09	
	21:36	13	21:04 (3)	20:35	19:19	10	18:51 (5)	17:09		16:16	
26	05:29	20:51 (3)	06:22	07:17		18:46 (5)		07:13		08:11	
	21:35	11	21:02 (3)	20:32	19:17	2	18:48 (5)	17:07		16:15	
27	05:30	20:52 (3)	06:24	07:19				07:15		08:13	
	21:33	9	21:01 (3)	20:30	19:14			17:04		16:13	
28	05:32	20:52 (3)	06:26	07:21				07:16		08:14	
	21:32	7	20:59 (3)	20:28	19:12			17:02		16:13	
29	05:34	20:54 (3)	06:28	07:22				07:18		08:16	
	21:30	4	20:58 (3)	20:25	19:09			17:00		16:12	
30	05:35	20:54 (3)	06:29	07:24				07:20		08:18	
	21:28	2	20:56 (3)	20:23	19:07			16:58		16:11	
31	05:37		06:31					07:22			
	21:26		20:21					16:56		16:13	
Potential sun hours	512		460	382		328		259		233	
Total, worst case	623			695							
Sun reduction	0.32			0.32							
Oper. time red.	1.00			1.00							
Wind dir. red.	0.63			0.68							
Total reduction	0.20			0.22							
Total, real	126			150							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DE - H109

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	19:00	07:01	18:38 (5)	20:00	05:52	18:52 (5)	20:55	05:03	20:33 (3)	
2	08:44	16:16	08:12	17:08	18:04	07:14	18:04	19:00	06:59		20:02	05:50		20:57	05:02	20:34 (3)	18
3	08:43	16:17	08:10	17:10	18:06	07:12	18:06	19:00	06:56		20:04	05:48		20:59	05:01	20:35 (3)	17
4	08:43	16:18	08:08	17:12	18:07	07:09	18:07	19:00	06:54		20:06	05:46		21:01	05:00	20:36 (3)	15
5	08:43	16:20	08:07	17:14	18:09	07:07	18:09	19:00	06:51		20:07	05:44		21:03	04:59	20:38 (3)	13
6	08:42	16:21	08:05	17:16	18:11	07:04	18:11	19:00	06:49		20:09	05:42	20:31 (3)	21:04	04:58	20:39 (3)	11
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	19:00	06:47		20:11	05:40	20:33 (3)	21:06	04:58	20:41 (3)	8
8	08:42	16:24	08:01	17:20	18:15	07:00	18:15	19:00	06:44		20:13	05:38	20:36 (3)	21:08	04:57	20:45 (3)	4
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	19:00	06:42	17:47 (5)	20:15	05:36	20:37 (3)	21:10	04:57	21:18 (4)	7
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	19:00	06:39	17:50 (5)	20:17	05:34	20:39 (3)	21:11	04:56	21:19 (4)	1
11	08:40	16:28	07:55	17:26	18:21	06:53	18:21	19:00	06:37	17:52 (5)	20:19	05:33	20:40 (3)	21:13	04:56	21:17 (4)	13
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	19:00	06:35	17:55 (5)	20:20	05:31	20:42 (3)	21:15	04:55	21:17 (4)	15
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	19:00	06:32	17:58 (5)	20:22	05:29	20:43 (3)	21:17	04:55	21:16 (4)	16
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	19:00	06:30	18:00 (5)	20:24	05:27	20:44 (3)	21:18	04:55	21:15 (4)	18
15	08:36	16:34	07:47	17:34	18:28	06:43	18:28	19:00	06:28	18:04 (5)	20:26	05:26	20:46 (3)	21:19	04:55	21:15 (4)	21
16	08:35	16:36	07:45	17:36	18:30	06:40	18:30	19:00	06:25	18:06 (5)	20:28	05:24	20:48 (3)	21:20	04:54	21:15 (4)	22
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	19:00	06:23	18:08 (5)	20:30	05:22	20:50 (3)	21:22	04:54	21:15 (4)	24
18	08:33	16:40	07:41	17:40	18:34	06:35	18:34	19:00	06:21	18:10 (5)	20:32	05:21	20:51 (3)	21:23	04:54	21:15 (4)	26
19	08:32	16:41	07:39	17:42	18:36	06:33	18:36	19:00	06:18	18:12 (5)	20:34	05:19	20:52 (3)	21:24	04:54	21:15 (4)	27
20	08:31	16:43	07:36	17:44	18:38	06:31	18:38	19:00	06:16	18:14 (5)	20:36	05:18	20:53 (3)	21:25	04:54	21:15 (4)	28
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	19:00	06:14	18:16 (5)	20:38	05:16	20:54 (3)	21:26	04:54	21:15 (4)	29
22	08:28	16:47	07:32	17:48	18:42	06:26	18:42	19:00	06:12	18:18 (5)	20:40	05:15	20:55 (3)	21:27	04:54	21:15 (4)	28
23	08:27	16:49	07:30	17:50	18:44	06:23	18:44	19:00	06:09	18:20 (5)	20:42	05:13	20:56 (3)	21:28	04:54	21:16 (4)	29
24	08:26	16:51	07:28	17:52	18:46	06:21	18:46	19:00	06:07	18:22 (5)	20:44	05:12	20:57 (3)	21:29	04:54	21:16 (4)	28
25	08:24	16:52	07:25	17:54	18:48	06:18	18:48	19:00	06:05	18:24 (5)	20:46	05:11	20:58 (3)	21:30	04:54	21:17 (4)	27
26	08:23	16:54	07:23	17:56	18:50	06:16	18:50	19:00	06:03	18:26 (5)	20:48	05:09	20:59 (3)	21:31	04:54	21:17 (4)	26
27	08:22	16:56	07:21	17:58	18:52	06:13	18:52	19:00	06:01	18:28 (5)	20:50	05:08	20:60 (3)	21:32	04:54	21:17 (4)	25
28	08:20	16:58	07:18	18:00	18:54	06:11	18:54	19:00	05:58	18:30 (5)	20:52	05:07	20:61 (3)	21:33	04:54	21:18 (4)	25
29	08:18	17:00	07:16	18:02	18:56	06:09	18:56	19:00	05:56	18:32 (5)	20:54	05:06	20:62 (3)	21:34	04:54	21:19 (4)	23
30	08:17	17:02	07:14	18:04	18:58	06:07	18:58	19:00	05:54	18:34 (5)	20:56	05:05	20:63 (3)	21:35	04:54	21:20 (4)	22
31	08:15	17:04	07:12	18:06	19:00	06:05	19:00	19:00	05:52	18:36 (5)	20:58	05:04	20:64 (3)	21:36	04:54	21:21 (4)	21
Potential sun hours	250	273	367	420	494	510	237	0.32	1.00	0.62	0.20	47					
Total, worst case																	
Sun reduction																	
Oper. time red.																	
Wind dir. red.																	
Total reduction																	
Total, real																	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DE - H109

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	21:20 (4)	05:39	20:37 (3)	06:33	07:26	18:16 (5)	07:24	08:19		
	22:00	4	21:24 (4)	21:25	16	20:53 (3)	20:18				
2	05:00	21:22 (4)	05:40	20:38 (3)	06:35	07:28	18:36 (5)	16:54	16:10		
	22:00	2	21:24 (4)	21:23	14	20:52 (3)	20:16				
3	05:00	21:22 (4)	05:42	20:38 (3)	06:36	07:30	18:19 (5)	07:28	08:22		
	21:59	1	21:23 (4)	21:21	12	20:50 (3)	20:13	18:31 (5)	16:50	16:08	
4	05:01		05:44	20:39 (3)	06:38	07:31	18:22 (5)	07:30	08:24		
	21:59		21:19	9	20:48 (3)	20:11	18:57	18:29 (5)	16:48	16:08	
5	05:02		05:45	20:39 (3)	06:40	07:33		07:32	08:25		
	21:58		21:17	7	20:46 (3)	20:09	18:55	16:46	16:07		
6	05:03	20:46 (3)	05:47	20:41 (3)	06:42	07:35	18:17 (5)	07:34	08:26		
	21:57	7	20:53 (3)	21:15	4	20:45 (3)	20:06	18:52	16:44	16:07	
7	05:04	20:45 (3)	05:49	20:42 (3)	06:43	07:37		07:36	08:28		
	21:57	10	20:55 (3)	21:13	1	20:43 (3)	20:04	18:50	16:43	16:06	
8	05:05	20:44 (3)	05:51		06:45	07:39		07:38	08:29		
	21:56	12	20:56 (3)	21:11	20:01	18:48		16:41	16:06		
9	05:06	20:43 (3)	05:52		06:47	07:41		07:40	08:30		
	21:55	14	20:57 (3)	21:09	19:59	18:45		16:39	16:05		
10	05:07	20:42 (3)	05:54		06:49	07:42		07:42	08:31		
	21:55	16	20:58 (3)	21:07	19:56	18:43		16:37	16:05		
11	05:08	20:42 (3)	05:56		06:50	18:31 (5)	07:44	16:34	08:33		
	21:54	17	20:59 (3)	21:05	19:54	18:43 (5)	18:40	16:36	16:05		
12	05:09	20:41 (3)	05:58		06:52	18:28 (5)	07:46	16:32	08:34		
	21:53	19	21:00 (3)	21:03	19:51	18:47 (5)	18:38	16:34	16:05		
13	05:11	20:40 (3)	05:59		06:54	18:25 (5)	07:48	16:32	08:35		
	21:52	21	21:01 (3)	21:01	19:49	18:49 (5)	18:36	16:32	16:05		
14	05:12	20:39 (3)	06:01		06:56	18:22 (5)	07:50	16:32	08:36		
	21:51	22	21:01 (3)	20:59	19:47	18:49 (5)	18:33	16:31	16:05		
15	05:13	20:39 (3)	06:03		06:58	18:21 (5)	07:52	16:31	08:37		
	21:50	23	21:02 (3)	20:57	19:44	18:50 (5)	18:31	16:29	16:05		
16	05:14	20:39 (3)	06:05		06:59	18:20 (5)	07:54	16:27	08:38		
	21:49	24	21:03 (3)	20:55	19:42	18:51 (5)	18:29	16:27	16:05		
17	05:16	20:38 (3)	06:06		07:01	18:18 (5)	07:55	16:26	08:38		
	21:47	25	21:03 (3)	20:53	19:39	18:51 (5)	18:26	16:26	16:05		
18	05:17	20:38 (3)	06:08		07:03	18:17 (5)	07:57	16:26	08:39		
	21:46	26	21:04 (3)	20:50	19:37	18:52 (5)	18:24	16:25	16:05		
19	05:18	20:37 (3)	06:10		07:05	18:16 (5)	07:59	16:25	08:40		
	21:45	27	21:04 (3)	20:48	19:34	18:52 (5)	18:22	16:23	16:05		
20	05:20	20:38 (3)	06:12		07:06	18:16 (5)	08:01	16:22	08:41		
	21:44	27	21:05 (3)	20:46	19:32	18:53 (5)	18:20	16:22	16:06		
21	05:21	20:37 (3)	06:13		07:08	18:14 (5)	08:03	16:22	08:41		
	21:42	28	21:05 (3)	20:44	19:29	18:52 (5)	18:17	16:20	16:06		
22	05:23	20:36 (3)	06:15		07:10	18:14 (5)	08:05	16:20	08:42		
	21:41	29	21:05 (3)	20:42	19:27	18:52 (5)	18:15	16:19	16:07		
23	05:24	20:37 (3)	06:17		07:12	18:14 (5)	08:07	16:19	08:42		
	21:39	29	21:06 (3)	20:39	19:24	18:52 (5)	18:13	16:18	16:07		
24	05:26	20:36 (3)	06:19		07:13	18:14 (5)	08:09	16:18	08:43		
	21:38	29	21:05 (3)	20:37	19:22	18:51 (5)	18:11	16:17	16:08		
25	05:27	20:37 (3)	06:20		07:15	18:13 (5)	07:11	16:16	08:43		
	21:36	27	21:04 (3)	20:35	19:19	18:50 (5)	17:09	16:16	16:08		
26	05:29	20:36 (3)	06:22		07:17	18:13 (5)	07:13	16:15	08:43		
	21:35	26	21:02 (3)	20:32	19:17	18:48 (5)	17:07	16:15	16:09		
27	05:30	20:37 (3)	06:24		07:19	18:13 (5)	07:15	16:15	08:44		
	21:33	24	21:01 (3)	20:30	19:14	18:46 (5)	17:04	16:13	16:10		
28	05:32	20:36 (3)	06:26		07:21	18:14 (5)	07:16	16:13	08:44		
	21:32	23	20:59 (3)	20:28	19:12	18:44 (5)	17:02	16:13	16:11		
29	05:34	20:37 (3)	06:28		07:22	18:15 (5)	07:18	16:12	08:44		
	21:30	21	20:58 (3)	20:25	19:09	18:41 (5)	17:00	16:12	16:11		
30	05:35	20:37 (3)	06:29		07:24	18:15 (5)	07:20	16:11	08:44		
	21:28	19	20:56 (3)	20:23	19:07	18:38 (5)	16:58	16:11	16:12		
31	05:37	20:37 (3)	06:31				07:22		08:44		
	21:26	18	20:55 (3)	20:21			16:56		16:13		
Potential sun hours	512		460		382		328	259	233		
Total, worst case	570		63		618		55				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.63		0.63		0.67		0.67				
Total reduction	0.21		0.22		0.22		0.20				
Total, real	117		14		133		11				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DF - H110

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:19 (3) 20:26 (3)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	20:18 (3) 20:27 (3)	21:45 21:46
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	20:17 (3) 20:29 (3)	21:45 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	20:16 (3) 21:01	21:45 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	20:15 (3) 21:03	21:45 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	20:15 (3) 21:04	21:45 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	20:15 (3) 21:06	21:45 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	20:14 (3) 21:08	21:45 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	20:14 (3) 21:10	21:45 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	20:14 (3) 21:11	21:45 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	20:14 (3) 21:13	21:45 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	20:14 (3) 21:15	21:45 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	20:14 (3) 21:17	21:45 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	20:15 (3) 21:18	21:45 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	20:15 (3) 21:20	21:45 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	20:16 (3) 21:22	21:45 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	20:16 (3) 21:23	21:45 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	20:17 (3) 21:25	21:45 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	20:18 (3) 21:27	21:45 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	20:18 (3) 21:28	21:45 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	20:20 (3) 21:30	21:45 22:01
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	20:21 (3) 21:31	21:45 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	20:22 (3) 21:33	21:45 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	20:24 (3) 21:34	21:45 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	20:26 (3) 21:36	21:45 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	20:44 (4) 21:37	22:01 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	20:43 (4) 21:39	22:01 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	20:43 (4) 21:40	22:01 22:01
29	08:18 17:00		07:09 19:54	05:56 20:52	20:42 (4) 21:41	22:01 22:01
30	08:17 17:02		07:06 19:56	05:54 20:53	21:07 (4) 21:43	22:01 22:00
31	08:15 17:04		07:04 19:58		20:41 (4) 21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case			615	3	706	1213
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.64	0.63	0.61
Total reduction			0.18	0.23	0.24	0.20
Total, real			113	1	170	237

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DF - H110

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:43 (4)	05:39	20:24 (3)	06:33	07:26	17:59 (5)	07:24	08:19		
	22:00	41	21:24 (4)	21:25	20:53 (3)	20:18	19:05	36	18:35 (5)	16:54	16:10
2	05:00	20:44 (4)	05:40	20:25 (3)	06:35	07:28	18:00 (5)	07:26	08:21		
	22:00	40	21:24 (4)	21:23	20:52 (3)	20:16	19:02	33	18:33 (5)	16:52	16:09
3	05:00	20:44 (4)	05:42	20:24 (3)	06:36	07:30	18:00 (5)	07:28	08:22		
	21:59	39	21:23 (4)	21:21	20:50 (3)	20:13	19:00	31	18:31 (5)	16:50	16:08
4	05:01	20:44 (4)	05:44	20:24 (3)	06:38	07:31	18:00 (5)	07:30	08:24		
	21:59	39	21:23 (4)	21:19	20:48 (3)	20:11	18:57	29	18:29 (5)	16:48	16:08
5	05:02	20:45 (4)	05:45	20:24 (3)	06:40	07:33	18:01 (5)	07:32	08:25		
	21:58	38	21:23 (4)	21:17	20:46 (3)	20:09	18:55	25	18:26 (5)	16:46	16:07
6	05:03	20:46 (4)	05:47	20:24 (3)	06:42	07:35	18:02 (5)	07:34	08:26		
	21:57	36	21:22 (4)	21:15	20:45 (3)	20:06	18:52	22	18:24 (5)	16:44	16:07
7	05:04	20:46 (4)	05:49	20:25 (3)	06:43	07:37	18:02 (5)	07:36	08:28		
	21:57	36	21:22 (4)	21:13	20:43 (3)	20:04	18:50	19	18:21 (5)	16:43	16:06
8	05:05	20:47 (4)	05:51	20:25 (3)	06:45	07:39	18:04 (5)	07:38	08:29		
	21:56	34	21:21 (4)	21:11	20:41 (3)	20:01	18:48	14	18:18 (5)	16:41	16:06
9	05:06	20:47 (4)	05:52	20:26 (3)	06:47	07:41	18:06 (5)	07:40	08:30		
	21:55	34	21:21 (4)	21:09	20:39 (3)	19:59	18:45	10	18:16 (5)	16:39	16:05
10	05:07	20:48 (4)	05:54	20:26 (3)	06:49	07:42	18:10 (5)	07:42	08:31		
	21:55	32	21:20 (4)	21:07	20:37 (3)	19:56	18:43	4	18:14 (5)	16:37	16:05
11	05:08	20:48 (4)	05:56	20:27 (3)	06:50	07:44	18:11 (5)	07:44	08:33		
	21:54	31	21:19 (4)	21:05	20:35 (3)	19:54	18:40		16:36	16:05	
12	05:09	20:49 (4)	05:58	20:28 (3)	06:52	07:46	18:12 (5)	07:45	08:34		
	21:53	29	21:18 (4)	21:03	20:34 (3)	19:51	18:38		16:34	16:05	
13	05:11	20:50 (4)	05:59	20:29 (3)	06:54	07:48	18:13 (5)	07:47	08:35		
	21:52	27	21:17 (4)	21:01	20:31 (3)	19:49	18:36		16:32	16:05	
14	05:12	20:50 (4)	06:01	20:30 (3)	06:56	07:50	18:14 (5)	07:49	08:36		
	21:51	26	21:16 (4)	20:59	19:47	18:33	18:15 (5)	16:31	16:05		
15	05:13	20:51 (4)	06:03	20:31 (3)	06:58	07:52	18:16 (5)	07:51	08:37		
	21:50	24	21:15 (4)	20:57	19:44	18:31	18:17 (5)	16:29	16:05		
16	05:14	20:52 (4)	06:05	20:32 (3)	06:59	07:54	18:18 (5)	07:53	08:38		
	21:49	23	21:15 (4)	20:55	19:42	18:29	18:19 (5)	16:27	16:05		
17	05:16	20:53 (4)	06:06	20:33 (3)	07:01	18:20 (5)	07:55	18:20 (5)	08:38		
	21:47	21	21:14 (4)	20:53	19:39	18:25 (5)	18:26	16:26	16:05		
18	05:17	20:54 (4)	06:08	20:34 (3)	07:03	18:15 (5)	07:57	18:27 (5)	08:39		
	21:46	18	21:12 (4)	20:50	19:37	18:30 (5)	18:24	16:25	16:05		
19	05:18	20:54 (4)	06:10	20:35 (3)	07:05	18:12 (5)	07:59	18:28 (5)	08:40		
	21:45	25	21:11 (4)	20:48	19:34	18:32 (5)	18:22	16:23	16:05		
20	05:20	20:55 (4)	06:12	20:36 (3)	07:06	18:10 (5)	08:01	18:29 (5)	08:41		
	21:44	26	21:10 (4)	20:46	19:32	18:34 (5)	18:20	16:22	16:06		
21	05:21	20:56 (4)	06:13	20:37 (3)	07:08	18:07 (5)	08:03	18:30 (5)	08:41		
	21:42	27	21:09 (4)	20:44	19:29	18:35 (5)	18:17	16:20	16:06		
22	05:23	20:57 (4)	06:15	20:38 (3)	07:10	18:06 (5)	08:05	18:31 (5)	08:42		
	21:41	26	21:07 (4)	20:42	19:27	18:36 (5)	18:15	16:19	16:07		
23	05:24	20:58 (4)	06:17	20:39 (3)	07:12	18:05 (5)	08:07	18:32 (5)	08:42		
	21:39	25	21:07 (4)	20:39	19:24	18:36 (5)	18:13	16:18	16:07		
24	05:26	20:59 (4)	06:19	20:40 (3)	07:13	18:04 (5)	08:09	18:33 (5)	08:43		
	21:38	22	20:58 (3)	20:37	19:22	18:37 (5)	18:11	16:17	16:08		
25	05:27	20:59 (4)	06:20	20:41 (3)	07:15	18:02 (5)	07:11	18:34 (5)	08:43		
	21:36	23	20:51 (3)	20:35	19:19	18:37 (5)	17:09	16:16	16:08		
26	05:29	20:59 (4)	06:22	20:42 (3)	07:17	18:01 (5)	07:13	18:35 (5)	08:43		
	21:35	25	20:52 (3)	20:32	19:17	18:37 (5)	17:07	16:15	16:09		
27	05:30	20:59 (4)	06:24	20:43 (3)	07:19	18:01 (5)	07:15	18:36 (5)	08:44		
	21:33	26	20:53 (3)	20:30	19:14	18:37 (5)	17:04	16:13	16:10		
28	05:32	20:59 (4)	06:26	20:44 (3)	07:21	18:00 (5)	07:16	18:37 (5)	08:44		
	21:32	27	20:53 (3)	20:28	19:12	18:37 (5)	17:02	16:13	16:11		
29	05:34	20:59 (4)	06:28	20:45 (3)	07:22	18:00 (5)	07:18	18:38 (5)	08:44		
	21:30	28	20:54 (3)	20:25	19:09	18:37 (5)	17:00	16:12	16:11		
30	05:35	20:59 (4)	06:29	20:46 (3)	07:24	17:59 (5)	07:20	18:39 (5)	08:44		
	21:28	29	20:54 (3)	20:23	19:07	18:36 (5)	16:58	16:11	16:12		
31	05:37	20:59 (4)	06:31	20:47 (3)	07:25	18:00 (5)	07:22	18:40 (5)	08:44		
	21:26	29	20:54 (3)	20:21	19:06	18:37 (5)	16:56	16:12	16:13		
Potential sun hours	512		460		382		328		259		233
Total, worst case		906		223		404		223			
Sun reduction		0.32		0.34		0.32		0.29			
Oper. time red.		1.00		1.00		1.00		1.00			
Wind dir. red.		0.62		0.64		0.68		0.68			
Total reduction		0.20		0.22		0.22		0.20			
Total, real		182		49		87		44			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DG - H111

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	05:52	19:58 (2) 05:03
	16:15	17:06	18:02	20:00	20:55	12 20:10 (2) 21:45
2	08:44	08:12	07:14	06:59	05:50	20:02 (2) 05:02
	16:16	17:08	18:04	20:02	20:57	5 20:07 (2) 21:46
3	08:43	08:10	07:11	06:56	05:48	05:01
	16:17	17:10	18:05	20:04	20:59	21:48
4	08:43	08:08	07:09	17:40 (4) 06:54	05:46	05:00
	16:18	17:12	18:07	1 17:41 (4) 20:06	21:01	21:49
5	08:43	08:07	07:07	17:38 (4) 06:51	05:44	04:59
	16:19	17:14	18:09	4 17:42 (4) 20:07	21:03	21:50
6	08:42	08:05	07:04	17:37 (4) 06:49	05:42	04:58
	16:21	17:16	18:11	8 17:45 (4) 20:09	21:04	21:51
7	08:42	08:03	07:02	17:35 (4) 06:47	05:40	04:58
	16:22	17:18	18:13	11 17:46 (4) 20:11	21:06	21:52
8	08:41	08:01	07:00	17:35 (4) 06:44	05:38	04:57
	16:24	17:20	18:15	13 17:48 (4) 20:13	21:08	21:53
9	08:41	07:59	06:57	17:33 (4) 06:42	05:36	04:57
	16:25	17:22	18:17	17 17:50 (4) 20:15	21:10	21:54
10	08:40	07:57	06:55	17:33 (4) 06:39	05:34	04:56
	16:26	17:24	18:19	19 17:52 (4) 20:17	21:11	21:55
11	08:40	07:55	06:52	17:33 (4) 06:37	05:33	04:56
	16:28	17:26	18:21	22 17:55 (4) 20:18	21:13	21:55
12	08:39	07:53	06:50	17:33 (4) 06:35	05:31	04:55
	16:30	17:28	18:23	23 17:56 (4) 20:20	21:15	21:56
13	08:38	07:51	06:48	17:33 (4) 06:32	05:29	04:55
	16:31	17:30	18:25	25 17:58 (4) 20:22	21:17	21:57
14	08:37	07:49	06:45	17:33 (4) 06:30	05:27	04:55
	16:33	17:32	18:27	26 17:59 (4) 20:24	21:18	21:57
15	08:36	07:47	06:43	17:34 (4) 06:28	05:26	04:54
	16:34	17:34	18:28	25 17:59 (4) 20:26	21:20	21:58
16	08:35	07:45	06:40	17:34 (4) 06:25	05:24	04:54
	16:36	17:36	18:30	23 17:57 (4) 20:28	21:22	21:59
17	08:34	07:43	06:38	17:35 (4) 06:23	19:58 (2) 05:22	04:54
	16:38	17:38	18:32	21 17:56 (4) 20:30	3 20:01 (2) 21:23	21:59
18	08:33	07:41	06:35	17:36 (4) 06:21	19:57 (2) 05:21	04:54
	16:40	17:40	18:34	17 17:53 (4) 20:31	6 20:03 (2) 21:25	22:00
19	08:32	07:39	06:33	17:39 (4) 06:18	19:56 (2) 05:19	04:54
	16:41	17:42	18:36	12 17:51 (4) 20:33	9 20:05 (2) 21:27	22:00
20	08:31	07:36	06:31	06:16	19:55 (2) 05:18	04:54
	16:43	17:44	18:38	20:35	12 20:07 (2) 21:28	22:00
21	08:30	07:34	06:28	06:14	19:54 (2) 05:16	04:54
	16:45	17:46	18:40	20:37	14 20:08 (2) 21:30	22:00
22	08:28	07:32	06:26	06:11	19:53 (2) 05:15	04:55
	16:47	17:48	18:41	20:39	17 20:10 (2) 21:31	22:01
23	08:27	07:30	06:23	06:09	19:53 (2) 05:13	04:55
	16:49	17:50	18:43	20:41	19 20:12 (2) 21:33	22:01
24	08:26	07:28	06:21	06:07	19:53 (2) 05:12	04:55
	16:50	17:52	18:45	20:42	21 20:14 (2) 21:34	22:01
25	08:24	07:25	06:18	06:05	19:53 (2) 05:11	04:55
	16:52	17:54	18:47	20:44	22 20:15 (2) 21:36	22:01
26	08:23	07:23	06:16	06:03	19:54 (2) 05:09	04:56
	16:54	17:56	18:49	20:46	22 20:16 (2) 21:37	22:01
27	08:22	07:21	06:13	06:00	19:54 (2) 05:08	04:56
	16:56	17:58	18:51	20:48	22 20:16 (2) 21:39	22:01
28	08:20	07:18	06:11	05:58	19:55 (2) 05:07	04:57
	16:58	18:00	18:53	20:50	20 20:15 (2) 21:40	22:01
29	08:18		07:08	05:56	19:56 (2) 05:06	04:57
	17:00		19:54	20:52	18 20:14 (2) 21:41	22:01
30	08:17		07:06	05:54	19:57 (2) 05:05	04:58
	17:02		19:56	20:53	15 20:12 (2) 21:43	22:00
31	08:15		07:04			05:04
	17:04		19:58			21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case			267	220		
Sun reduction			0.27	0.35		0.38
Oper. time red.			1.00	1.00		1.00
Wind dir. red.			0.68	0.65		0.65
Total reduction			0.18	0.23		0.25
Total, real			49	50		4

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DG - H111

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:12 (4) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:11 (4) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:11 (4) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:11 (4) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:11 (4) 16:46	08:25 16:07
6	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	18:12 (4) 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	18:11 (4) 16:43	08:28 16:06
8	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	18:12 (4) 16:41	08:29 16:06
9	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	18:13 (4) 16:39	08:30 16:05
10	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	18:16 (4) 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	20:09 (2) 19:54	07:44 18:40	16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	20:06 (2) 19:51	07:46 18:38	16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	20:04 (2) 19:49	07:48 18:36	16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	20:03 (2) 19:46	07:50 18:33	16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	20:02 (2) 19:44	07:52 18:31	16:29	08:37 16:04
16	05:14 21:49	06:04 20:55	20:01 (2) 19:42	07:54 18:29	16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	20:00 (2) 19:39	07:55 18:26	16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:00 (2) 19:37	07:57 18:24	16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	19:59 (2) 19:34	07:59 18:22	16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	19:59 (2) 19:32	08:01 18:20	16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	19:59 (2) 19:29	08:03 18:17	16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	19:58 (2) 19:27	08:05 18:15	16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	19:59 (2) 19:24	08:07 18:13	16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	20:00 (2) 19:22	18:24 (4) 18:11	16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	20:00 (2) 19:19	18:20 (4) 18:35 (4)	16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	20:01 (2) 19:17	18:18 (4) 18:37 (4)	16:11	08:43 16:09
27	05:30 21:33	06:24 20:30	20:04 (2) 19:14	19:17 18:38 (4)	16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	19:12 18:39 (4)	18:15 (4) 17:02	16:13	08:44 16:10
29	05:34 21:30	06:27 20:25	19:11 19:09	18:14 (4) 18:40 (4)	16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	19:07 18:38 (4)	17:24 16:58	16:17	08:44 16:12
31	05:37 21:26	06:31 20:21	17:19 16:56	17:14 16:56	16:11	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		237	142	130		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.68	0.68		
Total reduction		0.22	0.22	0.20		
Total, real		52	31	26		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DH - H112

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:32 (5)	08:14	16:11 (4)	07:16		07:01	05:52		19:47 (2)	05:03
	16:15	5	15:37 (5)	17:06	24	16:35 (4)	18:02	20:55	39	20:26 (2)	21:45
2	08:44	15:32 (5)	08:12	16:11 (4)	07:14		17:34 (3)	06:59		19:47 (2)	05:02
	16:16	7	15:39 (5)	17:08	26	16:37 (4)	18:04	20:57	40	20:27 (2)	21:46
3	08:44	15:32 (5)	08:10	16:10 (4)	07:12		17:33 (3)	06:56		19:46 (2)	05:01
	16:17	7	15:39 (5)	17:10	29	16:39 (4)	18:06	20:59	43	20:29 (2)	21:48
4	08:43	15:32 (5)	08:08	16:10 (4)	07:09		17:32 (3)	06:54		19:46 (2)	05:00
	16:18	9	15:41 (5)	17:12	31	16:41 (4)	18:07	21:01	43	20:29 (2)	21:49
5	08:43	15:32 (5)	08:07	16:09 (4)	07:07		17:30 (3)	06:51		19:46 (2)	04:59
	16:19	10	15:42 (5)	17:14	34	16:43 (4)	18:09	21:03	42	20:28 (2)	21:50
6	08:43	15:33 (5)	08:05	16:09 (4)	07:04		17:30 (3)	06:49		19:46 (2)	04:59
	16:21	11	15:44 (5)	17:16	36	16:45 (4)	18:11	21:04	42	20:28 (2)	21:51
7	08:42	15:33 (5)	08:03	16:09 (4)	07:02		17:29 (3)	06:47		19:47 (2)	04:58
	16:22	12	15:45 (5)	17:18	38	16:47 (4)	18:13	21:06	41	20:28 (2)	21:52
8	08:42	15:33 (5)	08:01	16:09 (4)	07:00		17:29 (3)	06:44		19:47 (2)	04:57
	16:24	13	15:46 (5)	17:20	41	16:50 (4)	18:15	21:08	41	20:28 (2)	21:53
9	08:41	15:34 (5)	07:59	16:09 (4)	06:57		17:28 (3)	06:42		19:47 (2)	04:57
	16:25	15	15:49 (5)	17:22	43	16:52 (4)	18:17	21:10	40	20:27 (2)	21:54
10	08:40	15:34 (5)	07:57	16:09 (4)	06:55		17:29 (3)	06:39		19:47 (2)	04:56
	16:26	16	15:50 (5)	17:24	45	16:54 (4)	18:19	21:11	39	20:26 (2)	21:55
11	08:40	15:34 (5)	07:55	16:09 (4)	06:53		17:29 (3)	06:37		19:48 (2)	04:56
	16:28	18	15:52 (5)	17:26	47	16:56 (4)	18:21	21:13	38	20:26 (2)	21:55
12	08:39	15:34 (5)	07:53	16:08 (4)	06:50		17:29 (3)	06:35		19:49 (2)	04:55
	16:30	20	15:54 (5)	17:28	50	16:58 (4)	18:23	21:15	36	20:25 (2)	21:56
13	08:38	15:35 (5)	07:51	16:08 (4)	06:48		17:30 (3)	06:32		19:49 (2)	04:55
	16:31	20	15:55 (5)	17:30	50	16:58 (4)	18:25	21:17	35	20:24 (2)	21:57
14	08:37	15:35 (5)	07:49	16:09 (4)	06:45		17:30 (3)	06:30		19:50 (2)	04:55
	16:33	22	15:57 (5)	17:32	49	16:58 (4)	18:27	21:18	34	20:24 (2)	21:58
15	08:36	15:36 (5)	07:47	16:09 (4)	06:43		17:32 (3)	06:28		19:51 (2)	04:55
	16:34	23	15:59 (5)	17:34	49	16:58 (4)	18:28	21:20	32	20:23 (2)	21:58
16	08:35	15:35 (5)	07:45	16:10 (4)	06:40		17:33 (3)	06:25		19:52 (2)	04:54
	16:36	25	16:00 (5)	17:36	48	16:58 (4)	18:30	21:22	31	20:23 (2)	21:59
17	08:34	15:36 (5)	07:43	16:11 (4)	06:38		17:37 (3)	06:23		19:52 (2)	04:54
	16:38	26	16:02 (5)	17:38	47	16:58 (4)	18:32	21:23	29	20:21 (2)	21:59
18	08:33	15:37 (5)	07:41	16:10 (4)	06:35	9	17:46 (3)	06:21		19:54 (2)	04:54
	16:40	26	16:03 (5)	17:40	46	16:56 (4)	18:34	20:31		20:21 (2)	22:00
19	08:32	15:38 (5)	07:39	16:11 (4)	06:33		06:18	20:00 (2)	05:19	19:56 (2)	04:54
	16:41	25	16:03 (5)	17:42	45	16:56 (4)	18:36	20:33	5	20:05 (2)	21:27
20	08:31	15:38 (5)	07:36	16:12 (4)	06:31		06:16	19:58 (2)	05:18	19:57 (2)	04:54
	16:43	25	16:03 (5)	17:44	43	16:55 (4)	18:38	20:35	9	20:07 (2)	21:28
21	08:30	15:39 (5)	07:34	16:14 (4)	06:28		06:14	19:55 (2)	05:16	19:59 (2)	04:54
	16:45	24	16:03 (5)	17:46	40	16:54 (4)	18:40	20:37	13	20:08 (2)	21:30
22	08:29	15:39 (5)	07:32	16:14 (4)	06:26		06:12	19:53 (2)	05:15	20:01 (2)	04:55
	16:47	23	16:02 (5)	17:48	38	16:52 (4)	18:42	20:39	17	20:10 (2)	21:31
23	08:27	15:41 (5)	07:30	16:15 (4)	06:23		06:09	19:52 (2)	05:13	20:03 (2)	04:55
	16:49	21	16:02 (5)	17:50	36	16:51 (4)	18:43	20:41	20	20:12 (2)	21:33
24	08:26	15:42 (5)	07:28	16:17 (4)	06:21		06:07	19:51 (2)	05:12		04:55
	16:50	19	16:01 (5)	17:52	33	16:50 (4)	18:45	20:43	23	20:14 (2)	21:34
25	08:24	15:44 (5)	07:25	16:19 (4)	06:18		06:05	19:50 (2)	05:11		04:55
	16:52	19	16:19 (4)	17:54	28	16:47 (4)	18:47	20:44	25	20:15 (2)	21:36
26	08:23	15:45 (5)	07:23	16:21 (4)	06:16		06:03	19:49 (2)	05:09		04:56
	16:54	19	16:21 (4)	17:56	24	16:45 (4)	18:49	20:46	28	20:17 (2)	21:37
27	08:22	15:47 (5)	07:21	16:25 (4)	06:13		06:01	19:49 (2)	05:08		04:56
	16:56	19	16:23 (4)	17:58	17	16:42 (4)	18:51	20:48	30	20:19 (2)	21:39
28	08:20	16:14 (4)	07:18	16:31 (4)	06:11		05:58	19:48 (2)	05:07		04:57
	16:58	12	16:26 (4)	18:00	4	16:35 (4)	18:53	20:50	33	20:21 (2)	21:40
29	08:18	16:13 (4)			07:09		05:56	19:48 (2)	05:06		04:57
	17:00	15	16:28 (4)		19:54		20:52	20:22 (2)	21:41		22:01
30	08:17	16:12 (4)			07:06		05:54	19:47 (2)	05:05		04:58
	17:02	18	16:30 (4)		19:56		20:54	20:24 (2)	21:43		22:00
31	08:15	16:11 (4)			07:04				05:04		
	17:04	21	16:32 (4)		19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case		545		1041		270		274		757	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.66		0.68		0.65		0.65	
Total reduction		0.16		0.15		0.18		0.23		0.25	
Total, real		87		159		50		63		187	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DH - H112

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December					
1	04:59		05:39		19:59 (2)	06:33		07:26	18:08 (3)	07:24	15:38 (4)	08:19	15:16 (5)			
	22:00		21:25	37	20:36 (2)	20:18		19:05	26	18:34 (3)	16:54	45	16:23 (4)	16:10	18	15:34 (5)
2	04:59		05:40		19:59 (2)	06:35		07:28		18:07 (3)	07:26		15:38 (4)	08:21		15:16 (5)
	22:00		21:23	38	20:37 (2)	20:16		19:02	26	18:33 (3)	16:52	43	16:21 (4)	16:09	17	15:33 (5)
3	05:00		05:42		19:57 (2)	06:36		07:30		18:07 (3)	07:28		15:38 (4)	08:22		15:17 (5)
	21:59		21:21	40	20:37 (2)	20:13		19:00	24	18:31 (3)	16:50	41	16:19 (4)	16:08	15	15:32 (5)
4	05:01		05:44		19:57 (2)	06:38		07:31		18:06 (3)	07:30		15:39 (4)	08:24		15:18 (5)
	21:59		21:19	41	20:38 (2)	20:11		18:57	23	18:29 (3)	16:48	38	16:17 (4)	16:08	14	15:32 (5)
5	05:02		05:45		19:56 (2)	06:40		07:33		18:06 (3)	07:32		15:39 (4)	08:25		15:18 (5)
	21:58		21:17	41	20:37 (2)	20:09		18:55	20	18:26 (3)	16:46	36	16:15 (4)	16:07	12	15:30 (5)
6	05:03		05:47		19:56 (2)	06:42		07:35		18:06 (3)	07:34		15:39 (4)	08:26		15:19 (5)
	21:58		21:15	42	20:38 (2)	20:06		18:52	18	18:24 (3)	16:44	33	16:12 (4)	16:07	11	15:30 (5)
7	05:04		05:49		19:56 (2)	06:43		07:37		18:05 (3)	07:36		15:40 (4)	08:28		15:19 (5)
	21:57		21:13	42	20:38 (2)	20:04		18:50	16	18:21 (3)	16:43	30	16:10 (4)	16:06	10	15:29 (5)
8	05:05		05:51		19:56 (2)	06:45		07:39		18:05 (3)	07:38		15:40 (4)	08:29		15:19 (5)
	21:56		21:12	42	20:38 (2)	20:01		18:48	13	18:18 (3)	16:41	28	16:08 (4)	16:06	9	15:28 (5)
9	05:06		05:52		19:56 (2)	06:47		07:41		18:06 (3)	07:40		15:41 (4)	08:30		15:21 (5)
	21:55		21:10	42	20:38 (2)	19:59		18:45	10	18:16 (3)	16:39	25	16:06 (4)	16:05	8	15:29 (5)
10	05:07		05:54		19:55 (2)	06:49		07:42		18:06 (3)	07:42		15:42 (4)	08:31		15:21 (5)
	21:55		21:08	42	20:37 (2)	19:56		18:43	8	18:14 (3)	16:37	23	16:05 (4)	16:05	7	15:28 (5)
11	05:08		05:56		19:55 (2)	06:50		07:44		18:07 (3)	07:44		15:43 (4)	08:33		15:22 (5)
	21:54		21:05	40	20:35 (2)	19:54		18:40	4	18:11 (3)	16:35	20	16:03 (4)	16:05	5	15:27 (5)
12	05:09		05:57		19:55 (2)	06:52		07:46		18:08 (3)	07:45		15:44 (4)	08:34		15:22 (5)
	21:53		21:03	39	20:34 (2)	19:51		18:38	1	18:09 (3)	16:34	17	16:01 (4)	16:05	5	15:27 (5)
13	05:10		05:59		19:55 (2)	06:54		07:48			07:47		15:45 (4)	08:35		15:23 (5)
	21:52		21:01	36	20:31 (2)	19:49		18:36			16:32	14	15:59 (4)	16:05	4	15:27 (5)
14	05:12		06:01		19:55 (2)	06:56		07:50		17:00 (4)	07:49		15:46 (4)	08:36		15:23 (5)
	21:51		20:59	34	20:29 (2)	19:47		18:33	12	17:12 (4)	16:31	12	15:58 (4)	16:05	3	15:26 (5)
15	05:13		06:03		19:56 (2)	06:58		07:52		16:56 (4)	07:51		15:20 (5)	08:37		15:24 (5)
	21:50		20:57	32	20:28 (2)	19:44		18:31	20	17:16 (4)	16:29	19	15:56 (4)	16:05	2	15:26 (5)
16	05:14		06:04		19:55 (2)	06:59		07:54		16:52 (4)	07:53		15:18 (5)	08:38		15:25 (5)
	21:49		20:55	30	20:25 (2)	19:42		18:29	26	17:18 (4)	16:27	20	15:54 (4)	16:05	2	15:27 (5)
17	05:16		06:06		19:56 (2)	07:01		07:55		16:50 (4)	07:55		15:17 (5)	08:38		15:25 (5)
	21:47		20:53	27	20:23 (2)	19:39		18:26	30	17:20 (4)	16:26	19	15:52 (4)	16:05	2	15:27 (5)
18	05:17		06:08		19:57 (2)	07:03		07:57		16:48 (4)	07:57		15:16 (5)	08:39		15:26 (5)
	21:46		20:51	25	20:22 (2)	19:37		18:24	34	17:22 (4)	16:24	19	15:35 (5)	16:05	1	15:27 (5)
19	05:18		06:10		19:57 (2)	07:05		07:59		16:46 (4)	07:59		15:15 (5)	08:40		15:27 (5)
	21:45		20:48	22	20:19 (2)	19:34		18:22	37	17:23 (4)	16:23	21	15:36 (5)	16:05	1	15:28 (5)
20	05:20		06:12		19:58 (2)	07:06		08:01		16:45 (4)	08:00		15:14 (5)	08:41		
	21:44		20:46	19	20:17 (2)	19:32		18:20	39	17:24 (4)	16:22	23	15:37 (5)	16:06		
21	05:21		06:13		19:59 (2)	07:08		08:03		16:43 (4)	08:02		15:14 (5)	08:41		
	21:42	11	20:23 (2)	20:44	16	20:15 (2)	19:29	18:17	42	17:25 (4)	16:20	24	15:38 (5)	16:06		
22	05:23		20:09 (2)	06:15		20:00 (2)	07:10	08:05		16:42 (4)	08:04		15:14 (5)	08:42		
	21:41	16	20:25 (2)	20:42	12	20:12 (2)	19:27	18:15	44	17:26 (4)	16:19	25	15:39 (5)	16:06		
23	05:24		20:08 (2)	06:17		20:02 (2)	07:12	08:07		16:41 (4)	08:06		15:14 (5)	08:42		
	21:39	20	20:28 (2)	20:39	8	20:10 (2)	19:24	18:13	45	17:26 (4)	16:18	25	15:39 (5)	16:07		
24	05:26		20:06 (2)	06:19		20:04 (2)	07:13	08:09		16:41 (4)	08:08		15:14 (5)	08:43		15:29 (5)
	21:38	23	20:29 (2)	20:37	5	20:09 (2)	19:22	18:11	46	17:27 (4)	16:17	26	15:40 (5)	16:08	1	15:30 (5)
25	05:27		20:06 (2)	06:20		07:15		07:11		15:40 (4)	08:09		15:14 (5)	08:43		15:29 (5)
	21:36	25	20:31 (2)	20:35		19:19		17:09	47	16:27 (4)	16:16	26	15:40 (5)	16:08	1	15:30 (5)
26	05:29		20:04 (2)	06:22		07:17		07:13		15:39 (4)	08:11		15:14 (5)	08:43		15:29 (5)
	21:35	27	20:31 (2)	20:32		19:17	6	18:26 (3)	48	16:27 (4)	16:14	26	15:40 (5)	16:09	2	15:31 (5)
27	05:30		20:03 (2)	06:24		07:19		18:16 (3)		15:39 (4)	08:13		15:15 (5)	08:44		15:31 (5)
	21:33	30	20:33 (2)	20:30		19:14	14	18:30 (3)	49	16:28 (4)	16:13	23	15:38 (5)	16:10	1	15:32 (5)
28	05:32		20:02 (2)	06:26		07:21		18:14 (3)		15:38 (4)	08:14		15:15 (5)	08:44		15:31 (5)
	21:32	31	20:33 (2)	20:28		19:12	18	18:32 (3)	50	16:28 (4)	16:12	23	15:38 (5)	16:11	2	15:33 (5)
29	05:34		20:01 (2)	06:28		07:22		18:12 (3)		15:38 (4)	08:16		15:15 (5)	08:44		15:31 (5)
	21:30	33	20:34 (2)	20:25		19:09	21	18:33 (3)	50	16:28 (4)	16:12	21	15:36 (5)	16:11	3	15:34 (5)
30	05:35		20:00 (2)	06:29		07:24		18:09 (3)		15:38 (4)	08:18		15:16 (5)	08:44		15:31 (5)
	21:28	35	20:35 (2)	20:23		19:07	24	18:33 (3)	49	16:27 (4)	16:11	19	15:35 (5)	16:12	3	15:34 (5)
31	05:37		20:00 (2)	06:31				07:22		15:37 (4)				08:44		15:31 (5)
	21:27	36	20:36 (2)	20:21				16:56	48	16:25 (4)				16:13	4	15:35 (5)
Potential sun hours	512		460			382		328		259			233			
Total, worst case	287		752			83		905		764				163		
Sun reduction	0.32		0.34			0.32		0.29		0.27				0.21		
Oper. time red.	1.00		1.00			1.00		1.00		1.00				1.00		
Wind dir. red.	0.65		0.65			0.68		0.66		0.66				0.66		
Total reduction	0.21		0.22			0.22		0.19		0.17				0.14		
Total, real	60		166			18		175		133				22		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DI - H113

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44			08:14			07:16		16:35 (4)	07:01			05:52		19:48 (2)	05:03		
	16:15			17:06			18:02	28	17:03 (4)	20:00			20:55	38	20:26 (2)	21:45		
2	08:44			08:12			07:14		16:36 (4)	06:59			05:50		19:48 (2)	05:02		
	16:16			17:08			18:04	24	17:00 (4)	20:02			20:57	39	20:27 (2)	21:46		
3	08:44			08:10		16:36 (4)	07:12		16:40 (4)	06:56			05:48		19:48 (2)	05:01		
	16:17			17:10	3	16:39 (4)	18:06	17	16:57 (4)	20:04			20:59	38	20:26 (2)	21:48		
4	08:43			08:08		16:34 (4)	07:09		16:46 (4)	06:54			05:46		19:48 (2)	05:00		
	16:18			17:12	7	16:41 (4)	18:07	6	16:52 (4)	20:06			21:01	38	20:26 (2)	21:49		
5	08:43			08:07		16:33 (4)	07:07		17:39 (3)	06:51			05:44		19:48 (2)	04:59		
	16:19			17:14	10	16:43 (4)	18:09	3	17:42 (3)	20:07			21:03	37	20:25 (2)	21:50		
6	08:43			08:05		16:32 (4)	07:04		17:38 (3)	06:49			05:42		19:48 (2)	04:59		
	16:21			17:16	13	16:45 (4)	18:11	7	17:45 (3)	20:09			21:04	37	20:25 (2)	21:51		
7	08:42			08:03		16:31 (4)	07:02		17:36 (3)	06:47			05:40		19:49 (2)	04:58		
	16:22			17:18	16	16:47 (4)	18:13	10	17:46 (3)	20:11			21:06	36	20:25 (2)	21:52		
8	08:42			08:01		16:30 (4)	07:00		17:36 (3)	06:44			05:38		19:50 (2)	04:57		
	16:24			17:20	20	16:50 (4)	18:15	12	17:48 (3)	20:13			21:08	34	20:24 (2)	21:53		
9	08:41		15:48 (5)	07:59		16:30 (4)	06:57		17:35 (3)	06:42			05:36		19:50 (2)	04:57		
	16:25	1	15:49 (5)	17:22	22	16:52 (4)	18:17	15	17:50 (3)	20:15			21:10	33	20:23 (2)	21:54		
10	08:40		15:47 (5)	07:57		16:29 (4)	06:55		17:35 (3)	06:39			05:34		19:50 (2)	04:56		
	16:26	3	15:50 (5)	17:24	25	16:54 (4)	18:19	17	17:52 (3)	20:17			21:11	32	20:22 (2)	21:55		
11	08:40		15:47 (5)	07:55		16:29 (4)	06:52		17:35 (3)	06:37			05:33		19:52 (2)	04:56		
	16:28	5	15:52 (5)	17:26	27	16:56 (4)	18:21	20	17:55 (3)	20:19			21:13	30	20:22 (2)	21:55		
12	08:39		15:47 (5)	07:53		16:27 (4)	06:50		17:35 (3)	06:35			05:31		19:52 (2)	04:55		
	16:30	7	15:54 (5)	17:28	31	16:58 (4)	18:23	21	17:56 (3)	20:20			21:15	29	20:21 (2)	21:56		
13	08:38		15:47 (5)	07:51		16:27 (4)	06:48		17:35 (3)	06:32			05:29		19:53 (2)	04:55		
	16:31	8	15:55 (5)	17:30	33	17:00 (4)	18:25	23	17:58 (3)	20:22			21:17	26	20:19 (2)	21:57		
14	08:37		15:47 (5)	07:49		16:27 (4)	06:45		17:35 (3)	06:30			05:27		19:55 (2)	04:55		
	16:33	10	15:57 (5)	17:32	35	17:02 (4)	18:27	25	18:00 (3)	20:24			21:18	24	20:19 (2)	21:58		
15	08:36		15:48 (5)	07:47		16:27 (4)	06:43		17:36 (3)	06:28			05:26		19:56 (2)	04:55		
	16:34	11	15:59 (5)	17:34	38	17:05 (4)	18:28	23	17:59 (3)	20:26			21:20	21	20:17 (2)	21:58		
16	08:35		15:47 (5)	07:45		16:27 (4)	06:40		17:36 (3)	06:25			05:24		19:58 (2)	04:54		
	16:36	13	16:00 (5)	17:36	40	17:07 (4)	18:30	21	17:57 (3)	20:28			21:22	18	20:16 (2)	21:59		
17	08:34		15:47 (5)	07:43		16:27 (4)	06:38		17:38 (3)	06:23			05:22		19:59 (2)	04:54		
	16:38	16	16:03 (5)	17:38	42	17:09 (4)	18:32	18	17:56 (3)	20:30			21:23	14	20:13 (2)	21:59		
18	08:33		15:48 (5)	07:41		16:26 (4)	06:35		17:40 (3)	06:21	20:01 (2)		05:21		20:03 (2)	04:54		
	16:40	17	16:05 (5)	17:40	45	17:11 (4)	18:34	13	17:53 (3)	20:31	2	20:03 (2)	21:25	7	20:10 (2)	22:00		
19	08:32		15:48 (5)	07:39		16:27 (4)	06:33		17:45 (3)	06:18		19:59 (2)	05:19			04:54		
	16:41	19	16:07 (5)	17:42	45	17:12 (4)	18:36	3	17:48 (3)	20:33	6	20:05 (2)	21:27			22:00		
20	08:31		15:48 (5)	07:36		16:27 (4)	06:31			06:16		19:57 (2)	05:18			04:54		
	16:43	20	16:08 (5)	17:44	45	17:12 (4)	18:38			20:35	10	20:07 (2)	21:28			22:00		
21	08:30		15:49 (5)	07:34		16:28 (4)	06:28			06:14		19:54 (2)	05:16			04:54		
	16:45	22	16:11 (5)	17:46	44	17:12 (4)	18:40			20:37	14	20:08 (2)	21:30			22:01		
22	08:29		15:49 (5)	07:32		16:27 (4)	06:26			06:12		19:53 (2)	05:15			04:55		
	16:47	23	16:12 (5)	17:48	44	17:11 (4)	18:42			20:39	17	20:10 (2)	21:31			22:01		
23	08:27		15:50 (5)	07:30		16:28 (4)	06:23			06:09		19:52 (2)	05:13			04:55		
	16:49	25	16:15 (5)	17:50	42	17:10 (4)	18:43			20:41	20	20:12 (2)	21:33			22:01		
24	08:26		15:50 (5)	07:28		16:29 (4)	06:21			06:07		19:51 (2)	05:12			04:55		
	16:50	24	16:14 (5)	17:52	41	17:10 (4)	18:45			20:43	23	20:14 (2)	21:34			22:01		
25	08:24		15:51 (5)	07:25		16:29 (4)	06:18			06:05		19:50 (2)	05:11			04:55		
	16:52	24	16:15 (5)	17:54	39	17:08 (4)	18:47			20:44	25	20:15 (2)	21:36			22:01		
26	08:23		15:51 (5)	07:23		16:31 (4)	06:16			06:03		19:50 (2)	05:09			04:56		
	16:54	23	16:14 (5)	17:56	36	17:07 (4)	18:49			20:46	27	20:17 (2)	21:37			22:01		
27	08:22		15:52 (5)	07:21		16:32 (4)	06:13			06:01		19:49 (2)	05:08			04:56		
	16:56	21	16:13 (5)	17:58	34	17:06 (4)	18:51			20:48	30	20:19 (2)	21:39			22:01		
28	08:20		15:54 (5)	07:18		16:33 (4)	06:11			05:58		19:49 (2)	05:07			04:57		
	16:58	19	16:13 (5)	18:00	31	17:04 (4)	18:53			20:50	32	20:21 (2)	21:40			22:01		
29	08:18		15:55 (5)				07:08			05:56		19:49 (2)	05:06			04:57		
	17:00	17	16:12 (5)				19:54			20:52	33	20:22 (2)	21:41			22:01		
30	08:17		15:56 (5)				07:06			05:54		19:48 (2)	05:05			04:58		
	17:02	15	16:11 (5)				19:56			20:54	36	20:24 (2)	21:43			22:00		
31	08:15		15:58 (5)				07:04						05:04					
	17:04	11	16:09 (5)				19:58						21:44					
Potential sun hours	250			273			367			420			494			510		
Total, worst case		354		808			306			275			531					
Sun reduction		0.24		0.23			0.27			0.35			0.38					
Oper. time red.		1.00		1.00			1.00			1.00			1.00					
Wind dir. red.		0.66		0.66			0.67			0.65			0.65					
Total reduction		0.16		0.15			0.18			0.23			0.25					
Total, real		57		124			56			63			131					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DI - H113

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	20:02 (2) 20:31 (2)	06:33 20:18		07:26 19:05	18:14 (3) 18:36 (3)	07:24 16:54	15:59 (4) 16:23 (4)	08:19 16:10	15:29 (5) 15:34 (5)
2	04:59 22:00	05:40 21:23	20:02 (2) 20:33 (2)	06:35 20:16		07:28 19:02	18:13 (3) 18:33 (3)	07:26 16:52	15:59 (4) 16:21 (4)	08:21 16:09	15:30 (5) 15:33 (5)
3	05:00 21:59	05:42 21:21	20:00 (2) 20:33 (2)	06:36 20:13		07:30 19:00	18:13 (3) 18:31 (3)	07:28 16:50	16:00 (4) 16:19 (4)	08:22 16:08	15:31 (5) 15:32 (5)
4	05:01 21:59	05:44 21:19	20:00 (2) 20:34 (2)	06:38 20:11		07:31 18:57	18:13 (3) 18:29 (3)	07:30 16:48	16:01 (4) 16:17 (4)	08:24 16:08	
5	05:02 21:58	05:45 21:17	19:59 (2) 20:34 (2)	06:40 20:09		07:33 18:55	18:13 (3) 18:26 (3)	07:32 16:46	16:02 (4) 16:15 (4)	08:25 16:07	
6	05:03 21:58	05:47 21:15	19:59 (2) 20:34 (2)	06:42 20:06		07:35 18:52	18:13 (3) 18:24 (3)	07:34 16:44	16:03 (4) 16:12 (4)	08:26 16:07	
7	05:04 21:57	05:49 21:13	19:58 (2) 20:35 (2)	06:43 20:04		07:37 18:50	18:13 (3) 18:21 (3)	07:36 16:43	16:04 (4) 16:10 (4)	08:28 16:06	
8	05:05 21:56	05:51 21:12	19:57 (2) 20:35 (2)	06:45 20:01		07:39 18:48	18:13 (3) 18:18 (3)	07:38 16:41	16:06 (4) 16:08 (4)	08:29 16:06	
9	05:06 21:55	05:52 21:10	19:57 (2) 20:35 (2)	06:47 19:59		07:41 18:45	18:14 (3) 18:16 (3)	07:40 16:39	08:30 16:05		
10	05:07 21:55	05:54 21:07	19:56 (2) 20:35 (2)	06:49 19:56		07:42 18:43	17:16 (4) 17:29 (4)	07:42 16:37	15:34 (5) 15:37 (5)	08:31 16:05	
11	05:08 21:54	05:56 21:05	19:56 (2) 20:35 (2)	06:50 19:54		07:44 18:40	17:12 (4) 17:33 (4)	07:44 16:35	15:30 (5) 15:41 (5)	08:33 16:05	
12	05:09 21:53	05:57 21:03	19:57 (2) 20:34 (2)	06:52 19:51		07:46 18:38	17:09 (4) 17:35 (4)	07:45 16:34	15:28 (5) 15:43 (5)	08:34 16:05	
13	05:10 21:52	05:59 21:01	19:56 (2) 20:31 (2)	06:54 19:49		07:48 18:36	17:07 (4) 17:37 (4)	07:47 16:32	15:27 (5) 15:44 (5)	08:35 16:05	
14	05:12 21:51	06:01 20:59	19:56 (2) 20:29 (2)	06:56 19:47		07:50 18:33	17:05 (4) 17:38 (4)	07:49 16:31	15:26 (5) 15:45 (5)	08:36 16:04	
15	05:13 21:50	06:03 20:57	19:57 (2) 20:28 (2)	06:58 19:44		07:52 18:31	17:04 (4) 17:39 (4)	07:51 16:29	15:25 (5) 15:46 (5)	08:37 16:05	
16	05:14 21:49	06:04 20:55	19:56 (2) 20:25 (2)	06:59 19:42		07:54 18:29	17:02 (4) 17:40 (4)	07:53 16:27	15:24 (5) 15:47 (5)	08:38 16:05	
17	05:16 21:47	06:06 20:53	19:57 (2) 20:23 (2)	07:01 19:39		07:55 18:26	17:01 (4) 17:41 (4)	07:55 16:26	15:24 (5) 15:48 (5)	08:38 16:05	
18	05:17 21:46	06:08 20:51	19:57 (2) 20:22 (2)	07:03 19:37		07:57 18:24	17:00 (4) 17:41 (4)	07:57 16:24	15:24 (5) 15:48 (5)	08:39 16:05	
19	05:18 21:45	06:10 20:48	19:57 (2) 20:19 (2)	07:05 19:34		07:59 18:22	16:59 (4) 17:42 (4)	07:59 16:23	15:24 (5) 15:49 (5)	08:40 16:05	
20	05:20 21:44	06:12 20:46	19:58 (2) 20:17 (2)	07:06 19:32		08:01 18:20	16:58 (4) 17:42 (4)	08:00 16:22	15:24 (5) 15:47 (5)	08:41 16:06	
21	05:21 21:42	06:13 20:44	19:59 (2) 20:15 (2)	07:08 19:29		08:03 18:17	16:58 (4) 17:42 (4)	08:02 16:20	15:24 (5) 15:46 (5)	08:41 16:06	
22	05:23 21:41	06:15 20:42	19:59 (2) 20:12 (2)	07:10 19:27		08:05 18:15	16:57 (4) 17:43 (4)	08:04 16:19	15:24 (5) 15:44 (5)	08:42 16:06	
23	05:24 21:39	06:17 20:39	20:01 (2) 20:10 (2)	07:12 19:24		08:07 18:13	16:57 (4) 17:43 (4)	08:06 16:18	15:24 (5) 15:43 (5)	08:42 16:07	
24	05:26 21:38	06:19 20:37	20:03 (2) 20:09 (2)	07:13 19:22		08:09 18:11	16:57 (4) 17:41 (4)	08:08 16:17	15:25 (5) 15:42 (5)	08:43 16:08	
25	05:27 21:36	06:20 20:35	20:04 (2) 20:06 (2)	07:15 19:19	18:23 (3)	07:11 17:09	15:56 (4) 16:38 (4)	08:09 16:16	15:25 (5) 15:41 (5)	08:43 16:08	
26	05:29 21:35	20:12 (2) 20:22 (2)	06:22 20:32	07:17 19:17	18:21 (3) 18:37 (3)	07:13 17:06	15:56 (4) 16:36 (4)	08:11 16:14	15:26 (5) 15:40 (5)	08:43 16:09	
27	05:30 21:33	20:09 (2) 20:24 (2)	06:24 20:30	07:19 19:14	18:19 (3) 18:38 (3)	07:15 17:04	15:56 (4) 16:34 (4)	08:13 16:13	15:27 (5) 15:38 (5)	08:44 16:10	
28	05:32 21:32	20:07 (2) 20:27 (2)	06:26 20:28	07:21 19:12	18:17 (3) 18:39 (3)	07:16 17:02	15:56 (4) 16:31 (4)	08:14 16:12	15:27 (5) 15:38 (5)	08:44 16:11	
29	05:34 21:30	20:05 (2) 20:28 (2)	06:27 20:25	07:22 19:09	18:16 (3) 18:40 (3)	07:18 17:00	15:57 (4) 16:29 (4)	08:16 16:12	15:27 (5) 15:36 (5)	08:44 16:11	
30	05:35 21:28	20:05 (2) 20:29 (2)	06:29 20:23	07:24 19:07	18:14 (3) 18:38 (3)	07:20 16:58	15:57 (4) 16:27 (4)	08:18 16:11	15:28 (5) 15:35 (5)	08:44 16:12	
31	05:37 21:26	20:04 (2) 20:31 (2)	06:31 20:21			07:22 16:56	15:57 (4) 16:25 (4)			08:44 16:13	
Potential sun hours	512	460	382	328	259	233					
Total, worst case	119	691	116	904	462	9					
Sun reduction	0.32	0.34	0.32	0.29	0.27	0.21					
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00					
Wind dir. red.	0.65	0.65	0.68	0.66	0.66	0.66					
Total reduction	0.21	0.22	0.22	0.19	0.18	0.14					
Total, real	25	153	25	175	81	1					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DJ - H114

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:03 (5)		07:16		16:40 (4)	07:01			05:52		19:49 (2)	05:03		
	16:15			17:06	16:19 (5)	16	18:02	35	17:15 (4)	20:00			20:55	37	20:26 (2)	21:45		
2	08:44			08:12	16:05 (5)		07:14		16:41 (4)	06:59			05:50		19:49 (2)	05:02		
	16:16			17:08	16:17 (5)	12	18:04	32	17:13 (4)	20:02			20:57	37	20:26 (2)	21:46		
3	08:44			08:10	16:08 (5)		07:12		16:43 (4)	06:56			05:48		19:49 (2)	05:01		
	16:17			17:10	16:14 (5)	6	18:06	28	17:11 (4)	20:04			20:59	36	20:25 (2)	21:48		
4	08:43			08:08			07:09		16:45 (4)	06:54			05:46		19:50 (2)	05:00		
	16:18			17:12			18:07	25	17:10 (4)	20:06			21:01	35	20:25 (2)	21:49		
5	08:43			08:07			07:07		16:47 (4)	06:51			05:44		19:50 (2)	04:59		
	16:19			17:14			18:09	19	17:06 (4)	20:07			21:03	34	20:24 (2)	21:50		
6	08:43			08:05			07:04		16:51 (4)	06:49			05:42		19:50 (2)	04:59		
	16:21			17:16			18:11	13	17:45 (3)	20:09			21:04	33	20:23 (2)	21:51		
7	08:42			08:03	16:46 (4)		07:02		17:42 (3)	06:47			05:40		19:51 (2)	04:58		
	16:22			17:18	16:47 (4)	1	18:13	4	17:46 (3)	20:11			21:06	33	20:24 (2)	21:52		
8	08:42			08:01	16:45 (4)		07:00		17:41 (3)	06:44			05:38		19:52 (2)	04:57		
	16:24			17:20	16:50 (4)	5	18:15	7	17:48 (3)	20:13			21:08	31	20:23 (2)	21:53		
9	08:41			07:59	16:43 (4)		06:57		17:39 (3)	06:42			05:36		19:52 (2)	04:57		
	16:25			17:22	16:52 (4)	9	18:17	11	17:50 (3)	20:15			21:10	30	20:22 (2)	21:54		
10	08:40			07:57	16:42 (4)		06:55		17:39 (3)	06:39			05:34		19:53 (2)	04:56		
	16:26			17:24	16:54 (4)	12	18:19	13	17:52 (3)	20:17			21:11	27	20:20 (2)	21:55		
11	08:40			07:55	16:41 (4)		06:52		17:39 (3)	06:37			05:33		19:54 (2)	04:56		
	16:28			17:26	16:56 (4)	15	18:21	16	17:55 (3)	20:19			21:13	26	20:20 (2)	21:55		
12	08:39			07:53	16:40 (4)		06:50		17:38 (3)	06:35			05:31		19:55 (2)	04:55		
	16:30			17:28	16:58 (4)	18	18:23	18	17:56 (3)	20:20			21:15	24	20:19 (2)	21:56		
13	08:38			07:51	16:39 (4)		06:48		17:39 (3)	06:32			05:29		19:56 (2)	04:55		
	16:31			17:30	17:00 (4)	21	18:25	19	17:58 (3)	20:22			21:17	21	20:17 (2)	21:57		
14	08:37	15:56 (5)		07:49	16:38 (4)		06:45		17:38 (3)	06:30			05:27		19:58 (2)	04:55		
	16:33	1	15:57 (5)	17:32	17:02 (4)	24	18:27	22	18:00 (3)	20:24			21:18	18	20:16 (2)	21:58		
15	08:36	15:56 (5)		07:47	16:38 (4)		06:43		17:39 (3)	06:28			05:26		20:00 (2)	04:55		
	16:34	3	15:59 (5)	17:34	17:05 (4)	27	18:28	23	18:02 (3)	20:26			21:20	13	20:13 (2)	21:58		
16	08:35	15:55 (5)		07:45	16:38 (4)		06:40		17:39 (3)	06:25			05:24		20:04 (2)	04:54		
	16:36	5	16:00 (5)	17:36	17:07 (4)	29	18:30	23	18:02 (3)	20:28			21:22	6	20:10 (2)	21:59		
17	08:34	15:55 (5)		07:43	16:38 (4)		06:38		17:40 (3)	06:23			05:22			04:54		
	16:38	8	16:03 (5)	17:38	17:09 (4)	31	18:32	21	18:01 (3)	20:30			21:23			21:59		
18	08:33	15:55 (5)		07:41	16:37 (4)		06:35		17:41 (3)	06:21	20:01 (2)		05:21			04:54		
	16:40	10	16:05 (5)	17:40	17:11 (4)	34	18:34	17	17:58 (3)	20:31	2	20:03 (2)	21:25			22:00		
19	08:32	15:55 (5)		07:39	16:37 (4)		06:33		17:43 (3)	06:18	19:59 (2)		05:19			04:54		
	16:41	12	16:07 (5)	17:42	17:13 (4)	36	18:36	13	17:56 (3)	20:33	6	20:05 (2)	21:27			22:00		
20	08:31	15:55 (5)		07:36	16:37 (4)		06:31		17:47 (3)	06:16	19:57 (2)		05:18			04:54		
	16:43	13	16:08 (5)	17:44	17:16 (4)	39	18:38	4	17:51 (3)	20:35	10	20:07 (2)	21:28			22:00		
21	08:30	15:55 (5)		07:34	16:37 (4)		06:28			06:14	19:55 (2)		05:16			04:54		
	16:45	16	16:11 (5)	17:46	17:18 (4)	41	18:40		20:37	13	20:08 (2)		21:30			22:01		
22	08:29	15:55 (5)		07:32	16:36 (4)		06:26			06:12	19:54 (2)		05:15			04:55		
	16:47	17	16:12 (5)	17:48	17:19 (4)	43	18:42		20:39	16	20:10 (2)		21:31			22:01		
23	08:27	15:56 (5)		07:30	16:37 (4)		06:23		06:09		19:53 (2)		05:13			04:55		
	16:49	19	16:15 (5)	17:50	17:20 (4)	43	18:43		20:41	19	20:12 (2)		21:33			22:01		
24	08:26	15:56 (5)		07:28	16:37 (4)		06:21		06:07		19:52 (2)		05:12			04:55		
	16:50	21	16:17 (5)	17:52	17:20 (4)	43	18:45		20:43	22	20:14 (2)		21:34			22:01		
25	08:24	15:57 (5)		07:25	16:37 (4)		06:18		06:05		19:51 (2)		05:11			04:55		
	16:52	22	16:19 (5)	17:54	17:18 (4)	41	18:47		20:44	24	20:15 (2)		21:36			22:01		
26	08:23	15:57 (5)		07:23	16:38 (4)		06:16		06:03		19:51 (2)		05:09			04:56		
	16:54	24	16:21 (5)	17:56	17:18 (4)	40	18:49		20:46	26	20:17 (2)		21:37			22:01		
27	08:22	15:57 (5)		07:21	16:39 (4)		06:13		06:01		19:50 (2)		05:08			04:56		
	16:56	24	16:21 (5)	17:58	17:17 (4)	38	18:51		20:48	29	20:19 (2)		21:39			22:01		
28	08:20	15:58 (5)		07:18	16:39 (4)		06:11		05:58		19:50 (2)		05:07			04:57		
	16:58	23	16:21 (5)	18:00	17:16 (4)	37	18:53		20:50	31	20:21 (2)		21:40			22:01		
29	08:18	15:59 (5)					07:08		05:56		19:50 (2)		05:06			04:57		
	17:00	22	16:21 (5)				19:54		20:52	32	20:22 (2)		21:41			22:01		
30	08:17	16:00 (5)					07:06		05:54		19:50 (2)		05:05			04:58		
	17:02	20	16:20 (5)				19:56		20:54	34	20:24 (2)		21:43			22:00		
31	08:15	16:01 (5)					07:04						05:04					
	17:04	18	16:19 (5)				19:58						21:44					
Potential sun hours	250			273			367		420				494			510		
Total, worst case		278		661			363		264		441							
Sun reduction		0.24		0.23			0.27		0.35		0.38							
Oper. time red.		1.00		1.00			1.00		1.00		1.00							
Wind dir. red.		0.66		0.67			0.67		0.65		0.65							
Total reduction		0.16		0.15			0.18		0.23		0.25							
Total, real		45		102			66		60		109							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DJ - H114

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	24	20:05 (2) 20:29 (2)	06:33 20:18		07:26 19:05	18:17 (3) 18:36 (3)	07:24 16:54	16:12 (4) 16:23 (4)	08:19 16:10
2	04:59 22:00	05:40 21:23	27	20:04 (2) 20:31 (2)	06:35 20:16		07:28 19:02	18:17 (3) 18:33 (3)	07:26 16:52	16:13 (4) 16:21 (4)	08:21 16:09
3	05:00 21:59	05:42 21:21	28	20:03 (2) 20:31 (2)	06:36 20:13		07:30 19:00	18:17 (3) 18:31 (3)	07:28 16:50	16:15 (4) 16:19 (4)	08:22 16:08
4	05:01 21:59	05:44 21:19	30	20:02 (2) 20:32 (2)	06:38 20:11		07:31 18:57	18:17 (3) 18:29 (3)	07:30 16:48	16:16 (4) 16:17 (4)	08:24 16:08
5	05:02 21:58	05:45 21:17	31	20:01 (2) 20:32 (2)	06:40 20:09		07:33 18:55	18:18 (3) 18:26 (3)	07:32 16:46		08:25 16:07
6	05:03 21:58	05:47 21:15	33	20:00 (2) 20:33 (2)	06:42 20:06		07:35 18:52	18:18 (3) 18:24 (3)	07:34 16:44		08:26 16:07
7	05:04 21:57	05:49 21:13	34	20:00 (2) 20:34 (2)	06:43 20:04		07:37 18:50	17:32 (4) 18:21 (3)	07:36 16:43		08:28 16:06
8	05:05 21:56	05:51 21:12	35	19:59 (2) 20:34 (2)	06:45 20:01		07:39 18:48	17:24 (4) 17:40 (4)	07:38 16:41	15:37 (5) 15:44 (5)	08:29 16:06
9	05:06 21:55	05:52 21:10	35	19:59 (2) 20:34 (2)	06:47 19:59		07:41 18:45	17:21 (4) 17:43 (4)	07:40 16:39	15:34 (5) 15:47 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	36	19:58 (2) 20:34 (2)	06:49 19:56		07:42 18:43	17:18 (4) 17:45 (4)	07:42 16:37	15:34 (5) 15:50 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	36	19:58 (2) 20:34 (2)	06:50 19:54		07:44 18:40	17:16 (4) 17:46 (4)	07:44 16:35	15:32 (5) 15:51 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	36	19:58 (2) 20:34 (2)	06:52 19:51		07:46 18:38	17:14 (4) 17:47 (4)	07:45 16:34	15:31 (5) 15:52 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01	34	19:57 (2) 20:31 (2)	06:54 19:49		07:48 18:36	17:13 (4) 17:48 (4)	07:47 16:32	15:31 (5) 15:53 (5)	08:35 16:05
14	05:12 21:51	06:01 20:59	32	19:57 (2) 20:29 (2)	06:56 19:47		07:50 18:33	17:12 (4) 17:49 (4)	07:49 16:31	15:30 (5) 15:53 (5)	08:36 16:04
15	05:13 21:50	06:03 20:57	30	19:58 (2) 20:28 (2)	06:58 19:44		07:52 18:31	17:11 (4) 17:50 (4)	07:51 16:29	15:30 (5) 15:54 (5)	08:37 16:05
16	05:14 21:49	06:04 20:55	28	19:57 (2) 20:25 (2)	06:59 19:42		07:54 18:29	17:10 (4) 17:50 (4)	07:53 16:27	15:30 (5) 15:54 (5)	08:38 16:05
17	05:16 21:47	06:06 20:53	25	19:58 (2) 20:23 (2)	07:01 19:39		07:55 18:26	17:09 (4) 17:51 (4)	07:55 16:26	15:30 (5) 15:52 (5)	08:38 16:05
18	05:17 21:46	06:08 20:51	24	19:58 (2) 20:22 (2)	07:03 19:37		07:57 18:24	17:08 (4) 17:51 (4)	07:57 16:24	15:30 (5) 15:51 (5)	08:39 16:05
19	05:18 21:45	06:10 20:48	21	19:58 (2) 20:19 (2)	07:05 19:34		07:59 18:22	17:08 (4) 17:51 (4)	07:59 16:23	15:30 (5) 15:49 (5)	08:40 16:05
20	05:20 21:44	06:12 20:46	18	19:59 (2) 20:17 (2)	07:06 19:32		08:01 18:20	17:08 (4) 17:50 (4)	08:00 16:22	15:30 (5) 15:47 (5)	08:41 16:06
21	05:21 21:42	06:13 20:44	15	20:00 (2) 20:15 (2)	07:08 19:29		08:03 18:17	17:07 (4) 17:48 (4)	08:02 16:20	15:30 (5) 15:46 (5)	08:41 16:06
22	05:23 21:41	06:15 20:42	12	20:00 (2) 20:12 (2)	07:10 19:27		08:05 18:15	17:07 (4) 17:45 (4)	08:04 16:19	15:31 (5) 15:44 (5)	08:42 16:06
23	05:24 21:39	06:17 20:39	9	20:01 (2) 20:10 (2)	07:12 19:24		08:07 18:13	17:07 (4) 17:43 (4)	08:06 16:18	15:32 (5) 15:43 (5)	08:42 16:07
24	05:26 21:38	06:19 20:37	6	20:03 (2) 20:09 (2)	07:13 19:22	11	08:09 18:39 (3)	17:07 (4) 17:41 (4)	08:08 16:17	15:32 (5) 15:42 (5)	08:43 16:08
25	05:27 21:36	06:20 20:35	1	20:05 (2) 20:06 (2)	07:15 19:19	16	07:11 18:40 (3)	16:07 (4) 17:09	08:09 16:16	15:33 (5) 15:41 (5)	08:43 16:08
26	05:29 21:35	06:22 20:32			07:17 19:17	20	07:13 18:42 (3)	16:07 (4) 17:06	08:11 16:14	15:34 (5) 15:40 (5)	08:43 16:09
27	05:30 21:33	06:24 20:30			07:19 19:14	22	07:15 18:21 (3)	16:08 (4) 17:04	08:13 16:13	15:35 (5) 15:38 (5)	08:44 16:10
28	05:32 21:32	20:13 (2) 20:22 (2)	06:26 20:28		07:21 19:12	24	07:16 18:20 (3)	16:08 (4) 16:31 (4)	08:14 16:12	15:36 (5) 15:38 (5)	08:44 16:11
29	05:34 21:30	20:09 (2) 20:24 (2)	06:27 20:25		07:22 19:09	22	07:18 18:19 (3)	16:09 (4) 17:00	08:16 16:12		08:44 16:11
30	05:35 21:28	20:08 (2) 20:27 (2)	06:29 20:23		07:24 19:07	20	07:20 18:18 (3)	16:09 (4) 16:58	08:18 16:27 (4)		08:44 16:12
31	05:37 21:26	20:07 (2) 20:29 (2)	06:31 20:21				07:22 16:56	16:10 (4) 16:25 (4)			08:44 16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	65		640		135		839		341		
Sun reduction	0.32		0.34		0.32		0.29		0.27		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.65		0.65		0.67		0.67		0.66		
Total reduction	0.21		0.22		0.22		0.20		0.18		
Total, real	14		142		29		164		60		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DK - H115

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:22 (5)	08:14	15:55 (4)	07:16	17:30 (3)	07:01	05:52	19:49 (2)	05:03	20:06 (2)
2	08:44	15:37 (5)	08:14	16:35 (4)	18:02	17:34 (3)	20:00	20:55	37	20:26 (2)	21:45
3	08:44	15:22 (5)	08:12	15:54 (4)	07:14	17:28 (3)	06:59	05:50	19:49 (2)	05:02	20:11 (2)
4	08:44	15:39 (5)	08:10	16:37 (4)	18:04	17:36 (3)	20:02	20:57	38	20:27 (2)	21:46
5	08:44	15:22 (5)	08:10	15:54 (4)	07:12	17:28 (3)	06:56	05:48	19:48 (2)	05:01	20:14 (2)
6	08:44	15:39 (5)	08:10	16:39 (4)	18:06	17:38 (3)	20:04	20:59	41	20:29 (2)	21:48
7	08:43	15:23 (5)	08:08	15:54 (4)	07:09	17:27 (3)	06:54	05:46	19:48 (2)	05:00	20:11 (2)
8	08:43	15:41 (5)	08:07	16:41 (4)	18:07	17:41 (3)	20:06	21:01	42	20:30 (2)	21:49
9	08:43	15:23 (5)	08:07	15:54 (4)	07:07	17:26 (3)	06:51	05:44	19:48 (2)	04:59	20:11 (2)
10	08:43	15:42 (5)	08:05	16:43 (4)	18:09	17:42 (3)	20:07	21:03	44	20:32 (2)	21:50
11	08:43	15:24 (5)	08:05	15:54 (4)	07:04	17:26 (3)	06:49	05:42	19:47 (2)	04:59	20:11 (2)
12	08:42	15:44 (5)	08:03	16:45 (4)	18:11	17:45 (3)	20:09	21:04	46	20:33 (2)	21:51
13	08:42	15:24 (5)	08:03	15:54 (4)	07:02	17:25 (3)	06:47	05:40	19:48 (2)	04:58	20:11 (2)
14	08:42	15:45 (5)	08:01	16:47 (4)	18:13	17:46 (3)	20:11	21:06	46	20:34 (2)	21:52
15	08:42	15:24 (5)	08:01	15:54 (4)	07:00	17:25 (3)	06:44	05:38	19:48 (2)	04:57	20:11 (2)
16	08:42	15:46 (5)	08:05	16:48 (4)	18:15	17:48 (3)	20:13	21:08	46	20:34 (2)	21:53
17	08:41	15:25 (5)	07:59	15:54 (4)	06:57	17:24 (3)	06:42	05:36	19:47 (2)	04:57	20:11 (2)
18	08:41	15:49 (5)	07:59	16:48 (4)	18:17	17:50 (3)	20:15	21:10	46	20:33 (2)	21:54
19	08:40	15:25 (5)	07:57	15:55 (4)	06:55	17:25 (3)	06:39	05:34	19:47 (2)	04:56	20:11 (2)
20	08:40	15:50 (5)	07:55	16:48 (4)	18:19	17:52 (3)	20:17	21:11	46	20:33 (2)	21:55
21	08:40	15:26 (5)	07:55	15:55 (4)	06:53	17:26 (3)	06:37	05:33	19:48 (2)	04:56	20:11 (2)
22	08:39	15:26 (5)	07:53	16:48 (4)	18:21	17:54 (3)	20:19	21:13	45	20:33 (2)	21:55
23	08:39	15:26 (5)	07:53	15:55 (4)	06:50	17:25 (3)	06:35	05:31	19:48 (2)	04:55	20:11 (2)
24	08:38	15:27 (5)	07:51	16:48 (4)	18:23	17:53 (3)	20:20	21:15	45	20:33 (2)	21:56
25	08:38	15:54 (5)	07:49	15:55 (4)	06:48	17:27 (3)	06:32	05:29	19:48 (2)	04:55	20:11 (2)
26	08:37	15:27 (5)	07:49	16:47 (4)	18:25	17:52 (3)	20:22	21:17	44	20:32 (2)	21:57
27	08:37	15:54 (5)	07:47	15:56 (4)	06:45	17:27 (3)	06:30	05:27	19:49 (2)	04:55	20:11 (2)
28	08:36	15:28 (5)	07:47	16:47 (4)	18:27	17:50 (3)	20:24	21:18	43	20:32 (2)	21:58
29	08:36	15:28 (5)	07:47	15:56 (4)	06:43	17:29 (3)	06:28	05:26	19:49 (2)	04:55	20:11 (2)
30	08:35	15:54 (5)	07:45	16:46 (4)	18:28	17:48 (3)	20:26	21:20	42	20:31 (2)	21:58
31	08:35	15:28 (5)	07:45	15:57 (4)	06:40	17:31 (3)	06:25	05:24	19:50 (2)	04:54	20:11 (2)
32	08:34	15:54 (5)	07:43	16:46 (4)	18:30	17:45 (3)	20:28	21:22	41	20:31 (2)	21:59
33	08:34	15:29 (5)	07:43	15:58 (4)	06:38	17:35 (3)	06:23	05:22	19:50 (2)	04:54	20:11 (2)
34	08:33	16:03 (4)	17:38	16:45 (4)	18:32	17:41 (3)	20:30	21:23	40	20:30 (2)	21:59
35	08:33	15:30 (5)	07:41	15:59 (4)	06:35	06:21	06:21	05:21	19:51 (2)	04:54	20:11 (2)
36	08:32	16:05 (4)	17:40	16:43 (4)	18:34	20:31	20:31	21:25	39	20:30 (2)	22:00
37	08:32	15:31 (5)	07:39	16:00 (4)	06:33	06:18	06:18	05:19	19:52 (2)	04:54	20:11 (2)
38	08:31	16:07 (4)	17:42	16:43 (4)	18:36	20:33	20:33	21:27	38	20:30 (2)	22:00
39	08:31	15:31 (5)	07:36	16:01 (4)	06:31	06:16	06:16	05:18	19:52 (2)	04:54	20:11 (2)
40	08:30	16:08 (4)	17:44	16:42 (4)	18:38	20:35	20:35	21:28	37	20:29 (2)	22:00
41	08:30	15:33 (5)	07:34	16:03 (4)	06:28	06:14	06:14	05:16	19:53 (2)	04:54	20:11 (2)
42	08:29	16:11 (4)	17:46	16:41 (4)	18:40	20:37	20:37	21:30	36	20:29 (2)	22:01
43	08:29	15:34 (5)	07:32	16:04 (4)	06:26	06:12	06:12	05:15	19:54 (2)	04:55	20:11 (2)
44	08:27	16:12 (4)	17:48	16:38 (4)	18:42	20:39	20:39	21:31	34	20:28 (2)	22:01
45	08:27	15:36 (5)	07:30	16:06 (4)	06:23	06:09	06:09	05:13	19:54 (2)	04:55	20:11 (2)
46	08:26	16:15 (4)	17:50	16:37 (4)	18:43	20:41	20:41	21:33	33	20:27 (2)	22:01
47	08:26	15:38 (5)	07:28	16:09 (4)	06:21	06:07	06:07	05:12	19:55 (2)	04:55	20:11 (2)
48	08:24	16:17 (4)	17:52	16:34 (4)	18:45	20:43	20:43	21:34	31	20:26 (2)	22:01
49	08:24	15:41 (5)	07:25	16:12 (4)	06:18	06:05	06:05	05:11	19:56 (2)	04:55	20:11 (2)
50	08:24	16:19 (4)	17:54	16:30 (4)	18:47	20:44	20:44	21:36	30	20:26 (2)	22:01
51	08:23	15:56 (4)	07:23	16:18 (4)	06:16	06:03	06:03	05:09	19:58 (2)	04:56	20:11 (2)
52	08:23	16:21 (4)	17:56	16:24 (4)	18:49	20:46	20:46	21:37	27	20:25 (2)	22:01
53	08:22	15:55 (4)	07:21	06:13	06:13	06:01	06:01	05:08	19:59 (2)	04:56	20:11 (2)
54	08:20	16:23 (4)	17:58	18:51	18:51	20:48	20:48	21:39	25	20:24 (2)	22:01
55	08:20	15:56 (4)	07:18	06:11	06:11	05:58	05:58	05:07	20:00 (2)	04:57	20:11 (2)
56	08:18	16:26 (4)	18:00	18:53	18:53	20:50	20:50	21:40	23	20:23 (2)	22:01
57	08:18	15:55 (4)	07:09	07:09	07:09	05:56	05:56	05:06	20:01 (2)	04:57	20:11 (2)
58	08:17	16:28 (4)	19:54	19:54	19:54	20:52	20:52	21:41	21	20:22 (2)	22:01
59	08:17	15:55 (4)	07:06	07:06	07:06	05:54	05:54	05:05	20:03 (2)	04:58	20:11 (2)
60	08:15	16:30 (4)	19:56	19:56	19:56	20:54	20:54	21:43	18	20:21 (2)	22:00
61	08:15	15:54 (4)	07:04	07:04	07:04	05:54	05:54	05:04	20:04 (2)	04:58	20:11 (2)
62	08:15	16:32 (4)	19:58	19:58	19:58	20:54	20:54	21:44	15	20:19 (2)	22:00
Potential sun hours	250	273	367	420	494	510	510	510	510	510	510
Total, worst case	816	1124	311	212	1139	14	14	14	14	14	14
Sun reduction	0.24	0.23	0.27	0.35	0.38	0.32	0.32	0.32	0.32	0.32	0.32
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.66	0.66	0.68	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Total reduction	0.16	0.15	0.18	0.23	0.25	0.21	0.21	0.21	0.21	0.21	0.21
Total, real	131	173	57	48	281	3	3	3	3	3	3

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DK - H115

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December							
1	04:59		05:39	19:58 (2)	06:33		07:26	18:05 (3)	07:24	15:24 (4)	08:19	15:08 (5)					
	22:00		21:25	45	20:43 (2)	20:18		19:05	26	18:31 (3)	16:54	54	16:18 (4)	16:10	26	15:34 (5)	
2	04:59		05:40		19:58 (2)	06:35		07:28		18:04 (3)	07:26		15:24 (4)	08:21		15:07 (5)	
	22:00		21:23	46	20:44 (2)	20:16		19:02	28	18:32 (3)	16:52	54	16:18 (4)	16:09	26	15:33 (5)	
3	05:00		05:42		19:58 (2)	06:36		07:30		18:03 (3)	07:28		15:24 (4)	08:22		15:08 (5)	
	21:59		21:21	45	20:43 (2)	20:13		19:00	28	18:31 (3)	16:50	54	16:18 (4)	16:08	24	15:32 (5)	
4	05:01		05:44		19:58 (2)	06:38		07:31		18:02 (3)	07:30		15:24 (4)	08:24		15:09 (5)	
	21:59		21:19	46	20:44 (2)	20:11		18:57	27	18:29 (3)	16:48	53	16:17 (4)	16:08	23	15:32 (5)	
5	05:02		05:45		19:57 (2)	06:40		07:33		18:02 (3)	07:32		15:24 (4)	08:25		15:09 (5)	
	21:58		21:17	46	20:43 (2)	20:09		18:55	24	18:26 (3)	16:46	51	16:15 (4)	16:07	21	15:30 (5)	
6	05:03		05:47		19:57 (2)	06:42		07:35		18:02 (3)	07:34		15:24 (4)	08:26		15:10 (5)	
	21:58		21:15	46	20:43 (2)	20:06		18:52	22	18:24 (3)	16:44	48	16:12 (4)	16:07	20	15:30 (5)	
7	05:04		05:49		19:58 (2)	06:43		07:37		18:01 (3)	07:36		15:24 (4)	08:28		15:10 (5)	
	21:57		21:13	45	20:43 (2)	20:04		18:50	20	18:21 (3)	16:43	46	16:10 (4)	16:06	19	15:29 (5)	
8	05:05		05:51		19:57 (2)	06:45		07:39		18:01 (3)	07:38		15:24 (4)	08:29		15:10 (5)	
	21:56		21:12	44	20:41 (2)	20:01		18:48	17	18:18 (3)	16:41	44	16:08 (4)	16:06	18	15:28 (5)	
9	05:06		05:52		19:57 (2)	06:47		07:41		18:01 (3)	07:40		15:24 (4)	08:30		15:11 (5)	
	21:55		21:10	42	20:39 (2)	19:59		18:45	15	18:16 (3)	16:39	42	16:06 (4)	16:05	17	15:28 (5)	
10	05:07		05:54		19:57 (2)	06:49		07:42		18:01 (3)	07:42		15:26 (4)	08:31		15:11 (5)	
	21:55		21:08	40	20:37 (2)	19:56		18:43	13	18:14 (3)	16:37	39	16:05 (4)	16:05	17	15:28 (5)	
11	05:08		05:56		19:58 (2)	06:50		07:44		18:02 (3)	07:44		15:26 (4)	08:33		15:12 (5)	
	21:54	8	20:24 (2)	21:05	37	20:35 (2)	19:54		18:40	9	18:11 (3)	16:35	37	16:03 (4)	16:05	15	15:27 (5)
12	05:09		05:57		19:58 (2)	06:52		07:46		18:03 (3)	07:45		15:26 (4)	08:34		15:12 (5)	
	21:53	13	20:27 (2)	21:03	36	20:34 (2)	19:51		18:38	6	18:09 (3)	16:34	35	16:01 (4)	16:05	15	15:27 (5)
13	05:10		05:59		19:58 (2)	06:54		07:48		18:04 (3)	07:47		15:27 (4)	08:35		15:13 (5)	
	21:52	16	20:28 (2)	21:01	33	20:31 (2)	19:49		18:36	3	18:07 (3)	16:32	32	15:59 (4)	16:05	14	15:27 (5)
14	05:12		06:01		19:59 (2)	06:56		07:50			07:49		15:28 (4)	08:36		15:13 (5)	
	21:51	19	20:30 (2)	20:59	30	20:29 (2)	19:47		18:33		16:31	30	15:58 (4)	16:05	13	15:26 (5)	
15	05:13		06:03		19:59 (2)	06:58		07:52			07:51		15:28 (4)	08:37		15:14 (5)	
	21:50	22	20:31 (2)	20:57	29	20:28 (2)	19:44		18:31		16:29	28	15:56 (4)	16:05	12	15:26 (5)	
16	05:14		06:05		19:59 (2)	06:59		07:54		16:47 (4)	07:53		15:29 (4)	08:38		15:14 (5)	
	21:49	24	20:32 (2)	20:55	26	20:25 (2)	19:42		18:29	13	17:00 (4)	16:27	25	15:54 (4)	16:05	13	15:27 (5)
17	05:16		06:06		20:00 (2)	07:01		07:55		16:42 (4)	07:55		15:14 (5)	08:38		15:15 (5)	
	21:47	26	20:34 (2)	20:53	23	20:23 (2)	19:39		18:26	22	17:04 (4)	16:26	28	15:52 (4)	16:05	12	15:27 (5)
18	05:17		06:08		20:02 (2)	07:03		07:57		16:39 (4)	07:57		15:12 (5)	08:39		15:16 (5)	
	21:46	29	20:35 (2)	20:51	20	20:22 (2)	19:37		18:24	27	17:06 (4)	16:24	31	15:51 (4)	16:05	11	15:27 (5)
19	05:18		06:10		20:02 (2)	07:05		07:59		16:37 (4)	07:59		15:10 (5)	08:40		15:17 (5)	
	21:45	30	20:35 (2)	20:48	17	20:19 (2)	19:34		18:22	31	17:08 (4)	16:23	32	15:49 (4)	16:05	11	15:28 (5)
20	05:20		06:12		20:04 (2)	07:06		08:01		16:35 (4)	08:00		15:09 (5)	08:41		15:16 (5)	
	21:44	32	20:37 (2)	20:46	13	20:17 (2)	19:32		18:20	35	17:10 (4)	16:22	32	15:47 (4)	16:06	11	15:27 (5)
21	05:21		06:13		20:06 (2)	07:08		08:03		16:33 (4)	08:02		15:08 (5)	08:41		15:17 (5)	
	21:42	33	20:37 (2)	20:44	9	20:15 (2)	19:29		18:17	38	17:11 (4)	16:20	32	15:46 (4)	16:06	11	15:28 (5)
22	05:23		06:15		20:07 (2)	07:10		08:05		16:31 (4)	08:04		15:07 (5)	08:42		15:17 (5)	
	21:41	35	20:38 (2)	20:42	5	20:12 (2)	19:27		18:15	41	17:12 (4)	16:19	31	15:44 (4)	16:06	11	15:28 (5)
23	05:24		06:17			07:12		08:07		16:30 (4)	08:06		15:07 (5)	08:42		15:18 (5)	
	21:39	36	20:39 (2)	20:39		19:24		18:13	43	17:13 (4)	16:18	29	15:43 (4)	16:07	11	15:29 (5)	
24	05:26		06:19			07:13		08:09		16:29 (4)	08:08		15:07 (5)	08:43		15:19 (5)	
	21:38	37	20:39 (2)	20:37		19:22		18:11	45	17:14 (4)	16:17	28	15:42 (4)	16:08	11	15:30 (5)	
25	05:27		06:20			07:15		07:11		15:28 (4)	08:09		15:07 (5)	08:43		15:19 (5)	
	21:36	39	20:41 (2)	20:35		19:19		17:09	47	16:15 (4)	16:16	26	15:41 (4)	16:08	11	15:30 (5)	
26	05:29		06:22			07:17		07:13		15:27 (4)	08:11		15:07 (5)	08:43		15:19 (5)	
	21:35	40	20:41 (2)	20:32		19:17		17:06	48	16:15 (4)	16:14	26	15:33 (5)	16:09	12	15:31 (5)	
27	05:30		06:24			07:19		07:15		15:26 (4)	08:13		15:07 (5)	08:44		15:20 (5)	
	21:33	41	20:42 (2)	20:30		19:14	13	18:26 (3)	50	16:16 (4)	16:13	26	15:33 (5)	16:10	12	15:32 (5)	
28	05:32		06:26			07:21		07:16		15:25 (4)	08:14		15:07 (5)	08:44		15:21 (5)	
	21:32	42	20:42 (2)	20:28		19:12	17	18:28 (3)	51	16:16 (4)	16:12	27	15:34 (5)	16:11	12	15:33 (5)	
29	05:34		06:28			07:22		18:09 (3)	07:18	15:24 (4)	08:16		15:07 (5)	08:44		15:21 (5)	
	21:30	43	20:42 (2)	20:25		19:09	21	18:30 (3)	52	16:16 (4)	16:12	27	15:34 (5)	16:11	13	15:34 (5)	
30	05:35		06:29			07:24		18:06 (3)	07:20	15:24 (4)	08:18		15:07 (5)	08:44		15:20 (5)	
	21:28	44	20:43 (2)	20:23		19:07	24	18:30 (3)	53	16:17 (4)	16:11	28	15:35 (5)	16:12	14	15:34 (5)	
31	05:37		06:31					07:22		15:24 (4)				08:44		15:21 (5)	
	21:27	44	20:43 (2)	20:21				16:56	53	16:17 (4)				16:13	14	15:35 (5)	
Potential sun hours	512		460		382		328		259					233			
Total, worst case	653		723		75		887		1075					470			
Sun reduction	0.32		0.34		0.32		0.29		0.27					0.21			
Oper. time red.	1.00		1.00		1.00		1.00		1.00					1.00			
Wind dir. red.	0.65		0.65		0.68		0.66		0.66					0.66			
Total reduction	0.21		0.22		0.22		0.19		0.17					0.14			
Total, real	136		160		16		173		188					64			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DL - H116

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44		15:02 (4)	08:14		16:33 (3)	07:16		17:16 (2)	07:01		05:52			05:03			
	16:15	30	15:32 (4)	17:06	1	16:34 (3)	18:02	18	17:34 (2)	20:00		20:55			21:45			
2	08:44		15:03 (4)	08:12		16:33 (3)	07:14		17:15 (2)	06:59		05:50			05:02			
	16:16	30	15:33 (4)	17:08	4	16:37 (3)	18:04	21	17:36 (2)	20:02		20:57			21:46			
3	08:44		15:03 (4)	08:10		16:32 (3)	07:12		17:14 (2)	06:56		05:48			05:01			
	16:17	29	15:32 (4)	17:10	7	16:39 (3)	18:06	24	17:38 (2)	20:04		20:59			21:48			
4	08:43		15:04 (4)	08:08		16:32 (3)	07:09		17:14 (2)	06:54		05:46			05:00			
	16:18	29	15:33 (4)	17:12	9	16:41 (3)	18:07	27	17:41 (2)	20:06		21:01			21:49			
5	08:43		15:04 (4)	08:07		16:32 (3)	07:07		17:13 (2)	06:51		05:44			04:59			
	16:19	29	15:33 (4)	17:14	11	16:43 (3)	18:09	29	17:42 (2)	20:07		21:03			21:50			
6	08:43		15:05 (4)	08:05		16:32 (3)	07:04		17:12 (2)	06:49		05:42			04:58			
	16:21	29	15:34 (4)	17:16	13	16:45 (3)	18:11	33	17:45 (2)	20:09		21:04			21:51			
7	08:42		15:05 (4)	08:03		16:32 (3)	07:02		17:12 (2)	06:47		05:40			04:58			
	16:22	28	15:33 (4)	17:18	15	16:47 (3)	18:13	34	17:46 (2)	20:11		21:06			21:52			
8	08:42		15:06 (4)	08:01		16:32 (3)	07:00		17:12 (2)	06:44		05:38			04:57			
	16:24	27	15:33 (4)	17:20	18	16:50 (3)	18:15	35	17:47 (2)	20:13		21:08			21:53			
9	08:41		15:07 (4)	07:59		16:33 (3)	06:57		17:11 (2)	06:42		05:36			04:57			
	16:25	27	15:34 (4)	17:22	19	16:52 (3)	18:17	35	17:46 (2)	20:15		21:10			21:54			
10	08:40		15:08 (4)	07:57		16:33 (3)	06:55		17:12 (2)	06:39		05:34			04:56			
	16:26	26	15:34 (4)	17:24	21	16:54 (3)	18:19	34	17:46 (2)	20:17		21:11			21:55			
11	08:40		15:09 (4)	07:55		16:34 (3)	06:52		17:12 (2)	06:37		05:33			04:56			
	16:28	25	15:34 (4)	17:26	20	16:54 (3)	18:21	34	17:46 (2)	20:19		21:13			21:55			
12	08:39		15:10 (4)	07:53		16:35 (3)	06:50		17:12 (2)	06:35		05:31			04:55			
	16:30	24	15:34 (4)	17:28	18	16:53 (3)	18:23	32	17:44 (2)	20:20		21:15			21:56			
13	08:38		15:11 (4)	07:51		16:36 (3)	06:48		17:13 (2)	06:32		05:29			04:55			
	16:31	22	15:33 (4)	17:30	15	16:51 (3)	18:25	31	17:44 (2)	20:22		21:17			21:57			
14	08:37		15:12 (4)	07:49		16:38 (3)	06:45		17:13 (2)	06:30		05:27			04:55			
	16:33	21	15:33 (4)	17:32	11	16:49 (3)	18:27	29	17:42 (2)	20:24		21:18			21:58			
15	08:36		15:14 (4)	07:47			06:43		17:15 (2)	06:28		05:26			04:54			
	16:34	18	15:32 (4)	17:34			18:28	26	17:41 (2)	20:26		21:20			21:58			
16	08:35		15:15 (4)	07:45			06:40		17:16 (2)	06:25		05:24			04:54			
	16:36	16	15:31 (4)	17:36			18:30	22	17:38 (2)	20:28		21:22			21:59			
17	08:34		15:17 (4)	07:43			06:38		17:18 (2)	06:23		05:22			04:54			
	16:38	13	15:30 (4)	17:38			18:32	18	17:36 (2)	20:30		21:23			21:59			
18	08:33		15:20 (4)	07:41			06:35		17:21 (2)	06:21		05:21			04:54			
	16:40	8	15:28 (4)	17:40			18:34	11	17:32 (2)	20:31		21:25			22:00			
19	08:32			07:39			06:33			06:18		05:19			04:54			
	16:41			17:42			18:36			20:33		21:27			22:00			
20	08:31			07:36			06:31			06:16		05:18			04:54			
	16:43			17:44			18:38			20:35		21:28			22:00			
21	08:30			07:34			06:28			06:14		05:16			04:54			
	16:45			17:46			18:40			20:37		21:30			22:01			
22	08:29			07:32			06:26			06:12		05:15			04:55			
	16:47			17:48			18:42			20:39		21:31			22:01			
23	08:27			07:30			06:23			06:09		05:13			04:55			
	16:49			17:50			18:43			20:41		21:33			22:01			
24	08:26			07:28			06:21			06:07		05:12			04:55			
	16:50			17:52			18:45			20:43		21:34			22:01			
25	08:24			07:25		17:24 (2)	06:18			06:05		05:11			04:55			
	16:52			17:54	2	17:26 (2)	18:47			20:44		21:36			22:01			
26	08:23			07:23		17:22 (2)	06:16			06:03		05:09			04:56			
	16:54			17:56	6	17:28 (2)	18:49			20:46		21:37			22:01			
27	08:22			07:21		17:20 (2)	06:13			06:00		05:08			04:56			
	16:56			17:58	11	17:31 (2)	18:51			20:48		21:39			22:01			
28	08:20			07:18		17:17 (2)	06:11			05:58		05:07			04:57			
	16:58			18:00	15	17:32 (2)	18:53			20:50		21:40			22:01			
29	08:19						07:08			05:56		05:06			04:57			
	17:00						19:54			20:52		21:41			22:01			
30	08:17						07:06			05:54		05:05			04:58			
	17:02						19:56			20:54		21:43			22:00			
31	08:15						07:04					05:04						
	17:04						19:58					21:44						
Potential sun hours	250		273		367		420		494		510							
Total, worst case	431		216		493													
Sun reduction	0.24		0.23		0.27													
Oper. time red.	1.00		1.00		1.00													
Wind dir. red.	0.65		0.66		0.68													
Total reduction	0.16		0.15		0.18													
Total, real	68		33		91													

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DL - H116

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September		October		November		December
1	04:59	05:39	06:33		07:26	17:51 (2)	07:24	16:03 (3)	08:19
	22:00	21:25	20:18		19:05	32 18:23 (2)	16:54	20 16:23 (3)	16:10 25 15:16 (4)
2	04:59	05:40	06:35		07:28	17:50 (2)	07:26	16:02 (3)	08:21
	22:00	21:23	20:16		19:02	33 18:23 (2)	16:52	19 16:21 (3)	16:09 26 15:16 (4)
3	05:00	05:42	06:36		07:30	17:50 (2)	07:28	16:02 (3)	08:22
	21:59	21:21	20:13		19:00	34 18:24 (2)	16:50	17 16:19 (3)	16:08 26 15:17 (4)
4	05:01	05:44	06:38		07:31	17:49 (2)	07:30	16:01 (3)	08:24
	21:59	21:19	20:11		18:57	35 18:24 (2)	16:48	16 16:17 (3)	16:08 27 15:18 (4)
5	05:02	05:45	06:40		07:33	17:49 (2)	07:32	16:01 (3)	08:25
	21:58	21:17	20:09		18:55	35 18:24 (2)	16:46	14 16:15 (3)	16:07 28 15:19 (4)
6	05:03	05:47	06:42		07:35	17:49 (2)	07:34	16:01 (3)	08:26
	21:58	21:15	20:06		18:52	35 18:24 (2)	16:44	11 16:12 (3)	16:07 29 15:20 (4)
7	05:04	05:49	06:43		07:37	17:47 (2)	07:36	16:02 (3)	08:28
	21:57	21:14	20:04		18:50	34 18:21 (2)	16:43	8 16:10 (3)	16:06 29 15:20 (4)
8	05:05	05:50	06:45		07:39	17:47 (2)	07:38	16:02 (3)	08:29
	21:56	21:12	20:01		18:48	31 18:18 (2)	16:41	6 16:08 (3)	16:06 29 15:20 (4)
9	05:06	05:52	06:47		07:41	17:48 (2)	07:40	16:04 (3)	08:30
	21:55	21:10	19:59		18:45	28 18:16 (2)	16:39	3 16:07 (3)	16:05 29 15:21 (4)
10	05:07	05:54	06:49		07:42	17:48 (2)	07:42	16:04 (3)	08:31
	21:55	21:08	19:56		18:43	26 18:14 (2)	16:37	1 16:05 (3)	16:05 30 15:22 (4)
11	05:08	05:56	06:50		07:44	17:48 (2)	07:44		08:33
	21:54	21:05	19:54		18:40	23 18:11 (2)	16:35		16:05 30 15:22 (4)
12	05:09	05:57	06:52		07:46	17:49 (2)	07:45		08:34
	21:53	21:03	19:51		18:38	20 18:09 (2)	16:34		16:05 30 15:22 (4)
13	05:10	05:59	06:54		07:48	17:50 (2)	07:47		08:35
	21:52	21:01	19:49		18:36	17 18:07 (2)	16:32		16:05 31 15:23 (4)
14	05:12	06:01	06:56		07:50	17:51 (2)	07:49		08:36
	21:51	20:59	19:47		18:33	13 18:04 (2)	16:31		16:04 30 15:23 (4)
15	05:13	06:03	06:58		07:52	17:53 (2)	07:51		08:37
	21:50	20:57	19:44		18:31	9 18:02 (2)	16:29		16:04 31 15:24 (4)
16	05:14	06:04	06:59		07:54	17:55 (2)	07:53		08:38
	21:49	20:55	19:42		18:29	4 17:59 (2)	16:27		16:05 31 15:25 (4)
17	05:16	06:06	07:01		07:55		07:55		08:38
	21:47	20:53	19:39		18:26		16:26		16:05 31 15:25 (4)
18	05:17	06:08	07:03		07:57		07:57		08:39
	21:46	20:51	19:37		18:24		16:24		16:05 31 15:26 (4)
19	05:18	06:10	07:05		07:59		07:59		08:40
	21:45	20:48	19:34		18:22		16:23		16:05 31 15:27 (4)
20	05:20	06:12	07:06		08:01		08:00		08:41
	21:44	20:46	19:32		18:20		16:22		16:06 32 15:27 (4)
21	05:21	06:13	07:08		08:03		08:02		08:41
	21:42	20:44	19:29		18:17		16:20		16:06 32 15:28 (4)
22	05:23	06:15	07:10		08:05		08:04		08:42
	21:41	20:42	19:27		18:15		16:19		16:06 32 15:28 (4)
23	05:24	06:17	07:12		08:07		08:06		08:42
	21:39	20:39	19:24		18:13		16:18		16:07 32 15:29 (4)
24	05:26	06:19	07:13		08:09		08:08	14:57 (4)	08:43
	21:38	20:37	19:22		18:11		16:17	8 15:05 (4)	16:08 32 15:29 (4)
25	05:27	06:20	07:15	18:05 (2)	07:11		08:09	14:55 (4)	08:43
	21:36	20:35	19:19	9 18:14 (2)	17:09		16:16	13 15:08 (4)	16:08 31 15:29 (4)
26	05:29	06:22	07:17	18:01 (2)	07:13		08:11	14:54 (4)	08:43
	21:35	20:32	19:17	16 18:17 (2)	17:06		16:14	16 15:10 (4)	16:09 31 15:29 (4)
27	05:30	06:24	07:19	17:58 (2)	07:15	16:11 (3)	08:13	14:53 (4)	08:44
	21:33	20:30	19:14	22 18:20 (2)	17:04	4 16:15 (3)	16:13	18 15:11 (4)	16:10 31 15:30 (4)
28	05:32	06:26	07:21	17:56 (2)	07:16	16:07 (3)	08:14	14:52 (4)	08:44
	21:32	20:28	19:12	25 18:21 (2)	17:02	12 16:19 (3)	16:12	21 15:13 (4)	16:10 31 15:31 (4)
29	05:34	06:27	07:22	17:55 (2)	07:18	16:05 (3)	08:16	14:51 (4)	08:44
	21:30	20:25	19:09	27 18:22 (2)	17:00	16 16:21 (3)	16:12	22 15:13 (4)	16:11 31 15:31 (4)
30	05:35	06:29	07:24	17:52 (2)	07:20	16:04 (3)	08:18	14:51 (4)	08:44
	21:28	20:23	19:07	30 18:22 (2)	16:58	18 16:22 (3)	16:11	24 15:15 (4)	16:12 31 15:31 (4)
31	05:37	06:31			07:22	16:03 (3)			08:44
	21:27	20:21			16:56	19 16:22 (3)			16:13 30 15:31 (4)
Potential sun hours	512	460	382		328		259		233
Total, worst case			129		478		237		930
Sun reduction			0.32		0.29		0.27		0.21
Oper. time red.			1.00		1.00		1.00		1.00
Wind dir. red.			0.68		0.67		0.65		0.65
Total reduction			0.22		0.20		0.17		0.13
Total, real			28		94		41		125

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DM - H117

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		16:23 (2)	07:16	07:01		05:52	05:03	04:59	05:39	06:33	07:26		07:24		15:45 (2)	08:19			15:30 (3)		
	16:15		17:06	11	16:34 (2)	18:02	20:00		20:55	21:45	22:00	21:25	20:18	19:05		16:54	37	16:22 (2)	16:10	4		15:34 (3)		
2	08:44		08:12		16:21 (2)	07:14	06:59		05:50	05:02	04:59	05:40	06:35	07:28		07:26		15:45 (2)	08:21			15:30 (3)		
	16:16		17:08	16	16:37 (2)	18:04	20:02		20:57	21:46	22:00	21:23	20:16	19:02		16:52	36	16:21 (2)	16:09	2		15:32 (3)		
3	08:44		08:10		16:20 (2)	07:12	06:56		05:48	05:01	05:00	05:42	06:36	07:30		07:28		15:46 (2)	08:22			15:31 (3)		
	16:17		17:10	19	16:39 (2)	18:06	20:04		20:59	21:48	21:59	21:21	20:13	19:00		16:50	33	16:19 (2)	16:08	1		15:32 (3)		
4	08:43		08:08		16:19 (2)	07:09	06:54		05:46	05:00	05:01	05:44	06:38	07:31		07:30		15:46 (2)	08:24					
	16:18		17:12	22	16:41 (2)	18:07	20:06		21:01	21:49	21:59	21:19	20:11	18:57		16:48	31	16:17 (2)	16:08					
5	08:43		08:07		16:18 (2)	07:07	06:51		05:44	04:59	05:02	05:45	06:40	07:33		07:32		15:47 (2)	08:25					
	16:19		17:14	25	16:43 (2)	18:09	20:07		21:03	21:50	21:58	21:17	20:09	18:55		16:46	27	16:14 (2)	16:07					
6	08:43		08:05		16:17 (2)	07:04	06:49		05:42	04:58	05:03	05:47	06:42	07:35		07:34		15:48 (2)	08:26					
	16:21		17:16	28	16:45 (2)	18:11	20:09		21:04	21:51	21:58	21:15	20:06	18:52		16:44	24	16:12 (2)	16:07					
7	08:42		08:03		16:17 (2)	07:02	06:47		05:40	04:58	05:04	05:49	06:43	07:37		07:36		15:49 (2)	08:28					
	16:22		17:18	30	16:47 (2)	18:13	20:11		21:06	21:52	21:57	21:14	20:04	18:50		16:43	21	16:10 (2)	16:06					
8	08:42		08:01		16:16 (2)	07:00	06:44		05:38	04:57	05:05	05:50	06:45	07:39		07:38		15:50 (2)	08:29					
	16:24		17:20	34	16:50 (2)	18:15	20:13		21:08	21:53	21:56	21:12	20:01	18:48		16:41	18	16:08 (2)	16:06					
9	08:41	15:48 (3)	07:59		16:16 (2)	06:57	06:42		05:36	04:57	05:06	05:52	06:47	07:41		07:40		15:52 (2)	08:30					
	16:25	1	15:49 (3)	17:22	36	16:52 (2)	18:17		20:15	21:10	21:54	21:55	21:10	19:59		16:39	15	16:07 (2)	16:05					
10	08:40	15:48 (3)	07:57		16:15 (2)	06:55	06:39		05:34	04:56	05:07	05:54	06:49	07:42		07:42		15:54 (2)	08:31					
	16:26	2	15:50 (3)	17:24	37	16:52 (2)	18:19		20:17	21:11	21:55	21:55	21:08	19:56		16:37	11	16:05 (2)	16:05					
11	08:40	15:48 (3)	07:55		16:15 (2)	06:53	06:37		05:33	04:56	05:08	05:56	06:50	07:44		07:44		15:56 (2)	08:33					
	16:28	4	15:52 (3)	17:26	38	16:53 (2)	18:21		20:19	21:13	21:55	21:54	21:05	19:54		16:35	7	16:03 (2)	16:05					
12	08:39	15:48 (3)	07:53		16:15 (2)	06:50	06:35		05:31	04:55	05:09	05:57	06:52	07:46		07:45		15:52 (3)	08:34					
	16:30	6	15:54 (3)	17:28	38	16:53 (2)	18:23		20:20	21:15	21:56	21:53	21:03	19:51		16:34	9	16:01 (2)	16:05					
13	08:38	15:48 (3)	07:51		16:14 (2)	06:48	06:32		05:29	04:55	05:10	05:59	06:54	07:47		07:47		15:29 (3)	08:35					
	16:31	7	15:55 (3)	17:30	38	16:52 (2)	18:30		20:22	21:17	21:57	21:52	21:01	19:49		16:32	12	15:41 (3)	16:05					
14	08:37	15:48 (3)	07:49		16:15 (2)	06:45	06:30		05:27	04:55	05:12	06:01	06:56	07:50		07:49		15:28 (3)	08:36					
	16:33	9	15:57 (3)	17:32	38	16:53 (2)	18:27		20:24	21:18	21:58	21:51	20:59	19:47		16:31	15	15:43 (3)	16:04					
15	08:36	15:48 (3)	07:47		16:15 (2)	06:43	06:28		05:26	04:54	05:13	06:03	06:58	07:52		07:51		15:27 (3)	08:37					
	16:34	11	15:59 (3)	17:34	38	16:53 (2)	18:28		20:26	21:20	21:58	21:50	20:57	19:44		16:29	17	15:44 (3)	16:04					
16	08:35	15:48 (3)	07:45		16:15 (2)	06:40	06:25		05:24	04:54	05:14	06:04	06:59	07:54		07:53		15:26 (3)	08:38					
	16:36	12	16:00 (3)	17:36	38	16:53 (2)	18:30		20:28	21:22	21:59	21:49	20:55	19:42		18:29	11	17:11 (2)	16:27	19		15:45 (3)	16:05	
17	08:34	16:02 (3)	07:43		16:16 (2)	06:38	06:23		05:22	04:54	05:16	06:06	07:01	07:55		16:56 (2)	07:55							
	16:38	14	15:48 (3)	17:38	36	16:52 (2)	18:32		20:30	21:23	21:59	21:47	20:53	19:39		18:26	18	17:14 (2)	16:26	21		15:46 (3)	16:05	
18	08:33	15:49 (3)	07:41		16:16 (2)	06:35	06:21		05:21	04:54	05:17	06:08	07:03	07:57		16:54 (2)	07:57							
	16:40	16	16:05 (3)	17:40	35	16:51 (2)	18:34		20:31	21:25	22:00	21:46	20:51	19:37		18:24	22	17:16 (2)	16:24	22		15:47 (3)	16:05	
19	08:32	15:49 (3)	07:39		16:17 (2)	06:33	06:18		05:19	04:54	05:18	06:10	07:05	07:59		16:52 (2)	07:59							
	16:41	18	16:07 (3)	17:42	34	16:51 (2)	18:36		20:33	21:27	22:00	21:45	20:48	19:34		18:22	26	17:18 (2)	16:23	22		15:47 (3)	16:05	
20	08:31	15:49 (3)	07:36		16:18 (2)	06:31	06:16		05:18	04:54	05:20	06:12	07:06	08:01		16:50 (2)	07:00							
	16:43	19	16:08 (3)	17:44	32	16:50 (2)	18:38		20:35	21:28	22:00	21:44	20:46	19:32		18:20	29	17:19 (2)	16:22	22		15:47 (3)	16:06	
21	08:30	15:50 (3)	07:34		16:19 (2)	06:28	06:14		05:16	04:54	05:21	06:13	07:08	08:03		16:49 (2)	08:02							
	16:45	21	16:11 (3)	17:46	30	16:49 (2)	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:17	31	17:20 (2)	16:20	21		15:46 (3)	16:06	
22	08:29	15:50 (3)	07:32		16:19 (2)	06:26	06:12		05:15	04:55	05:23	06:15	07:10	08:05		16:48 (2)	08:04							
	16:47	22	16:12 (3)	17:48	28	16:47 (2)	18:42		20:39	21:31	22:01	21:41	20:42	19:27		18:15	33	17:21 (2)	16:19	19		15:44 (3)	16:06	
23	08:27	15:51 (3)	07:30		16:21 (2)	06:23	06:09		05:13	04:55	05:24	06:17	07:12	08:07		16:47 (2)	08:06							
	16:49	22	16:13 (3)	17:50	25	16:46 (2)	18:43		20:41	21:33	22:01	21:39	20:39	19:24		18:13	34	17:21 (2)	16:18	18		15:43 (3)	16:07	
24	08:26	15:51 (3)	07:28		16:23 (2)	06:21	06:07		05:12	04:55	05:26	06:19	07:13	08:09		16:46 (2)	08:08							
	16:50	22	16:13 (3)	17:52	21	16:44 (2)	18:45		20:43	21:34	22:01	21:38	20:37	19:22		18:11	36	17:22 (2)	16:17	16		15:42 (3)	16:08	
25	08:25	15:52 (3)	07:25		16:25 (2)	06:18	06:05		05:11	04:55	05:27	06:20	07:15	07:11		15:45 (2)	08:09							
	16:52	21	16:13 (3)	17:54	16	16:41 (2)	18:47		20:44	21:36	22:01	21:36	20:35	19:19		17:09	37	16:22 (2)	16:16	15		15:41 (3)	16:08	
26	08:23	15:53 (3)	07:23		16:30 (2)	06:16	06:03		05:09	04:56	05:29	06:22	07:17	07:13		15:45 (2)	08:11							
	16:54	19	16:12 (3)	17:56	6	16:36 (2)	18:49		20:46	21:37	22:01	21:35	20:32	19:17		17:06	37	16:22 (2)	16:14	12		15:39 (3)	16:09	
27	08:22	15:54 (3)	07:21		16:13 (2)	06:09	06:04		05:06	04:56	05:30	06:24	07:19	07:14		15:44 (2)	08:13							
	16:56	17	16:11 (3)	17:58		18:51	20:48		21:39	22:01	21:33	20:30	19:14	17:04		16:22 (2)	16:13	11		15:38 (3)	16:10			
28	08:20	15:56 (3)	07:18		16:11 (2)	05:58	05:07		04:57	05:32	06:26	07:21	07:16			15:44 (2)	08:14							
	16:58	15	16:11 (3)	18:00		18:53	20:50		21:40	22:01	21:32	20:28	19:12	17:02		16:22 (2)	16:12	9		15:37 (3)	16:10			
29	08:19	15:58 (3)	07:10		16:12 (2)	05:56	05:06		04:57	05:34	06:27	07:22	07:18			15:44 (2)	08:16							
	17:00	11	16:09 (3)		19:55	20:52	21:41		22:01	21:30	20:25	19:09	17:00			16:22 (2)	16:12	8		15:36 (3)	16:11			
30	08:17	16:00 (3)			17:06	05:54	05:05		04:58	05:35	06:29	07:24	07:20			15:44 (2)	08:18							
	17:02	10	16:29 (2)		19:56	20:54	21:43		22:00	21:28	20:23	19:07				16:22 (2)	16:11	6		15:35 (3)	16:12			
31	08:15	16:24 (2)			17:04		05:04			05:37	06:31					16:22 (2)	16:11	6		15:35 (3)	16:12			
	17:04	7	16:31 (2)		19:58																			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DN - H118

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	17:06	08:50 (2)	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54
3	08:44	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26
4	16:16	17:08	08:50 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
5	08:44	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
6	16:17	17:10	08:51 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50
7	08:43	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30
8	16:18	17:12	08:51 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48
9	08:43	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32
10	16:20	17:14	08:51 (2)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46
11	08:43	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34
12	16:21	17:16	08:51 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44
13	08:42	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36
14	16:22	17:18	08:51 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43
15	08:42	08:01	08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38
16	16:24	17:20	08:51 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41
17	08:41	07:59	08:27 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40
18	16:25	17:22	08:50 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39
19	08:41	07:57	08:28 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42
20	16:27	17:24	08:50 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37
21	08:40	07:55	08:29 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44
22	16:28	17:26	08:49 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36
23	08:39	07:53	08:30 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46
24	16:30	17:28	08:48 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34
25	08:38	07:51	08:32 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48
26	16:31	17:30	08:46 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32
27	08:37	07:49	08:35 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49
28	16:33	17:32	08:42 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31
29	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	16:05
30	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05
31	08:36	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	16:05
32	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16:05
33	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	16:05
34	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	16:05
35	08:33	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	16:05
36	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:05
37	08:32	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	16:05
38	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05
39	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	16:05
40	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:06
41	08:30	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	16:06
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:20	16:06
43	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	16:06
44	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:07
45	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	16:07
46	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	16:07
47	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	16:07
48	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	16:08
49	08:25	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:09	16:08
50	16:52	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	16:08
51	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	16:08
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	16:09
53	08:22	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13	16:09
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	16:14	16:10
55	08:20	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:03 (2)	16:10
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	10 08:13 (2)	16:11
57	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:00 (2)	16:11
58	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	15 08:15 (2)	16:12
59	08:17	08:45 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:00 (2)	16:12
60	17:02	3 08:48 (2)	19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	18 08:18 (2)	16:12
61	08:15	08:44 (2)	07:04		05:04		05:37	06:31		07:22	07:58 (2)	16:12
62	17:04	5 08:49 (2)	19:58		21:44		21:27	20:21		16:56	21 08:19 (2)	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	8	230								64	178	
Sun reduction	0.24	0.23								0.29	0.27	
Oper. time red.	1.00	1.00								1.00	1.00	
Wind dir. red.	0.62	0.62								0.62	0.62	
Total reduction	0.15	0.14								0.18	0.16	
Total, real	1	33								12	29	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DO - H119

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:09 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:36 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:37	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:44 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DP - H120

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	06:18 (1) 06:23 (1)	05:03 21:45	04:59 22:00	05:39 21:25	24 06:34 (1)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	06:16 (1) 06:24 (1)	05:02 21:47	05:00 22:00	05:40 21:23	24 06:35 (1)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	06:14 (1) 06:24 (1)	05:01 21:48	05:01 21:59	05:42 21:21	22 06:34 (1)	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	06:12 (1) 06:24 (1)	05:00 21:49	05:01 21:59	05:44 21:19	21 06:35 (1)	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	06:10 (1) 06:24 (1)	04:59 21:50	05:02 21:58	05:46 21:18	19 06:35 (1)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	06:09 (1) 06:25 (1)	04:59 21:51	05:03 21:58	05:47 21:16	18 06:35 (1)	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	06:07 (1) 06:25 (1)	04:58 21:52	05:04 21:57	05:49 21:14	16 06:35 (1)	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	06:05 (1) 06:25 (1)	04:57 21:53	05:05 21:56	05:51 21:12	14 06:34 (1)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	06:03 (1) 06:24 (1)	04:57 21:54	05:06 21:56	05:52 21:10	12 06:34 (1)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	06:02 (1) 06:25 (1)	04:56 21:55	05:07 21:55	05:54 21:08	9 06:33 (1)	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	06:00 (1) 06:24 (1)	04:56 21:56	05:08 21:54	05:56 21:06	7 06:32 (1)	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	06:00 (1) 06:23 (1)	04:56 21:56	05:10 21:53	05:58 21:04	4 06:31 (1)	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	06:01 (1) 06:23 (1)	04:55 21:57	05:11 21:52	05:59 21:01	1 06:30 (1)	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	06:02 (1) 06:22 (1)	04:55 21:58	05:12 21:51	06:01 19:47		06:56 18:34	07:50 17:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	06:03 (1) 06:22 (1)	04:55 21:58	05:13 21:50	06:03 20:57		06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	06:03 (1) 06:21 (1)	04:55 21:59	05:15 21:49	06:05 20:55		07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	06:05 (1) 06:20 (1)	04:54 21:59	05:16 21:48	06:06 20:53		07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	06:06 (1) 06:18 (1)	04:54 22:00	05:17 21:46	06:08 20:51		07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	06:08 (1) 06:16 (1)	04:54 22:00	05:19 21:45	06:10 20:48		07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28		04:55 22:00	05:20 21:44	06:12 20:46		07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30		04:55 22:01	05:22 21:42	06:14 20:44		07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31		04:55 22:01	05:23 21:41	06:15 20:42		07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33		04:55 22:01	05:24 21:40	06:17 20:39		07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35		04:55 22:01	05:26 21:38	24 06:20 (1) 06:18 (1)	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36		04:56 22:01	05:28 21:37	10 06:28 (1) 06:28 (1)	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37		04:56 22:01	05:29 21:35	13 06:29 (1) 06:29 (1)	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39		04:57 22:01	05:31 21:33	16 06:31 (1) 06:31 (1)	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40		04:57 22:01	05:32 21:32	18 06:13 (1) 06:31 (1)	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42		04:58 22:01	05:34 21:30	20 06:33 (1) 06:33 (1)	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	06:20 (1) 06:22 (1)	04:58 22:00	05:36 21:28	21 06:33 (1) 06:33 (1)	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44			05:37 21:27	22 06:34 (1) 06:34 (1)			07:22 20:21		08:44 16:14
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case				2	308			124	191					
Sun reduction				0.35	0.38			0.32	0.34					
Oper. time red.				1.00	1.00			1.00	1.00					
Wind dir. red.				0.67	0.67			0.67	0.67					
Total reduction				0.24	0.26			0.22	0.23					
Total, real				0	79			27	44					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DQ - H121

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	05:03	05:34 (1)	04:59	05:32 (1)	05:39	06:33	07:26	07:24	08:19		
2	16:15	17:06	18:02	20:00	20:56	21:45	05:45 (1)	22:00	18	05:50 (1)	21:25	20:18	19:05	16:54	16:10	
	08:44	08:12	07:14	06:59	05:50	05:02	05:33 (1)	05:00		05:33 (1)	05:41	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	21:47	05:45 (1)	22:00	17	05:50 (1)	21:23	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48	05:01	05:32 (1)	05:01		05:34 (1)	05:42	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	21:48	05:45 (1)	21:59	17	05:51 (1)	21:21	20:14	19:00	16:50	16:09	
	08:43	08:09	07:09	06:54	05:46	05:00	05:31 (1)	05:01		05:34 (1)	05:44	06:38	07:32	07:30	08:24	
4	16:18	17:12	18:08	20:06	21:01	21:49	05:44 (1)	21:59	16	05:50 (1)	21:19	20:11	18:57	16:48	16:08	
	08:43	08:07	07:07	06:52	05:44	04:59	05:31 (1)	05:02		05:35 (1)	05:46	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03	21:50	05:45 (1)	21:58	16	05:51 (1)	21:18	20:09	18:55	16:47	16:07	
6	08:43	08:05	07:05	06:49	05:42	04:59	05:30 (1)	05:03		05:36 (1)	05:47	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:09	21:05	21:51	05:45 (1)	21:58	15	05:51 (1)	21:16	20:06	18:53	16:45	16:07	
	08:42	08:03	07:02	06:47	05:40	04:58	05:30 (1)	05:04		05:37 (1)	05:49	06:44	07:37	07:36	08:28	
8	16:22	17:18	18:13	20:11	21:06	21:52	05:46 (1)	21:57	15	05:52 (1)	21:14	20:04	18:50	16:43	16:06	
	08:42	08:01	07:00	06:44	05:38	04:57	05:29 (1)	05:05		05:38 (1)	05:51	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	21:53	05:45 (1)	21:56	14	05:52 (1)	21:12	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	05:36	04:57	05:29 (1)	05:06		05:39 (1)	05:52	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	21:54	05:46 (1)	21:56	13	05:52 (1)	21:10	19:59	18:45	16:39	16:06	
	08:41	07:57	06:55	06:40	05:35	04:56	05:28 (1)	05:07		05:40 (1)	05:54	06:49	07:43	07:42	08:32	
10	16:27	17:24	18:19	20:17	21:12	21:55	05:45 (1)	21:55	12	05:52 (1)	21:08	19:57	18:43	16:37	16:05	
	08:40	07:55	06:53	06:37	05:33	04:56	05:28 (1)	05:08		05:41 (1)	05:56	06:51	07:44	07:44	08:33	
	16:28	17:26	18:21	20:19	21:13	21:56	05:46 (1)	21:54	11	05:52 (1)	21:06	19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31	04:56	05:28 (1)	05:10		05:42 (1)	05:58	06:52	07:46	07:46	08:34	
	16:30	17:28	18:23	20:21	21:15	21:56	05:46 (1)	21:53	10	05:52 (1)	21:04	19:52	18:38	16:34	16:05	
	08:38	07:51	06:48	06:33	05:29	04:55	05:27 (1)	05:11		05:43 (1)	05:59	06:54	07:48	07:48	08:35	
13	16:31	17:30	18:25	20:22	21:17	21:57	05:45 (1)	21:52	9	05:52 (1)	21:01	19:49	18:36	16:32	16:05	
	08:37	07:49	06:45	06:30	05:27	04:55	05:27 (1)	05:12		05:44 (1)	06:01	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:19	21:58	05:46 (1)	21:51	8	05:52 (1)	20:59	19:47	18:34	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26	04:55	05:27 (1)	05:13		05:45 (1)	06:03	06:58	07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	21:20	21:58	05:46 (1)	21:50	7	05:52 (1)	20:57	19:44	18:31	16:29	16:05	
	08:36	07:45	06:41	06:25	05:24	04:55	05:27 (1)	05:15		05:47 (1)	06:05	07:00	07:54	07:53	08:38	
17	16:36	17:36	18:31	20:28	21:22	21:59	05:46 (1)	21:49	6	05:53 (1)	20:55	19:42	18:29	16:28	16:05	
	08:35	07:43	06:38	06:23	05:22	04:54	05:27 (1)	05:16		05:48 (1)	06:06	07:01	07:56	07:55	08:39	
	16:38	17:38	18:32	20:30	21:24	21:59	05:46 (1)	21:48	4	05:52 (1)	20:53	19:39	18:27	16:26	16:05	
18	08:33	07:41	06:36	06:21	05:21	04:54	05:27 (1)	05:17		05:49 (1)	06:08	07:03	07:58	07:57	08:39	
	16:40	17:40	18:34	20:32	21:25	22:00	05:46 (1)	21:46	3	05:52 (1)	20:51	19:37	18:24	16:25	16:05	
	08:32	07:39	06:33	06:19	05:19	04:54	05:27 (1)	05:19		05:51 (1)	06:10	07:05	07:59	07:59	08:40	
19	16:42	17:42	18:36	20:33	21:27	22:00	05:46 (1)	21:45	1	05:52 (1)	20:48	19:34	18:22	16:23	16:05	
	08:31	07:37	06:31	06:16	05:18	04:55	05:27 (1)	05:20		06:12	07:07	08:01	08:01	08:41		
	16:43	17:44	18:38	20:35	21:28	22:00	05:46 (1)	21:44		20:46	19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16	04:55	05:28 (1)	05:22		06:14	07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	21:30	22:01	05:47 (1)	21:42		20:44	19:29	18:18	16:21	16:06		
	08:29	07:32	06:26	06:12	05:15	04:55	05:28 (1)	05:23		06:15	07:10	08:05	08:04	08:42		
22	16:47	17:48	18:42	20:39	21:31	22:01	05:47 (1)	21:41	19	05:47 (1)	20:42	19:27	18:15	16:19	16:07	
	08:27	07:30	06:23	06:10	05:13	04:55	05:28 (1)	05:24		06:17	07:12	08:07	08:06	08:42		
	16:49	17:50	18:44	20:41	21:33	22:01	05:47 (1)	21:40	19	05:47 (1)	20:39	19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12	04:55	05:28 (1)	05:26		06:19	07:14	08:09	08:08	08:43		
	16:51	17:52	18:45	20:43	21:34	22:01	05:47 (1)	21:38	19	05:47 (1)	20:37	19:22	18:11	16:17	16:08	
	08:25	07:26	06:19	06:05	05:11	04:56	05:29 (1)	05:28		06:21	07:15	08:11	08:09	08:43		
25	16:53	17:54	18:47	20:45	21:36	2	05:42 (1)	22:01	19	05:48 (1)	21:37	20:35	19:20	17:09	16:16	16:08
	08:23	07:23	06:16	06:03	05:10	05:39 (1)	05:29 (1)	05:29		06:22	07:17	08:13	08:11	08:44		
	16:55	17:56	18:49	20:46	21:37	4	05:43 (1)	22:01	19	05:48 (1)	21:35	20:33	19:17	17:07	16:15	16:09
27	08:22	07:21	06:14	06:01	05:08	05:38 (1)	05:30 (1)	05:31		06:24	07:19	08:15	08:13	08:44		
	16:56	17:58	18:51	20:48	21:39	5	05:43 (1)	22:01	19	05:49 (1)	21:33	20:30	19:15	17:05	16:14	16:10
	08:20	07:19	06:11	05:59	05:07	05:37 (1)	05:30 (1)	05:32		06:26	07:21	08:17	08:14	08:44		
28	16:58	18:00	18:53	20:50	21:40	6	05:43 (1)	22:01	19	05:49 (1)	21:32	20:28	19:12	17:02	16:13	16:11
	08:19		07:09	05:56	05:06	05:36 (1)	05:31 (1)	05:34		06:28	07:23	08:19	08:16	08:44		
	17:00		19:55	20:52	21:42	8	05:44 (1)	22:01	18	05:49 (1)	21:30	20:26	19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05	05:35 (1)	05:31 (1)	05:36		06:29	07:24	08:21	08:18	08:44		
	17:02		19:57	20:54	21:43	9	05:44 (1)	22:00	18	05:49 (1)	21:28	20:23	19:07	16:58	16:11	16:13
	08:15		07:04	05:04	05:04	05:34 (1)		05:37		06:31		07:22	07:22	08:44		
31	17:04		19:58	21:44	10	05:44 (1)		21:27		20:21	16:56	16:16	16:14			
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233				
Total, worst case					44	519	212									
Sun reduction					0.38	0.32	0.32									
Oper. time red.					1.00	1.00	1.00									
Wind dir. red.					0.66	0.66	0.66									
Total reduction					0.25	0.21	0.21									
Total, real					11	109	45									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DR - H122

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DS - H123

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16	07:01	07:25 (5)	05:52	05:03	05:34 (3)	07:01	07:25 (5)	05:52	05:03	05:34 (3)		05:03	05:34 (3)	
	16:15	17:06	18:02	20:00	8	07:33 (5)	20:55	21:45	20:00	8	07:33 (5)	20:55	21:45	9	05:43 (3)	05:43 (3)	
2	08:44	08:12	07:14	06:59	07:23 (5)	05:50	05:02	05:33 (3)	06:59	07:23 (5)	05:50	05:02	05:33 (3)		05:02	05:33 (3)	
	16:16	17:08	18:04	20:02	11	07:34 (5)	20:57	21:47	20:02	11	07:34 (5)	20:57	21:47	10	05:43 (3)	05:43 (3)	
3	08:44	08:10	07:12	06:56	07:20 (5)	05:48	05:01	05:32 (3)	06:56	07:20 (5)	05:48	05:01	05:32 (3)		05:01	05:32 (3)	
	16:17	17:10	18:06	20:04	13	07:33 (5)	20:59	21:48	20:04	13	07:33 (5)	20:59	21:48	11	05:43 (3)	05:43 (3)	
4	08:43	08:09	07:09	06:54	07:18 (5)	05:46	05:00	05:31 (3)	06:54	07:18 (5)	05:46	05:00	05:31 (3)		05:00	05:31 (3)	
	16:18	17:12	18:08	20:06	15	07:33 (5)	21:01	21:49	20:06	15	07:33 (5)	21:01	21:49	12	05:43 (3)	05:43 (3)	
5	08:43	08:07	07:07	06:52	07:15 (5)	05:44	04:59	05:31 (3)	06:52	07:15 (5)	05:44	04:59	05:31 (3)		04:59	05:31 (3)	
	16:20	17:14	18:10	20:08	17	07:32 (5)	21:03	21:50	20:08	17	07:32 (5)	21:03	21:50	12	05:43 (3)	05:43 (3)	
6	08:43	08:05	07:05	06:49	07:13 (5)	05:42	04:59	05:30 (3)	06:49	07:13 (5)	05:42	04:59	05:30 (3)		04:59	05:30 (3)	
	16:21	17:16	18:11	20:09	18	07:31 (5)	21:04	21:51	20:09	18	07:31 (5)	21:04	21:51	13	05:43 (3)	05:43 (3)	
7	08:42	08:03	07:02	06:47	07:11 (5)	05:40	04:58	05:30 (3)	06:47	07:11 (5)	05:40	04:58	05:30 (3)		04:58	05:30 (3)	
	16:22	17:18	18:13	20:11	20	07:31 (5)	21:06	21:52	20:11	20	07:31 (5)	21:06	21:52	14	05:44 (3)	05:44 (3)	
8	08:42	08:01	07:00	06:44	07:08 (5)	05:38	04:57	05:29 (3)	06:44	07:08 (5)	05:38	04:57	05:29 (3)		04:57	05:29 (3)	
	16:24	17:20	18:15	20:13	21	07:29 (5)	21:08	21:53	20:13	21	07:29 (5)	21:08	21:53	14	05:43 (3)	05:43 (3)	
9	08:41	07:59	06:57	06:42	07:09 (5)	05:36	04:57	05:29 (3)	06:42	07:09 (5)	05:36	04:57	05:29 (3)		04:57	05:29 (3)	
	16:25	17:22	18:17	20:15	19	07:28 (5)	21:10	21:54	20:15	19	07:28 (5)	21:10	21:54	15	05:44 (3)	05:44 (3)	
10	08:40	07:57	06:55	06:40	07:10 (5)	05:35	04:56	05:28 (3)	06:40	07:10 (5)	05:35	04:56	05:28 (3)		04:56	05:28 (3)	
	16:27	17:24	18:19	20:17	15	07:25 (5)	21:12	21:55	20:17	15	07:25 (5)	21:12	21:55	15	05:43 (3)	05:43 (3)	
11	08:40	07:55	06:53	06:37	07:13 (5)	05:33	04:56	05:28 (3)	06:37	07:13 (5)	05:33	04:56	05:28 (3)		04:56	05:28 (3)	
	16:28	17:26	18:21	20:19	9	07:22 (5)	21:13	21:55	20:19	9	07:22 (5)	21:13	21:55	16	05:44 (3)	05:44 (3)	
12	08:39	07:53	06:50	06:35		05:31	04:56	05:28 (3)	06:35		05:31	04:56	05:28 (3)		04:56	05:28 (3)	
	16:30	17:28	18:23	20:21		21:15	21:56	05:44 (3)	20:21		21:15	21:56	05:44 (3)		21:56	05:44 (3)	
13	08:38	07:51	06:48	06:32		05:29	04:55	05:27 (3)	06:32		05:29	04:55	05:27 (3)		04:55	05:27 (3)	
	16:31	17:30	18:25	20:22		21:17	21:57	05:43 (3)	20:22		21:17	21:57	05:43 (3)		21:57	05:43 (3)	
14	08:37	07:49	06:45	06:30		05:27	04:55	05:27 (3)	06:30		05:27	04:55	05:27 (3)		04:55	05:27 (3)	
	16:33	17:32	18:27	20:24		21:18	21:58	05:44 (3)	20:24		21:18	21:58	05:44 (3)		21:58	05:44 (3)	
15	08:36	07:47	06:43	06:28		05:26	04:55	05:27 (3)	06:28		05:26	04:55	05:27 (3)		04:55	05:27 (3)	
	16:35	17:34	18:29	20:26		21:20	21:58	05:44 (3)	20:26		21:20	21:58	05:44 (3)		21:58	05:44 (3)	
16	08:35	07:45	06:41	06:25		05:24	04:55	05:27 (3)	06:25		05:24	04:55	05:27 (3)		04:55	05:27 (3)	
	16:36	17:36	18:30	20:28		21:22	21:59	05:44 (3)	20:28		21:22	21:59	05:44 (3)		21:59	05:44 (3)	
17	08:34	07:43	06:38	06:23		05:22	04:54	05:27 (3)	06:23		05:22	04:54	05:27 (3)		04:54	05:27 (3)	
	16:38	17:38	18:32	20:30		21:23	21:59	05:44 (3)	20:30		21:23	21:59	05:44 (3)		21:59	05:44 (3)	
18	08:33	07:41	06:36	06:21		05:21	04:54	05:27 (3)	06:21		05:21	04:54	05:27 (3)		04:54	05:27 (3)	
	16:40	17:40	18:34	20:32		21:25	22:00	05:44 (3)	20:32		21:25	22:00	05:44 (3)		22:00	05:44 (3)	
19	08:32	07:39	06:33	06:19		05:19	04:54	05:27 (3)	06:19		05:19	04:54	05:27 (3)		04:54	05:27 (3)	
	16:42	17:42	18:36	20:33		21:27	22:00	05:44 (3)	20:33		21:27	22:00	05:44 (3)		22:00	05:44 (3)	
20	08:31	07:37	06:31	06:16		05:18	04:55	05:27 (3)	06:16		05:18	04:55	05:27 (3)		04:55	05:27 (3)	
	16:43	17:44	18:38	20:35		21:28	22:00	05:44 (3)	20:35		21:28	22:00	05:44 (3)		22:00	05:44 (3)	
21	08:30	07:34	06:28	06:14		05:16	04:55	05:28 (3)	06:14		05:16	04:55	05:28 (3)		04:55	05:28 (3)	
	16:45	17:46	18:40	20:37		21:30	22:01	05:45 (3)	20:37		21:30	22:01	05:45 (3)		22:01	05:45 (3)	
22	08:29	07:32	06:26	06:12		05:15	04:55	05:28 (3)	06:12		05:15	04:55	05:28 (3)		04:55	05:28 (3)	
	16:47	17:48	18:42	20:39		21:31	22:01	05:45 (3)	20:39		21:31	22:01	05:45 (3)		22:01	05:45 (3)	
23	08:27	07:30	06:23	06:09		05:13	04:55	05:28 (3)	06:09		05:13	04:55	05:28 (3)		04:55	05:28 (3)	
	16:49	17:50	18:44	20:41		21:33	22:01	05:45 (3)	20:41		21:33	22:01	05:45 (3)		22:01	05:45 (3)	
24	08:26	07:28	06:21	06:07		05:12	04:55	05:28 (3)	06:07		05:12	04:55	05:28 (3)		04:55	05:28 (3)	
	16:51	17:52	18:45	20:43		21:34	22:01	05:45 (3)	20:43		21:34	22:01	05:45 (3)		22:01	05:45 (3)	
25	08:25	07:25	06:18	06:05		05:11	04:56	05:29 (3)	06:05		05:11	04:56	05:29 (3)		04:56	05:29 (3)	
	16:53	17:54	18:47	20:44		21:36	22:01	05:46 (3)	20:44		21:36	22:01	05:46 (3)		22:01	05:46 (3)	
26	08:23	07:23	06:16	06:03		05:10	04:56	05:29 (3)	06:03		05:10	04:56	05:29 (3)		04:56	05:29 (3)	
	16:54	17:56	18:49	20:46		21:37	22:01	05:46 (3)	20:46		21:37	22:01	05:46 (3)		22:01	05:46 (3)	
27	08:22	07:21	06:14	06:01		05:08	04:57	05:30 (3)	06:01		05:08	04:57	05:30 (3)		04:57	05:30 (3)	
	16:56	17:58	18:51	20:48		21:39	22:01	05:47 (3)	20:48		21:39	22:01	05:47 (3)		22:01	05:47 (3)	
28	08:20	07:19	06:11	05:59		05:07	04:57	05:30 (3)	06:11		05:07	04:57	05:30 (3)		04:57	05:30 (3)	
	16:58	18:00	18:53	20:50		21:40	22:01	05:47 (3)	20:50		21:40	22:01	05:47 (3)		22:01	05:47 (3)	
29	08:19		07:09	05:56		05:06	04:58	05:31 (3)	07:09		05:06	04:58	05:31 (3)		04:58	05:31 (3)	
	17:00		19:55	20:52		21:41	22:01	05:47 (3)	19:55		21:41	22:01	05:47 (3)		22:01	05:47 (3)	
30	08:17		07:06	05:54		05:05	04:58	05:31 (3)	07:06		05:05	04:58	05:31 (3)		04:58	05:31 (3)	
	17:02		19:56	20:54		21:43	22:00	05:47 (3)	19:56	2	07:32 (5)	22:00	05:47 (3)		22:00	05:47 (3)	
31	08:15		07:04	05:54		05:04	05:34 (3)		07:04		05:04	05:34 (3)					
	17:04		19:58	20:54		21:44	22:00	05:47 (3)	19:58	5	07:32 (5)	22:00	05:47 (3)		22:00	05:47 (3)	
Potential sun hours	250	273	367	420		494	510										
Total, worst case				7		166		460									
Sun reduction				0.27		0.35		0.32									
Oper. time red.				1.00		1.00		1.00									
Wind dir. red.				0.68		0.68		0.66									
Total reduction				0.18		0.24		0.21									
Total, real				1		40		97									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DS - H123

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33	07:11 (5)	07:26	07:24	08:19			
	22:00	16 05:48 (3)	21:25	20:18	11 07:22 (5)	19:05	16:54	16:10			
2	05:00	05:33 (3)	05:40	06:35	07:09 (5)	07:28	07:26	08:21			
	22:00	15 05:48 (3)	21:23	20:16	15 07:24 (5)	19:02	16:52	16:09			
3	05:00	05:33 (3)	05:42	06:37	07:07 (5)	07:30	07:28	08:22			
	21:59	15 05:48 (3)	21:21	20:14	19 07:26 (5)	19:00	16:50	16:09			
4	05:01	05:34 (3)	05:44	06:38	07:05 (5)	07:32	07:30	08:24			
	21:59	14 05:48 (3)	21:19	20:11	21 07:26 (5)	18:57	16:48	16:08			
5	05:02	05:35 (3)	05:46	06:40	07:07 (5)	07:33	07:32	08:25			
	21:58	14 05:49 (3)	21:17	20:09	20 07:27 (5)	18:55	16:46	16:07			
6	05:03	05:36 (3)	05:47	06:42	07:09 (5)	07:35	07:34	08:26			
	21:58	13 05:49 (3)	21:16	20:06	18 07:27 (5)	18:53	16:45	16:07			
7	05:04	05:37 (3)	05:49	06:44	07:10 (5)	07:37	07:36	08:28			
	21:57	13 05:50 (3)	21:14	20:04	17 07:27 (5)	18:50	16:43	16:06			
8	05:05	05:38 (3)	05:51	06:45	07:12 (5)	07:39	07:38	08:29			
	21:56	12 05:50 (3)	21:12	20:01	15 07:27 (5)	18:48	16:41	16:06			
9	05:06	05:39 (3)	05:52	06:47	07:14 (5)	07:41	07:40	08:30			
	21:55	11 05:50 (3)	21:10	19:59	13 07:27 (5)	18:45	16:39	16:06			
10	05:07	05:40 (3)	05:54	06:49	07:16 (5)	07:43	07:42	08:32			
	21:55	10 05:50 (3)	21:08	19:57	11 07:27 (5)	18:43	16:37	16:05			
11	05:08	05:41 (3)	05:56	06:51	07:17 (5)	07:44	07:44	08:33			
	21:54	10 05:51 (3)	21:06	19:54	8 07:25 (5)	18:41	16:36	16:05			
12	05:10	05:42 (3)	05:58	06:52	07:19 (5)	07:46	07:46	08:34			
	21:53	9 05:51 (3)	21:04	19:52	6 07:25 (5)	18:38	16:34	16:05			
13	05:11	05:43 (3)	05:59	06:54	07:21 (5)	07:48	07:47	08:35			
	21:52	8 05:51 (3)	21:01	19:49	3 07:24 (5)	18:36	16:32	16:05			
14	05:12	05:44 (3)	06:01	06:56		07:50	07:49	08:36			
	21:51	7 05:51 (3)	20:59	19:47		18:34	16:31	16:05			
15	05:13	05:45 (3)	06:03	06:58		07:52	07:51	08:37			
	21:50	5 05:50 (3)	20:57	19:44		18:31	16:29	16:05			
16	05:15	05:47 (3)	06:05	06:59		07:54	07:53	08:38			
	21:49	4 05:51 (3)	20:55	19:42		18:29	16:28	16:05			
17	05:16	05:48 (3)	06:06	07:01		07:56	07:55	08:39			
	21:47	3 05:51 (3)	20:53	19:39		18:27	16:26	16:05			
18	05:17	05:49 (3)	06:08	07:03		07:57	07:57	08:39			
	21:46	1 05:50 (3)	20:51	19:37		18:24	16:25	16:05			
19	05:19		06:10	07:05		07:59	07:59	08:40			
	21:45		20:48	19:34		18:22	16:23	16:05			
20	05:20		06:12	07:07		08:01	08:01	08:41			
	21:44		20:46	19:32		18:20	16:22	16:06			
21	05:21		06:14	07:08		08:03	08:02	08:41			
	21:42		20:44	19:29		18:18	16:21	16:06			
22	05:23		06:15	07:10		08:05	08:04	08:42			
	21:41		20:42	19:27		18:15	16:19	16:07			
23	05:24		06:17	07:12		08:07	08:06	08:42			
	21:39		20:39	19:24		18:13	16:18	16:07			
24	05:26		06:19	07:14		08:09	08:08	08:43			
	21:38		20:37	19:22		18:11	16:17	16:08			
25	05:28		06:21	07:15		07:11	08:09	08:43			
	21:36		20:35	19:19		17:09	16:16	16:08			
26	05:29		06:22	07:17		07:13	08:11	08:43			
	21:35		20:33	19:17		17:07	16:15	16:09			
27	05:31		06:24	07:19		07:15	08:13	08:44			
	21:33		20:30	19:15		17:05	16:14	16:10			
28	05:32		06:26	07:21		07:17	08:14	08:44			
	21:32		20:28	19:12		17:02	16:13	16:11			
29	05:34		06:28	07:23		07:19	08:16	08:44			
	21:30		20:25	19:10		17:00	16:12	16:12			
30	05:35		06:29	07:24		07:20	08:18	08:44			
	21:28		20:23	19:07		16:58	16:11	16:13			
31	05:37		06:31			07:22		08:44			
	21:27		20:21			16:56		16:14			
Potential sun hours	512		460	382		328	259	233			
Total, worst case	180			177							
Sun reduction	0.32			0.32							
Oper. time red.	1.00			1.00							
Wind dir. red.	0.66			0.68							
Total reduction	0.21			0.22							
Total, real	38			38							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DT - H124

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DU - H125

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:40 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:23		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DV - H126

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	09:05 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
2	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	16:10
3	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21
4	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
5	08:44	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
6	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08
7	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24
8	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
9	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25
10	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07
11	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27
12	16:21	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	16:07
13	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28
14	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06
15	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29
16	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06
17	08:41	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
18	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05
19	08:41	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32
20	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05
21	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33
22	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05
23	08:39	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34
24	16:30	17:28	18:23	20:21	21:15	21:58	21:53	21:04	19:52	18:38	16:34	16:05
25	08:38	09:10 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:35
26	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05
27	08:37	09:09 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36
28	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	16:05
29	08:37	09:08 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37
30	16:34	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05
31	08:36	09:07 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38
32	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16:05
33	08:35	09:05 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39
34	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	16:05
35	08:33	09:04 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39
36	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:05
37	08:32	09:03 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40
38	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05
39	08:31	09:01 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:41
40	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	16:06
41	08:30	09:00 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:20	16:06
43	08:29	08:59 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42
44	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	16:07
45	08:27	08:57 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42
46	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	16:07
47	08:26	08:55 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43
48	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	16:08
49	08:25	08:54 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09	08:43
50	16:52	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:09	16:16	16:08
51	08:23	08:54 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:44
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:15	16:09
53	08:22	08:56 (2)	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13	08:44
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	16:14	16:10
55	08:20	08:56 (2)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:15	08:44
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:13	16:11
57	08:19	09:15 (2)	07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16	08:44
58	17:00	09:14 (2)	19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:12	16:11
59	08:17	09:13 (2)	19:56	20:54	21:43	22:01	21:28	20:23	19:07	18:00	16:11	16:12
60	17:02	09:01 (2)	19:56	20:54	21:43	22:01	21:28	20:23	19:07	18:00	16:11	16:12
61	08:15	09:01 (2)	19:56	20:54	21:43	22:01	21:28	20:23	19:07	18:00	16:11	16:12
62	17:04	09:12 (2)	19:58	20:56	21:44	22:01	21:27	20:21	19:05	18:00	16:11	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	256	3									260	
Sun reduction	0.24	0.23									0.27	
Oper. time red.	1.00	1.00									1.00	
Wind dir. red.	0.61	0.61									0.61	
Total reduction	0.15	0.14									0.16	
Total, real	38	0									42	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DW - H127

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44	15:22 (5)	08:14	15:49 (4)	07:16	17:09 (3)	07:01	19:14 (2)	05:52	05:03								
	16:15	15	15:37 (5)	17:06	39	16:28 (4)	18:02	24	17:33 (3)	20:00	19	19:33 (2)	20:55	21:45				
2	08:44	15:23 (5)	08:12	15:49 (4)	07:14	17:09 (3)	06:59		19:12 (2)	05:50				05:02				
	16:16	16	15:39 (5)	17:08	39	16:28 (4)	18:04	23	17:32 (3)	20:02	23	19:35 (2)	20:57	21:46				
3	08:44	15:22 (5)	08:10	15:50 (4)	07:12	17:10 (3)	06:56		19:11 (2)	05:48				05:01				
	16:17	17	15:39 (5)	17:10	38	16:28 (4)	18:06	21	17:31 (3)	20:04	26	19:37 (2)	20:59	21:48				
4	08:43	15:23 (5)	08:08	15:50 (4)	07:09	17:12 (3)	06:54		19:10 (2)	05:46				05:00				
	16:18	18	15:41 (5)	17:12	38	16:28 (4)	18:07	18	17:30 (3)	20:06	29	19:39 (2)	21:01	21:49				
5	08:43	15:23 (5)	08:07	15:51 (4)	07:07	17:13 (3)	06:51		19:09 (2)	05:44				04:59				
	16:19	19	15:42 (5)	17:14	36	16:27 (4)	18:09	14	17:27 (3)	20:07	31	19:40 (2)	21:03	21:50				
6	08:43	15:24 (5)	08:05	15:52 (4)	07:04	17:17 (3)	06:49		19:08 (2)	05:42				04:59				
	16:21	20	15:44 (5)	17:16	35	16:27 (4)	18:11	7	17:24 (3)	20:09	34	19:42 (2)	21:04	21:51				
7	08:42	15:24 (5)	08:03	15:52 (4)	07:02		06:47		19:07 (2)	05:40				04:58				
	16:22	21	15:45 (5)	17:18	34	16:26 (4)	18:13		20:11	19:43 (2)	36	19:43 (2)	21:06	21:52				
8	08:42	15:24 (5)	08:01	15:53 (4)	07:00		06:44		19:07 (2)	05:38				04:57				
	16:24	22	15:46 (5)	17:20	32	16:25 (4)	18:15		20:13	19:45 (2)	38	19:45 (2)	21:08	21:53				
9	08:41	15:26 (5)	07:59	15:55 (4)	06:57		06:42		19:07 (2)	05:36				04:57				
	16:25	23	15:49 (5)	17:22	29	16:24 (4)	18:17		20:15	19:45 (2)	38	19:45 (2)	21:10	21:54				
10	08:40	15:26 (5)	07:57	15:56 (4)	06:55		06:39		19:06 (2)	05:34				04:56				
	16:26	23	15:49 (5)	17:24	27	16:23 (4)	18:19		20:17	19:44 (2)	38	19:44 (2)	21:11	21:55				
11	08:40	15:27 (5)	07:55	15:58 (4)	06:52		06:37		19:06 (2)	05:33				04:56				
	16:28	22	15:49 (5)	17:26	24	16:22 (4)	18:21		20:19	19:44 (2)	38	19:44 (2)	21:13	21:55				
12	08:39	15:27 (5)	07:53	15:59 (4)	06:50		06:35		19:06 (2)	05:31				04:55				
	16:30	25	15:54 (4)	17:28	20	16:19 (4)	18:23		20:20	19:44 (2)	38	19:44 (2)	21:15	21:56				
13	08:38	15:28 (5)	07:51	16:03 (4)	06:48		06:32		19:06 (2)	05:29				04:55				
	16:31	27	15:55 (4)	17:30	13	16:16 (4)	18:25		20:22	19:43 (2)	37	19:43 (2)	21:17	21:57				
14	08:37	15:29 (5)	07:49		06:45		06:30		19:06 (2)	05:27				04:55				
	16:33	28	15:57 (4)	17:32		18:27		20:24	36	19:42 (2)	21:18			21:58				
15	08:36	15:30 (5)	07:47		06:43		06:28		19:07 (2)	05:26				04:54				
	16:34	29	15:59 (4)	17:34		18:28		20:26	35	19:42 (2)	21:20			21:58				
16	08:35	15:30 (5)	07:45		06:40		06:25		19:08 (2)	05:24				04:54				
	16:36	30	16:00 (4)	17:36		18:30		20:28	33	19:41 (2)	21:22			21:59				
17	08:34	15:31 (5)	07:43		06:38		06:23		19:08 (2)	05:22				04:54				
	16:38	31	16:02 (4)	17:38		18:32		20:30	31	19:39 (2)	21:23			21:59				
18	08:33	15:32 (5)	07:41		06:35		06:21		19:09 (2)	05:21				04:54				
	16:40	33	16:05 (4)	17:40		18:34		20:31	29	19:38 (2)	21:25			22:00				
19	08:32	15:34 (5)	07:39		06:33		06:18		19:10 (2)	05:19				04:54				
	16:41	32	16:07 (4)	17:42		18:36		20:33	27	19:37 (2)	21:27			22:00				
20	08:31	15:35 (5)	07:36	17:13 (3)	06:31		06:16		19:12 (2)	05:18				04:54				
	16:43	31	16:08 (4)	17:44	3	17:16 (3)	18:38		20:35	23	19:35 (2)	21:28		22:00				
21	08:30	15:38 (5)	07:34	17:12 (3)	06:28		06:14		19:13 (2)	05:16				04:54				
	16:45	30	16:11 (4)	17:46	6	17:18 (3)	18:40		20:37	19	19:32 (2)	21:30		22:01				
22	08:29	15:47 (4)	07:32	17:10 (3)	06:26		06:12		19:16 (2)	05:15				04:55				
	16:47	25	16:12 (4)	17:48	9	17:19 (3)	18:42		20:39	13	19:29 (2)	21:31		22:01				
23	08:27	15:48 (4)	07:30	17:09 (3)	06:23		06:09			05:13				04:55				
	16:49	27	16:15 (4)	17:50	13	17:22 (3)	18:43		20:41			21:33		22:01				
24	08:26	15:47 (4)	07:28	17:09 (3)	06:21		06:07			05:12				04:55				
	16:50	30	16:17 (4)	17:52	15	17:24 (3)	18:45		20:43			21:34		22:01				
25	08:24	15:48 (4)	07:25	17:08 (3)	06:18		06:05			05:11				04:55				
	16:52	31	16:19 (4)	17:54	18	17:26 (3)	18:47		20:44			21:36		22:01				
26	08:23	15:47 (4)	07:23	17:08 (3)	06:16		06:03			05:09				04:56				
	16:54	34	16:21 (4)	17:56	20	17:28 (3)	18:49		20:46			21:37		22:01				
27	08:22	15:47 (4)	07:21	17:09 (3)	06:13		06:01			05:08				04:56				
	16:56	36	16:23 (4)	17:58	22	17:31 (3)	18:51		20:48			21:39		22:01				
28	08:20	15:48 (4)	07:18	17:08 (3)	06:11		05:58			05:07				04:57				
	16:58	38	16:26 (4)	18:00	24	17:32 (3)	18:53		20:50			21:40		22:01				
29	08:18	15:48 (4)		07:08		19:21 (2)	05:56			05:06				04:57				
	17:00	40	16:28 (4)		19:54	7	19:28 (2)	20:52		21:41				22:01				
30	08:17	15:48 (4)		07:06		19:18 (2)	05:54			05:05				04:58				
	17:02	40	16:28 (4)		19:56	12	19:30 (2)	20:54		21:43				22:00				
31	08:15	15:48 (4)		07:04		19:15 (2)				05:04								
	17:04	40	16:28 (4)		19:58	16	19:31 (2)			21:44								
Potential sun hours	250		273		367		420		494		510							
Total, worst case	853		534		142		671											
Sun reduction	0.24		0.23		0.27		0.35											
Oper. time red.	1.00		1.00		1.00		1.00											
Wind dir. red.	0.66		0.67		0.67		0.67											
Total reduction	0.16		0.15		0.18		0.24											
Total, real	137		83		26		159											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DW - H127

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:05 (2) 19:43 (2)	07:26 16:54	15:26 (4) 15:53 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	19:05 (2) 19:43 (2)	07:28 16:52	15:24 (4) 15:54 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	19:04 (2) 19:42 (2)	07:30 16:50	15:23 (4) 15:55 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	19:04 (2) 19:42 (2)	07:31 16:48	15:22 (4) 15:56 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	19:04 (2) 19:41 (2)	07:33 16:46	15:21 (4) 15:56 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	19:04 (2) 19:39 (2)	07:35 16:44	15:20 (4) 15:57 (4)
7	05:04 21:57	05:49 21:13	06:43 20:04	19:04 (2) 19:35 (2)	07:37 16:43	15:20 (4) 15:57 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	19:04 (2) 19:33 (2)	07:39 18:01 (3)	15:19 (4) 15:58 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	19:05 (2) 19:31 (2)	07:41 18:03 (3)	15:19 (4) 15:58 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	19:05 (2) 19:28 (2)	07:42 18:04 (3)	15:20 (4) 15:59 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	19:06 (2) 19:26 (2)	07:44 18:05 (3)	15:20 (4) 15:59 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	19:07 (2) 19:24 (2)	07:46 18:06 (3)	15:20 (4) 16:00 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	19:09 (2) 19:22 (2)	07:48 18:06 (3)	15:20 (4) 15:59 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	19:11 (2) 19:18 (2)	07:50 18:04 (3)	15:20 (4) 15:57 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	19:15 (2) 19:16 (2)	07:52 18:02 (3)	15:20 (4) 15:56 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 17:59 (3)	15:20 (4) 15:54 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 17:57 (3)	15:21 (4) 15:52 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 17:55 (3)	15:21 (4) 15:51 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 17:52 (3)	15:22 (4) 15:49 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 17:50 (3)	15:22 (4) 15:47 (4)
21	05:21 21:42	06:13 20:44	07:08 19:21 (2)	08:03 18:17	08:02 17:42 (3)	15:13 (5) 15:46 (4)
22	05:23 21:41	06:15 20:42	07:10 19:18 (2)	08:05 18:15	08:04 17:43 (3)	15:11 (5) 15:44 (4)
23	05:24 21:39	06:17 20:39	07:12 19:16 (2)	08:07 18:13	08:06 16:18	15:10 (5) 15:43 (4)
24	05:26 21:38	06:19 20:37	07:13 19:14 (2)	08:09 18:11	08:08 16:17	15:09 (5) 15:42 (4)
25	05:27 21:36	06:20 20:35	07:15 19:12 (2)	07:11 19:09	08:09 16:16	15:09 (5) 15:41 (4)
26	05:29 21:35	06:22 20:32	07:17 19:11 (2)	07:13 17:09	08:11 16:14	15:09 (5) 15:39 (4)
27	05:30 21:33	06:24 20:30	07:19 19:10 (2)	07:15 17:04	08:13 16:13	15:09 (5) 15:38 (4)
28	05:32 21:32	06:26 20:28	07:21 19:08 (2)	07:16 17:02	08:14 15:41 (4)	15:09 (5) 15:37 (4)
29	05:34 21:30	06:27 20:25	07:22 19:07 (2)	07:18 17:00	08:16 15:46 (4)	15:08 (5) 16:12
30	05:35 21:28	06:29 20:23	07:24 19:05 (2)	07:20 16:58	08:18 15:49 (4)	15:08 (5) 16:11
31	05:37 21:27	06:31 20:21	07:25 19:43 (2)	07:22 16:56	15:26 (4) 15:51 (4)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		322	391	300	983	455
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.66
Total reduction		0.23	0.21	0.20	0.18	0.14
Total, real		74	84	59	172	62

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: DX - H128

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		15:01 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24									08:19	14:50 (2)		
2	16:15	25	15:26 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54									16:10	20	15:10 (2)	
	08:44		15:02 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26									08:21		14:50 (2)	
3	16:16	25	15:27 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52									16:09	20	15:10 (2)	
	08:44		15:02 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28									08:22		14:50 (2)	
4	16:17	25	15:27 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50									16:08	22	15:12 (2)	
	08:43		15:03 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30									08:24		14:50 (2)	
5	16:18	24	15:27 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48									16:08	23	15:13 (2)	
	08:43		15:03 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32									08:25		14:50 (2)	
6	16:19	24	15:27 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46									16:07	23	15:13 (2)	
	08:43		15:04 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34									08:26		14:51 (2)	
7	16:21	24	15:28 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44									16:07	23	15:14 (2)	
	08:42		15:05 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36									08:28		14:50 (2)	
8	16:22	23	15:28 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43									16:06	24	15:14 (2)	
	08:42		15:05 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38									08:29		14:50 (2)	
9	16:23	23	15:28 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41									16:06	24	15:14 (2)	
	08:41		15:07 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40									08:30		14:51 (2)	
10	16:25	21	15:28 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39									16:05	25	15:16 (2)	
	08:40		15:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42									08:32		14:51 (2)	
11	16:26	21	15:28 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37									16:05	25	15:16 (2)	
	08:40		15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44									08:33		14:51 (2)	
12	16:28	20	15:28 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35									16:05	25	15:16 (2)	
	08:39		15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46									08:34		14:51 (2)	
13	16:29	19	15:28 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34									16:05	26	15:17 (2)	
	08:38		15:10 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47									08:35		14:52 (2)	
14	16:31	18	15:28 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32									16:04	25	15:17 (2)	
	08:37		15:12 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49									08:36		14:53 (2)	
15	16:33	15	15:27 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30									16:04	25	15:18 (2)	
	08:36		15:13 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51									08:37		14:53 (2)	
16	16:34	13	15:26 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29									16:04	25	15:18 (2)	
	08:35		15:15 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53									08:38		14:53 (2)	
17	16:36	9	15:24 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27									16:05	26	15:19 (2)	
	08:34		15:18 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55									08:39		14:54 (2)	
18	16:38	4	15:22 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26									16:05	25	15:19 (2)	
	08:33			07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57									08:39		14:54 (2)	
19	16:39			17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24									16:05	26	15:20 (2)	
	08:32			07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59									08:40		14:55 (2)	
20	16:41			17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23									16:05	26	15:21 (2)	
	08:31			07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00									08:41		14:55 (2)	
21	16:43			17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22									16:05	26	15:21 (2)	
	08:30			07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02									08:41		14:56 (2)	
22	16:45			17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20									16:06	26	15:22 (2)	
	08:29			07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04									08:42		14:56 (2)	
23	16:47			17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19									16:06	26	15:22 (2)	
	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06									08:42		14:57 (2)	
24	16:49			17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18									16:07	26	15:23 (2)	
	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08									08:43		14:57 (2)	
25	16:50			17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17									16:07	26	15:23 (2)	
	08:25			07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	08:11	08:09									14:57 (2)		08:43	
26	16:52			17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:15	3								15:00 (2)	16:08	26	15:23 (2)
	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11									14:54 (2)	08:43		14:58 (2)
27	16:54			17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14	9								15:03 (2)	16:09	25	15:23 (2)
	08:22			07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13									14:53 (2)	08:44		14:59 (2)
28	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	12								15:05 (2)	16:10	25	15:24 (2)
	08:20			07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14									14:52 (2)	08:44		14:59 (2)
29	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	15								15:07 (2)	16:10	26	15:25 (2)
	08:19				07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16									14:50 (2)	08:44		15:00 (2)
30	17:00				19:54	20:52	21:41	22:01	21:30	20:25	19:09	18:00	16:11	18								15:08 (2)	16:11	25	15:25 (2)
	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18									14:50 (2)	08:44		15:01 (2)
31	17:02				19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	19								15:09 (2)	16:12	25	15:26 (2)
	08:15				07:04		05:04		05:37	06:31		07:22										16:58			

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DY - H129

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: DZ - H130

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EA - H131

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EB - H132

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EC - H133

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: ED - H134

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EE - H135

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EF - H136

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EG - H137

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: EH - H138

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	06:25 (5)	05:03	05:39 (4)	04:59	06:33	07:26	07:24
2	08:44	08:12	07:14	06:59	05:50	06:26 (5)	05:02	05:33 (4)	05:00	06:35	07:28	07:26
3	08:44	08:10	07:12	06:56	05:48	06:27 (5)	05:01	05:32 (4)	05:00	06:37	07:30	07:28
4	08:43	08:08	07:09	06:54	05:46	06:28 (5)	05:00	05:31 (4)	05:01	06:38	07:32	07:30
5	08:43	08:07	07:07	06:52	05:44	06:29 (5)	04:59	05:31 (4)	05:02	06:46 (5)	07:33	07:32
6	08:43	08:05	07:05	06:49	05:42	06:31 (5)	04:59	05:31 (4)	05:03	06:42 (5)	07:35	07:34
7	08:42	08:03	07:02	06:47	05:40	06:33 (5)	04:58	05:32 (4)	05:04	06:40 (5)	07:37	07:36
8	08:42	08:01	07:00	06:44	05:38	06:34 (5)	04:57	05:32 (4)	05:05	06:38 (5)	07:39	07:38
9	08:41	07:59	06:57	06:42	05:36	06:35 (5)	04:57	05:33 (4)	05:06	06:39 (5)	07:40	07:39
10	08:40	07:57	06:55	06:40	05:35	06:36 (5)	04:56	05:34 (4)	05:07	06:40 (5)	07:41	07:40
11	08:40	07:55	06:53	06:37	05:33	06:37 (5)	04:55	05:35 (4)	05:08	06:41 (5)	07:42	07:41
12	08:39	07:53	06:50	06:35	05:31	06:38 (5)	04:54	05:36 (4)	05:10	06:42 (5)	07:43	07:42
13	08:38	07:51	06:48	06:32	05:29	06:39 (5)	04:53	05:37 (4)	05:13	06:43 (5)	07:44	07:43
14	08:37	07:49	06:46	06:30	05:27	06:40 (5)	04:52	05:38 (4)	05:16	06:44 (5)	07:45	07:44
15	08:36	07:47	06:44	06:28	05:26	06:41 (5)	04:51	05:39 (4)	05:19	06:45 (5)	07:46	07:45
16	08:35	07:45	06:42	06:26	05:24	06:42 (5)	04:50	05:40 (4)	05:22	06:46 (5)	07:47	07:46
17	08:34	07:43	06:40	06:24	05:22	06:43 (5)	04:49	05:41 (4)	05:24	06:47 (5)	07:48	07:47
18	08:33	07:41	06:38	06:22	05:21	06:44 (5)	04:48	05:42 (4)	05:26	06:48 (5)	07:49	07:48
19	08:32	07:39	06:36	06:20	05:19	06:45 (5)	04:47	05:43 (4)	05:29	06:49 (5)	07:50	07:49
20	08:31	07:37	06:34	06:18	05:17	06:46 (5)	04:46	05:44 (4)	05:32	06:50 (5)	07:51	07:50
21	08:30	07:35	06:32	06:16	05:15	06:47 (5)	04:45	05:45 (4)	05:35	06:51 (5)	07:52	07:51
22	08:29	07:33	06:30	06:14	05:13	06:48 (5)	04:44	05:46 (4)	05:38	06:52 (5)	07:53	07:52
23	08:27	07:30	06:27	06:11	05:10	06:49 (5)	04:43	05:47 (4)	05:40	06:53 (5)	07:54	07:53
24	08:26	07:28	06:25	06:09	05:08	06:50 (5)	04:42	05:48 (4)	05:42	06:54 (5)	07:55	07:54
25	08:25	07:25	06:23	06:07	05:06	06:51 (5)	04:41	05:49 (4)	05:45	06:55 (5)	07:56	07:55
26	08:23	07:23	06:21	06:05	05:04	06:52 (5)	04:40	05:50 (4)	05:48	06:56 (5)	07:57	07:56
27	08:22	07:21	06:19	06:03	05:02	06:53 (5)	04:39	05:51 (4)	05:50	06:57 (5)	07:58	07:57
28	08:20	07:19	06:17	06:01	05:00	06:54 (5)	04:38	05:52 (4)	05:52	06:58 (5)	07:59	07:58
29	08:19	07:17	06:15	05:59	04:58	06:55 (5)	04:37	05:53 (4)	05:54	06:59 (5)	08:00	07:59
30	08:17	07:15	06:13	05:57	04:56	06:56 (5)	04:36	05:54 (4)	05:55	07:00 (5)	08:01	07:59
31	08:15	07:13	06:11	05:55	04:54	06:57 (5)	04:35	05:55 (4)	05:56	07:01 (5)	08:02	08:01
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction				0.35	0.38	0.32	0.32	0.32	0.34			
Oper. time red.				1.00	1.00	1.00	1.00	1.00	1.00			
Wind dir. red.				0.68	0.67	0.66	0.66	0.66	0.68			
Total reduction				0.24	0.26	0.21	0.21	0.23				
Total, real				87	63	24	41	124				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EI - H139

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EJ - H140

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EK - H141

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EL - H142

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:25 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: EM - H143

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		07:25 (5)	05:52		06:18 (4)	05:03		05:34 (3)
	16:15	17:06	18:02						20:00	27	07:52 (5)	20:55	8	06:26 (4)	21:45	5	05:39 (3)
2	08:44	08:12	07:14						06:59		07:24 (5)	05:50		06:16 (4)	05:02		05:33 (3)
	16:16	17:08	18:04						20:02	27	07:51 (5)	20:57	10	06:26 (4)	21:47	6	05:39 (3)
3	08:44	08:10	07:12						06:56		07:24 (5)	05:48		06:14 (4)	05:01		05:32 (3)
	16:17	17:10	18:06						20:04	25	07:49 (5)	20:59	11	06:25 (4)	21:48	7	05:39 (3)
4	08:43	08:09	07:09						06:54		07:26 (5)	05:46		06:12 (4)	05:00		05:31 (3)
	16:18	17:12	18:08						20:06	22	07:48 (5)	21:01	11	06:23 (4)	21:49	8	05:39 (3)
5	08:43	08:07	07:07						06:52		07:26 (5)	05:44		06:10 (4)	04:59		05:31 (3)
	16:20	17:14	18:10						20:08	20	07:46 (5)	21:03	11	06:21 (4)	21:50	9	05:40 (3)
6	08:43	08:05	07:05						06:49		07:29 (5)	05:42		06:12 (4)	04:59		05:30 (3)
	16:21	17:16	18:11						20:09	15	07:44 (5)	21:04	8	06:20 (4)	21:51	10	05:40 (3)
7	08:42	08:03	07:02						06:47		07:32 (5)	05:40			04:58		05:30 (3)
	16:22	17:18	18:13						20:11	8	07:40 (5)	21:06			21:52	11	05:41 (3)
8	08:42	08:01	07:00						06:44			05:38			04:57		05:29 (3)
	16:24	17:20	18:15						20:13			21:08			21:53	11	05:40 (3)
9	08:41	07:59	06:57						06:42			05:36			04:57		05:29 (3)
	16:25	17:22	18:17						20:15			21:10			21:54	12	05:41 (3)
10	08:40	07:57	06:55						06:40			05:35			04:56		05:28 (3)
	16:27	17:24	18:19						20:17			21:12			21:55	13	05:41 (3)
11	08:40	07:55	06:53						06:37			05:33			04:56		05:28 (3)
	16:28	17:26	18:21						20:19			21:13			21:55	13	05:41 (3)
12	08:39	07:53	06:50						06:35			05:31			04:56		05:28 (3)
	16:30	17:28	18:23						20:20			21:15			21:56	14	05:42 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:27 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	14	05:41 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:27 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	15	05:42 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:27 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	15	05:42 (3)
16	08:35	07:45	06:41						06:25			05:24			04:55		05:27 (3)
	16:36	17:36	18:30						20:28			21:22			21:59	15	05:42 (3)
17	08:34	07:43	06:38						06:23			05:22			04:54		05:27 (3)
	16:38	17:38	18:32						20:30			21:23			21:59	16	05:43 (3)
18	08:33	07:41	06:36						06:21			05:21			04:54		05:27 (3)
	16:40	17:40	18:34						20:32			21:25			22:00	16	05:43 (3)
19	08:32	07:39	06:33						06:18			05:19			04:54		05:27 (3)
	16:42	17:42	18:36						20:33			21:27			22:00	16	05:43 (3)
20	08:31	07:37	06:31						06:16			05:18			04:54		05:27 (3)
	16:43	17:44	18:38						20:35			21:28			22:00	16	05:43 (3)
21	08:30	07:34	06:28						06:14			05:16			04:55		05:27 (3)
	16:45	17:46	18:40						20:37			21:30			22:01	16	05:43 (3)
22	08:29	07:32	06:26					06:50 (5)	06:12			05:15			04:55		05:28 (3)
	16:47	17:48	18:42	3				06:53 (5)	20:39			21:31			22:01	16	05:44 (3)
23	08:27	07:30	06:23					06:47 (5)	06:09			05:13			04:55		05:28 (3)
	16:49	17:50	18:44	6				06:53 (5)	20:41			21:33			22:01	16	05:44 (3)
24	08:26	07:28	06:21					06:45 (5)	06:07			05:12			04:55		05:28 (3)
	16:51	17:52	18:45	9				06:54 (5)	20:43			21:34			22:01	16	05:44 (3)
25	08:25	07:25	06:18					06:42 (5)	06:05			05:11			04:56		05:29 (3)
	16:53	17:54	18:47	12				06:54 (5)	20:44			21:36			22:01	16	05:45 (3)
26	08:23	07:23	06:16					06:40 (5)	06:03			05:09			04:56		05:29 (3)
	16:54	17:56	18:49	15				06:55 (5)	20:46			21:37			22:01	15	05:44 (3)
27	08:22	07:21	06:14					06:37 (5)	06:01		06:26 (4)	05:08			04:57		05:30 (3)
	16:56	17:58	18:51	17				06:54 (5)	20:48	2	06:28 (4)	21:39			22:01	15	05:45 (3)
28	08:20	07:19	06:11					06:35 (5)	05:59		06:24 (4)	05:07			04:57		05:30 (3)
	16:58	18:00	18:53	20				06:55 (5)	20:50	4	06:28 (4)	21:40			22:01	15	05:45 (3)
29	08:19		07:09					07:32 (5)	05:56		06:22 (4)	05:06		05:36 (3)	04:58		05:31 (3)
	17:00		19:55	22				07:54 (5)	20:52	5	06:27 (4)	21:41	1	05:37 (3)	22:01	14	05:45 (3)
30	08:17		07:06					07:30 (5)	05:54		06:20 (4)	05:05		05:35 (3)	04:58		05:31 (3)
	17:02		19:56	24				07:54 (5)	20:54	7	06:27 (4)	21:43	2	05:37 (3)	22:00	14	05:45 (3)
31	08:15		07:04					07:27 (5)				05:04		05:34 (3)			
	17:04		19:58	25				07:52 (5)				21:44	4	05:38 (3)			
Potential sun hours	250	273	367					420				494			510		
Total, worst case					153			162				66			395		
Sun reduction					0.27			0.35				0.38			0.32		
Oper. time red.					1.00			1.00				1.00			1.00		
Wind dir. red.					0.67			0.67				0.67			0.66		
Total reduction					0.18			0.24				0.26			0.21		
Total, real					28			39				17			83		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EM - H143

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July			August			September			October		November		December	
1	04:59		05:32 (3)	05:39			06:33			07:26	07:24	08:19			
	22:00	14	05:46 (3)	21:25			20:18			19:05	16:54	16:10			
2	05:00		05:33 (3)	05:40			06:35			07:28	07:26	08:21			
	22:00	13	05:46 (3)	21:23			20:16			19:02	16:52	16:09			
3	05:00		05:33 (3)	05:42			06:37			07:30	07:28	08:22			
	21:59	12	05:45 (3)	21:21			20:14			19:00	16:50	16:09			
4	05:01		05:34 (3)	05:44			06:38			07:32	07:30	08:24			
	21:59	12	05:46 (3)	21:19			20:11			18:57	16:48	16:08			
5	05:02		05:35 (3)	05:46			06:40		07:28 (5)	07:33	07:32	08:25			
	21:58	11	05:46 (3)	21:17			20:09	8	07:36 (5)	18:55	16:46	16:07			
6	05:03		05:36 (3)	05:47		06:23 (4)	06:42		07:25 (5)	07:35	07:34	08:26			
	21:58	10	05:46 (3)	21:16	4	06:27 (4)	20:06	15	07:40 (5)	18:53	16:45	16:07			
7	05:04		05:37 (3)	05:49		06:20 (4)	06:44		07:22 (5)	07:37	07:36	08:28			
	21:57	9	05:46 (3)	21:14	10	06:30 (4)	20:04	19	07:41 (5)	18:50	16:43	16:06			
8	05:05		05:38 (3)	05:51		06:20 (4)	06:45		07:20 (5)	07:39	07:38	08:29			
	21:56	9	05:47 (3)	21:12	11	06:31 (4)	20:01	22	07:42 (5)	18:48	16:41	16:06			
9	05:06		05:39 (3)	05:52		06:22 (4)	06:47		07:19 (5)	07:41	07:40	08:30			
	21:55	8	05:47 (3)	21:10	11	06:33 (4)	19:59	25	07:44 (5)	18:45	16:39	16:06			
10	05:07		05:40 (3)	05:54		06:24 (4)	06:49		07:18 (5)	07:43	07:42	08:32			
	21:55	6	05:46 (3)	21:08	10	06:34 (4)	19:57	26	07:44 (5)	18:43	16:37	16:05			
11	05:08		05:41 (3)	05:56		06:25 (4)	06:51		07:17 (5)	07:44	07:44	08:33			
	21:54	5	05:46 (3)	21:06	9	06:34 (4)	19:54	27	07:44 (5)	18:41	16:36	16:05			
12	05:09		05:42 (3)	05:58		06:27 (4)	06:52		07:19 (5)	07:46	07:46	08:34			
	21:53	4	05:46 (3)	21:03	8	06:35 (4)	19:52	26	07:45 (5)	18:38	16:34	16:05			
13	05:11		05:43 (3)	05:59		06:29 (4)	06:54		07:21 (5)	07:48	07:47	08:35			
	21:52	3	05:46 (3)	21:01	7	06:36 (4)	19:49	24	07:45 (5)	18:36	16:32	16:05			
14	05:12		05:44 (3)	06:01		06:30 (4)	06:56		07:22 (5)	07:50	07:49	08:36			
	21:51	2	05:46 (3)	20:59	5	06:35 (4)	19:47	22	07:44 (5)	18:34	16:31	16:05			
15	05:13			06:03		06:32 (4)	06:58		07:24 (5)	07:52	07:51	08:37			
	21:50			20:57	3	06:35 (4)	19:44	20	07:44 (5)	18:31	16:29	16:05			
16	05:14			06:05		06:33 (4)	06:59		07:26 (5)	07:54	07:53	08:38			
	21:49			20:55	1	06:34 (4)	19:42	18	07:44 (5)	18:29	16:28	16:05			
17	05:16			06:06			07:01		07:28 (5)	07:56	07:55	08:39			
	21:47			20:53			19:39	15	07:43 (5)	18:27	16:26	16:05			
18	05:17			06:08			07:03		07:29 (5)	07:57	07:57	08:39			
	21:46			20:51			19:37	13	07:42 (5)	18:24	16:25	16:05			
19	05:19			06:10			07:05		07:31 (5)	07:59	07:59	08:40			
	21:45			20:48			19:34	10	07:41 (5)	18:22	16:23	16:05			
20	05:20			06:12			07:07		07:33 (5)	08:01	08:01	08:41			
	21:44			20:46			19:32	7	07:40 (5)	18:20	16:22	16:06			
21	05:21			06:13			07:08		07:35 (5)	08:03	08:02	08:41			
	21:42			20:44			19:29	4	07:39 (5)	18:18	16:21	16:06			
22	05:23			06:15			07:10			08:05	08:04	08:42			
	21:41			20:42			19:27			18:15	16:19	16:07			
23	05:24			06:17			07:12			08:07	08:06	08:42			
	21:39			20:39			19:24			18:13	16:18	16:07			
24	05:26			06:19			07:14			08:09	08:08	08:43			
	21:38			20:37			19:22			18:11	16:17	16:08			
25	05:27			06:21			07:15			07:11	08:09	08:43			
	21:36			20:35			19:19			17:09	16:16	16:08			
26	05:29			06:22			07:17			07:13	08:11	08:43			
	21:35			20:32			19:17			17:07	16:15	16:09			
27	05:31			06:24			07:19			07:15	08:13	08:44			
	21:33			20:30			19:15			17:05	16:14	16:10			
28	05:32			06:26			07:21			07:17	08:14	08:44			
	21:32			20:28			19:12			17:02	16:13	16:11			
29	05:34			06:28			07:23			07:19	08:16	08:44			
	21:30			20:25			19:10			17:00	16:12	16:12			
30	05:35			06:29			07:24			07:20	08:18	08:44			
	21:28			20:23			19:07			16:58	16:11	16:13			
31	05:37			06:31						07:22		08:44			
	21:27			20:21						16:56		16:14			
Potential sun hours	512			460			382			328	259	233			
Total, worst case		118			79			301							
Sun reduction		0.32			0.34			0.32							
Oper. time red.		1.00			1.00			1.00							
Wind dir. red.		0.66			0.67			0.67							
Total reduction		0.21			0.23			0.22							
Total, real		25			18			65							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EN - H144

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:06 (5)	08:14	15:25 (4)	07:16	17:04 (3)	07:01	05:52	19:18 (2)	05:03	
	16:15	31	15:37 (4)	17:06	43	16:08 (4)	18:02	28	17:32 (3)	20:00	
2	08:44	15:07 (5)	08:12	15:26 (4)	07:14	17:04 (3)	06:59		05:50	19:18 (2)	05:02
	16:16	32	15:39 (4)	17:08	42	16:08 (4)	18:04	27	17:31 (3)	20:02	
3	08:44	15:07 (5)	08:10	15:27 (4)	07:12	17:06 (3)	06:56		05:48	19:20 (2)	05:01
	16:17	32	15:39 (4)	17:10	40	16:07 (4)	18:06	24	17:30 (3)	20:04	
4	08:43	15:08 (5)	08:08	15:28 (4)	07:09	17:07 (3)	06:54		05:46	19:21 (2)	05:00
	16:18	33	15:41 (4)	17:12	38	16:06 (4)	18:07	22	17:29 (3)	20:06	
5	08:43	15:08 (5)	08:07	15:29 (4)	07:07	17:08 (3)	06:51	2	19:39 (2)	21:01	29
	16:19	34	15:42 (4)	17:14	36	16:05 (4)	18:09	19	17:27 (3)	20:07	8
6	08:43	15:10 (5)	08:05	15:31 (4)	07:04	17:10 (3)	06:49		05:42	19:22 (2)	05:00
	16:21	34	15:44 (4)	17:16	33	16:04 (4)	18:11	15	17:25 (3)	20:09	13
7	08:42	15:10 (5)	08:03	15:32 (4)	07:02	17:14 (3)	06:47		05:40	19:26 (2)	05:00
	16:22	35	15:45 (4)	17:18	30	16:02 (4)	18:13	6	17:20 (3)	20:11	17
8	08:42	15:11 (5)	08:01	15:34 (4)	07:00		06:44		05:38	19:24 (2)	05:00
	16:24	35	15:46 (4)	17:20	27	16:01 (4)	18:15	22	19:46 (2)	21:08	9
9	08:41	15:12 (5)	07:59	15:37 (4)	06:57		06:42		05:36	19:23 (2)	05:00
	16:25	37	15:49 (4)	17:22	22	15:59 (4)	18:17	25	19:48 (2)	21:10	
10	08:40	15:13 (5)	07:57	15:40 (4)	06:55		06:39		05:34	19:21 (2)	05:00
	16:26	37	15:50 (4)	17:24	16	15:56 (4)	18:19	28	19:49 (2)	21:11	
11	08:40	15:14 (5)	07:55		06:53		06:37		05:33	19:20 (2)	05:00
	16:28	38	15:52 (4)	17:26		18:21	20:19	31	19:51 (2)	21:13	
12	08:39	15:15 (5)	07:53		06:50		06:35		05:31	19:19 (2)	05:00
	16:30	39	15:54 (4)	17:28		18:23	20:20	34	19:53 (2)	21:15	
13	08:38	15:17 (5)	07:51		06:48		06:32		05:29	19:17 (2)	05:00
	16:31	38	15:55 (4)	17:30		18:25	20:22	37	19:54 (2)	21:17	
14	08:37	15:18 (5)	07:49		06:45		06:30		05:27	19:16 (2)	05:00
	16:33	39	15:57 (4)	17:32		18:27	20:24	40	19:56 (2)	21:18	
15	08:36	15:18 (4)	07:47		06:43		06:28		05:26	19:16 (2)	05:00
	16:34	41	15:59 (4)	17:34		18:28	20:26	42	19:58 (2)	21:20	
16	08:35	15:17 (4)	07:45		06:40		06:25		05:24	19:16 (2)	05:00
	16:36	43	16:00 (4)	17:36		18:30	20:28	44	20:00 (2)	21:22	
17	08:34	15:18 (4)	07:43		06:38		06:23		05:22	19:14 (2)	05:00
	16:38	44	16:02 (4)	17:38		18:32	20:30	47	20:01 (2)	21:23	
18	08:33	15:18 (4)	07:41	17:09 (3)	06:35		06:21		05:21	19:14 (2)	05:00
	16:40	47	16:05 (4)	17:40	2	17:11 (3)	18:34	48	20:02 (2)	21:25	
19	08:32	15:19 (4)	07:39	17:08 (3)	06:33		06:18		05:19	19:14 (2)	05:00
	16:41	48	16:07 (4)	17:42	5	17:13 (3)	18:36	48	20:02 (2)	21:27	
20	08:31	15:18 (4)	07:36	17:07 (3)	06:31		06:16		05:18	19:14 (2)	05:00
	16:43	50	16:08 (4)	17:44	9	17:16 (3)	18:38	48	20:02 (2)	21:28	
21	08:30	15:19 (4)	07:34	17:06 (3)	06:28		06:14		05:16	19:13 (2)	05:00
	16:45	49	16:08 (4)	17:46	12	17:18 (3)	18:40	48	20:01 (2)	21:30	
22	08:29	15:19 (4)	07:32	17:05 (3)	06:26		06:12		05:15	19:13 (2)	05:00
	16:47	49	16:08 (4)	17:48	14	17:19 (3)	18:42	47	20:00 (2)	21:31	
23	08:27	15:20 (4)	07:30	17:05 (3)	06:23		06:09		05:13	19:13 (2)	05:00
	16:49	49	16:09 (4)	17:50	17	17:22 (3)	18:43	47	20:00 (2)	21:33	
24	08:26	15:20 (4)	07:28	17:05 (3)	06:21		06:07		05:12	19:14 (2)	05:00
	16:50	49	16:09 (4)	17:52	19	17:24 (3)	18:45	46	20:00 (2)	21:34	
25	08:24	15:21 (4)	07:25	17:04 (3)	06:18		06:05		05:11	19:14 (2)	05:00
	16:52	48	16:09 (4)	17:54	22	17:26 (3)	18:47	45	19:59 (2)	21:36	
26	08:23	15:21 (4)	07:23	17:04 (3)	06:16		06:03		05:09	19:14 (2)	05:00
	16:54	48	16:09 (4)	17:56	24	17:28 (3)	18:49	45	19:59 (2)	21:37	
27	08:22	15:21 (4)	07:21	17:04 (3)	06:13		06:01		05:08	19:15 (2)	05:00
	16:56	48	16:09 (4)	17:58	27	17:31 (3)	18:51	43	19:58 (2)	21:39	
28	08:20	15:22 (4)	07:18	17:04 (3)	06:11		05:58		05:07	19:15 (2)	05:00
	16:58	47	16:09 (4)	18:00	28	17:32 (3)	18:53	42	19:57 (2)	21:40	
29	08:19	15:23 (4)			07:09		05:56		05:06	19:16 (2)	05:00
	17:00	46	16:09 (4)		19:54		20:52	40	19:56 (2)	21:41	
30	08:17	15:23 (4)			07:06		05:54		05:05	19:17 (2)	05:00
	17:02	45	16:08 (4)		19:56		20:54	38	19:55 (2)	21:43	
31	08:15	15:24 (4)			07:04				05:04		
	17:04	44	16:08 (4)		19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case	1289		506		141		975		206		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.66		0.67		0.66		0.66		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	206		78		26		227		52		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: EN - H144

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:19 (2) 19:50 (2)	07:26 19:05	15:09 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	19:20 (2) 19:48 (2)	07:28 19:02	15:06 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	19:21 (2) 19:46 (2)	07:30 19:00	15:04 (4) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	19:21 (2) 19:43 (2)	07:31 18:57	15:02 (4) 16:08
5	05:02 21:58	05:45 21:17	19:39 (2) 19:51 (2)	06:40 20:09	19:23 (2) 19:41 (2)	15:00 (4) 16:07
6	05:03 21:58	05:47 21:15	19:36 (2) 19:55 (2)	06:42 20:06	19:25 (2) 19:39 (2)	15:34 (4) 16:07
7	05:04 21:57	05:49 21:14	19:34 (2) 19:57 (2)	06:43 20:04	19:26 (2) 19:35 (2)	15:35 (4) 16:06
8	05:05 21:56	05:51 21:12	19:31 (2) 19:58 (2)	06:45 20:01	19:31 (2) 19:33 (2)	14:57 (4) 16:06
9	05:06 21:55	05:52 21:10	19:30 (2) 20:00 (2)	06:47 19:59	19:33 (2) 18:45	15:37 (4) 16:05
10	05:07 21:55	05:54 21:08	19:28 (2) 20:01 (2)	06:49 19:56	19:33 (2) 18:43	15:37 (4) 16:05
11	05:08 21:54	05:56 21:05	19:27 (2) 20:02 (2)	06:50 19:54	19:33 (2) 18:40	15:37 (4) 16:05
12	05:09 21:53	05:57 21:03	19:26 (2) 20:03 (2)	06:52 19:51	19:33 (2) 18:38	15:37 (4) 16:05
13	05:10 21:52	05:59 21:01	19:24 (2) 20:03 (2)	06:54 19:49	19:33 (2) 18:36	15:37 (4) 16:05
14	05:12 21:51	06:01 20:59	19:23 (2) 20:04 (2)	06:56 19:47	19:33 (2) 18:33	15:37 (4) 16:04
15	05:13 21:50	06:03 20:57	19:23 (2) 20:05 (2)	06:58 19:44	19:33 (2) 18:31	15:37 (4) 16:04
16	05:14 21:49	06:04 20:55	19:21 (2) 20:05 (2)	06:59 19:42	19:33 (2) 18:29	15:37 (4) 16:04
17	05:16 21:47	06:06 20:53	19:21 (2) 20:05 (2)	07:01 19:39	19:33 (2) 18:26	15:37 (4) 16:04
18	05:17 21:46	06:08 20:51	19:20 (2) 20:06 (2)	07:03 19:37	19:33 (2) 18:24	15:37 (4) 16:04
19	05:18 21:45	06:10 20:48	19:19 (2) 20:05 (2)	07:05 19:34	19:33 (2) 18:22	15:37 (4) 16:04
20	05:20 21:44	06:12 20:46	19:19 (2) 20:06 (2)	07:06 19:32	19:33 (2) 18:20	15:37 (4) 16:04
21	05:21 21:42	06:13 20:44	19:19 (2) 20:06 (2)	07:08 19:29	19:33 (2) 18:17	15:37 (4) 16:04
22	05:23 21:41	06:15 20:42	19:18 (2) 20:05 (2)	07:10 19:27	19:33 (2) 18:15	15:37 (4) 16:04
23	05:24 21:39	06:17 20:39	19:18 (2) 20:05 (2)	07:12 19:24	19:33 (2) 18:13	15:37 (4) 16:04
24	05:26 21:38	06:19 20:37	19:18 (2) 20:05 (2)	07:13 19:22	19:33 (2) 18:11	15:37 (4) 16:04
25	05:27 21:36	06:20 20:35	19:17 (2) 20:04 (2)	07:15 19:19	19:33 (2) 18:09	15:37 (4) 16:04
26	05:29 21:35	06:22 20:32	19:17 (2) 20:04 (2)	07:17 19:17	19:33 (2) 18:07	15:37 (4) 16:04
27	05:30 21:33	06:24 20:30	19:17 (2) 20:02 (2)	07:19 19:14	19:33 (2) 18:04	15:37 (4) 16:04
28	05:32 21:32	06:26 20:28	19:17 (2) 19:59 (2)	07:21 19:12	19:33 (2) 18:02	15:37 (4) 16:04
29	05:34 21:30	06:28 20:25	19:17 (2) 19:57 (2)	07:22 19:09	19:33 (2) 18:00	15:37 (4) 16:04
30	05:35 21:28	06:29 20:23	19:18 (2) 19:55 (2)	07:24 19:07	19:33 (2) 17:58	15:37 (4) 16:04
31	05:37 21:27	06:31 20:21	19:18 (2) 19:52 (2)	07:25 19:07	19:33 (2) 17:56	15:37 (4) 16:04
Potential sun hours	512	460	382	328	259	233
Total, worst case		1045	149	328	1243	948
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.66	0.67	0.66	0.65
Total reduction		0.23	0.21	0.20	0.17	0.14
Total, real		235	31	65	217	129

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EO - H145

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	15:15 (3)	08:14	15:31 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	08:44	15:37 (3)	08:12	15:32 (2)	07:06	06:59	05:50	05:02	04:59	05:40	06:35	07:28
3	08:44	15:16 (3)	08:10	15:32 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
4	08:43	15:39 (3)	08:08	15:33 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31
5	08:43	15:17 (3)	08:07	15:34 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33
6	08:43	15:42 (2)	08:05	15:35 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35
7	08:42	15:44 (2)	08:03	15:36 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37
8	08:42	15:18 (3)	08:01	15:37 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39
9	08:41	15:46 (2)	07:59	16:05 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
10	08:40	15:20 (3)	07:57	16:03 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42
11	08:40	15:50 (2)	07:55	16:02 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44
12	08:39	15:21 (3)	07:53	15:55 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46
13	08:38	15:22 (3)	07:51	15:55 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48
14	08:37	15:23 (3)	07:49	15:57 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
15	08:36	15:25 (3)	07:47	16:00 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52
16	08:35	15:26 (3)	07:45	16:01 (2)	06:40	06:29	05:25	04:53	05:14	06:04	06:59	07:54
17	08:34	15:27 (3)	07:43	16:02 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55
18	08:33	15:29 (3)	07:41	16:03 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57
19	08:32	15:30 (2)	07:39	16:04 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
20	08:31	15:31 (2)	07:37	16:05 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
21	08:30	15:32 (2)	07:35	16:06 (2)	06:29	06:14	05:17	04:54	05:21	06:13	07:08	08:03
22	08:29	15:33 (2)	07:33	16:07 (2)	06:27	06:12	05:15	04:55	05:23	06:15	07:10	08:05
23	08:28	15:34 (2)	07:31	16:08 (2)	06:25	06:10	05:13	04:55	05:24	06:17	07:12	08:07
24	08:27	15:35 (2)	07:29	16:09 (2)	06:23	06:09	05:11	04:55	05:26	06:19	07:13	08:09
25	08:26	15:36 (2)	07:27	16:10 (2)	06:21	06:07	05:10	04:55	05:27	06:20	07:15	08:11
26	08:25	15:37 (2)	07:25	16:11 (2)	06:19	06:05	05:09	04:55	05:28	06:22	07:17	08:13
27	08:24	15:38 (2)	07:23	16:12 (2)	06:17	06:03	05:07	04:55	05:29	06:23	07:19	08:15
28	08:23	15:39 (2)	07:21	16:13 (2)	06:15	06:01	05:05	04:55	05:30	06:24	07:19	08:17
29	08:22	15:40 (2)	07:19	16:14 (2)	06:13	06:00	05:03	04:55	05:31	06:25	07:20	08:19
30	08:21	15:41 (2)	07:17	16:15 (2)	06:11	05:58	05:01	04:55	05:32	06:26	07:21	08:21
31	08:20	15:42 (2)	07:15	16:16 (2)	06:10	05:57	05:00	04:55	05:33	06:27	07:22	08:23
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	1017	336									1046	674
Sun reduction	0.24	0.23									0.27	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.66	0.66									0.66	0.66
Total reduction	0.16	0.15									0.18	0.14
Total, real	163	52								5	183	92

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: **6918 Kellystown** Description: **5 no. turbine Wind Farm, Co. Louth**

Licensed user: **Jennings O'Donovan**
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: **28/03/2025 12:44/4.0.552**

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EP - H146

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		15:16 (3)	08:14		15:34 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26			07:24		15:07 (2)	08:19		15:03 (3)			
	16:15	21	15:37 (3)	17:06	44	16:18 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05			16:54	38	15:45 (2)	16:10	31	15:34 (2)			
2	08:44		15:17 (3)	08:12		15:34 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28			07:26		15:06 (2)	08:21		15:03 (3)			
	16:16	22	15:39 (3)	17:08	44	16:18 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02			16:52	40	15:46 (2)	16:09	29	15:32 (2)			
3	08:44		15:17 (3)	08:10		15:34 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30			07:28		15:05 (2)	08:22		15:03 (3)			
	16:17	22	15:39 (3)	17:10	44	16:18 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00			16:50	41	15:46 (2)	16:08	26	15:29 (3)			
4	08:43		15:18 (3)	08:08		15:34 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31			07:30		15:05 (2)	08:24		15:04 (3)			
	16:18	23	15:41 (3)	17:12	44	16:18 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57			16:48	42	15:47 (2)	16:08	26	15:30 (3)			
5	08:43		15:18 (3)	08:07		15:34 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33			07:32		15:04 (2)	08:25		15:04 (3)			
	16:19	24	15:42 (3)	17:14	43	16:17 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55			16:46	43	15:47 (2)	16:07	25	15:29 (3)			
6	08:43		15:19 (3)	08:05		15:34 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35			07:34		15:04 (2)	08:26		15:05 (3)			
	16:21	25	15:44 (3)	17:16	43	16:17 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52			16:44	43	15:47 (2)	16:07	25	15:30 (3)			
7	08:42		15:19 (3)	08:03		15:35 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37			07:36		15:04 (2)	08:28		15:05 (3)			
	16:22	25	15:44 (3)	17:18	42	16:17 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50			16:43	43	15:47 (2)	16:06	24	15:29 (3)			
8	08:42		15:19 (3)	08:01		15:36 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39			07:38		15:03 (2)	08:29		15:05 (3)			
	16:24	25	15:44 (3)	17:20	41	16:17 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48			16:41	44	15:47 (2)	16:06	23	15:28 (3)			
9	08:41		15:20 (3)	07:59		15:36 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41			07:40		15:04 (2)	08:30		15:06 (3)			
	16:25	25	15:45 (3)	17:22	40	16:17 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45			16:39	44	15:48 (2)	16:05	22	15:28 (3)			
10	08:40		15:21 (3)	07:57		15:36 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42			07:42		15:04 (2)	08:32		15:06 (3)			
	16:26	29	15:50 (2)	17:24	39	16:16 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43			16:37	44	15:48 (2)	16:05	22	15:28 (3)			
11	08:40		15:21 (3)	07:55		15:38 (2)	06:53	06:37	05:33	04:55	05:08	05:56	06:50	07:44			07:44		15:05 (2)	08:33		15:06 (3)			
	16:28	31	15:52 (2)	17:26	37	16:15 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40			16:35	43	15:48 (2)	16:05	21	15:27 (3)			
12	08:39		15:22 (3)	07:53		15:39 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46			07:46		15:05 (2)	08:34		15:07 (3)			
	16:30	32	15:54 (2)	17:28	35	16:14 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38			16:34	43	15:48 (2)	16:05	20	15:27 (3)			
13	08:38		15:23 (3)	07:51		15:40 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48			07:47		15:05 (2)	08:35		15:07 (3)			
	16:31	32	15:55 (2)	17:30	32	16:12 (2)	18:32	20:22	21:17	21:57	21:52	21:01	19:49	18:35			16:32	43	15:48 (2)	16:04	19	15:27 (3)			
14	08:37		15:23 (3)	07:49		15:41 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50			07:49		15:05 (2)	08:36		15:08 (3)			
	16:33	34	15:57 (2)	17:32	30	16:11 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33			16:31	43	15:48 (2)	16:04	18	15:26 (3)			
15	08:36		15:24 (3)	07:47		15:43 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52			07:51		15:06 (2)	08:37		15:08 (3)			
	16:34	35	15:59 (2)	17:34	27	16:10 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31			16:29	42	15:48 (2)	16:04	18	15:26 (3)			
16	08:35		15:24 (3)	07:45		15:45 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54			07:53		15:06 (2)	08:38		15:09 (3)			
	16:36	36	16:00 (2)	17:36	23	16:08 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29			16:27	41	15:47 (2)	16:05	17	15:26 (3)			
17	08:34		15:26 (3)	07:43		15:49 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55			07:55		15:07 (2)	08:38		15:09 (3)			
	16:38	36	16:02 (2)	17:38	17	16:06 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26			16:26	40	15:47 (2)	16:05	18	15:27 (3)			
18	08:33		15:27 (3)	07:41		15:53 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57			07:57		15:08 (2)	08:39		15:10 (3)			
	16:40	38	16:05 (2)	17:40	7	16:00 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24			16:24	39	15:47 (2)	16:05	17	15:27 (3)			
19	08:32		15:29 (3)	07:39		06:33	06:18	05:19	04:54	04:54	05:18	06:10	07:05	07:59			07:59		15:08 (2)	08:40		15:11 (3)			
	16:41	38	16:07 (2)	17:42		18:36	20:33	21:27	22:00	21:45	21:45	20:48	19:34	18:22			16:23	38	15:46 (2)	16:05	17	15:28 (3)			
20	08:31		15:30 (3)	07:36		06:34	06:14	05:18	04:54	04:54	05:20	06:14	07:09	08:00			08:00		15:09 (2)	08:41		15:12 (3)			
	16:43	38	16:08 (2)	17:44		18:38	20:35	21:28	22:00	21:41	21:41	20:46	19:32	18:20			16:22	37	15:46 (2)	16:06	16	15:27 (3)			
21	08:30		15:33 (3)	07:34		06:28	06:14	05:16	04:54	04:54	05:21	06:13	07:08	08:03			08:02		15:08 (3)	08:41		15:12 (3)			
	16:45	37	16:10 (2)	17:46		18:40	20:37	21:30	22:01	21:42	21:42	20:44	19:29	18:17			16:20	37	15:45 (2)	16:06	16	15:28 (3)			
22	08:29		15:34 (2)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05				08:04		15:06 (3)	08:42		15:12 (3)			
	16:47	37	16:11 (2)	17:48		18:42	20:39	21:31	22:01	21:41	21:41	20:42	19:27	18:15			16:19	38	15:44 (2)	16:06	16	15:28 (3)			
23	08:27		15:34 (2)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07				08:06		15:05 (3)	08:42		15:13 (3)			
	16:49	38	16:12 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13				16:18	38	15:43 (2)	16:07	16	15:29 (3)			
24	08:26		15:34 (2)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09					16:21 (2)	08:08		15:13 (3)				
	16:50	39	16:13 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11				11	16:32 (2)	16:17	38	15:42 (2)	16:08	16	15:29 (3)	
25	08:25		15:34 (2)	07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11					15:17 (2)	08:09		15:04 (3)	08:43			
	16:52	40	16:14 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09				19	15:36 (2)	16:16	37	15:41 (2)	16:08	17	15:30 (3)	
26	08:23		15:33 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13					15:14 (2)	08:11		15:03 (3)	08:43			
	16:54	41	16:14 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06				24	15:38 (2)	16:14	36	15:39 (2)	16:09	17	15:30 (3)	
27	08:22		15:33 (2)	07:21		06:15	06:01	05:08	04:55	05:28	06:21	07:16	08:13					15:12 (2)	08:09		15:03 (3)	08:44			
	16:56	42	16:15 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04					15:40 (2)	16:13	35	15:38 (2)	16:10	17	15:32 (3)	
28	08:20		15:33 (2)	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16					15:10 (2)	08:14		15:03 (3)	08:44			
	16:58	43	16:16 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02				31	15:41 (2)	16:12	34	15:37 (2)	16:10	18	15:33 (3)	
29	08:19		15:33 (2)			07:09	05:56	05:06	04:57	05:34	06:27	07:22	07:18					15:09 (2)	08:16		15:03 (3)	08:44			
	17:00	43	16:16 (2)			19:55	20:52	21:41	22:01	21:30															

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EQ - H147

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: ER - H148

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:09 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:36 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:37	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:44 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: ES - H149

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: ET - H150

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		15:26 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24									08:19	15:11 (1)		
	16:15	11	15:37 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54									16:10	23	15:34 (1)	
2	08:44		15:27 (1)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26									08:21		15:12 (1)	
	16:16	11	15:38 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52									16:09	21	15:33 (1)	
3	08:44		15:26 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28									08:22		15:12 (1)	
	16:17	13	15:39 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50									16:08	20	15:32 (1)	
4	08:43		15:27 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30									08:24		15:12 (1)	
	16:18	14	15:41 (1)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48									16:08	20	15:32 (1)	
5	08:43		15:27 (1)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32									08:25		15:12 (1)	
	16:19	15	15:42 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46									16:07	18	15:30 (1)	
6	08:43		15:27 (1)	08:05	07:05	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34									08:27		15:14 (1)	
	16:21	17	15:44 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44									16:07	16	15:30 (1)	
7	08:42		15:27 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36									08:28		15:14 (1)	
	16:22	18	15:45 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43									16:06	15	15:29 (1)	
8	08:42		15:27 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38									08:29		15:15 (1)	
	16:24	19	15:46 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41									16:06	14	15:29 (1)	
9	08:41		15:28 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40									08:30		15:15 (1)	
	16:25	21	15:49 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39									16:05	13	15:28 (1)	
10	08:40		15:29 (1)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42									08:32		15:16 (1)	
	16:26	21	15:50 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37									16:05	12	15:28 (1)	
11	08:40		15:29 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44									08:33		15:16 (1)	
	16:28	23	15:52 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:35									16:05	11	15:27 (1)	
12	08:39		15:29 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46									08:34		15:16 (1)	
	16:30	23	15:52 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34									16:05	11	15:27 (1)	
13	08:38		15:30 (1)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47									08:35		15:18 (1)	
	16:31	23	15:53 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32									16:05	9	15:27 (1)	
14	08:37		15:30 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49									08:36		15:19 (1)	
	16:33	23	15:53 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31									16:04	8	15:27 (1)	
15	08:36		15:31 (1)	07:47	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51									08:37		15:19 (1)	
	16:34	22	15:53 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29									16:04	8	15:27 (1)	
16	08:35		15:32 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53									08:38		15:19 (1)	
	16:36	22	15:54 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27									16:05	7	15:26 (1)	
17	08:34		15:32 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55									08:39		15:20 (1)	
	16:38	21	15:53 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:26	16:26									16:05	7	15:27 (1)	
18	08:33		15:33 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57									15:14 (1)		08:39	
	16:40	20	15:53 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:24									15:22 (1)		16:05	
19	08:32		15:34 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59									15:12 (1)		08:40	
	16:41	19	15:53 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23									15:25 (1)		16:05	
20	08:31		15:34 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01									15:11 (1)		08:41	
	16:43	18	15:52 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22									15:26 (1)		16:06	
21	08:30		15:35 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02									15:11 (1)		08:41	
	16:45	17	15:52 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20									15:27 (1)		16:06	
22	08:29		15:36 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04									15:10 (1)		08:42	
	16:47	15	15:51 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19									15:28 (1)		16:06	
23	08:27		15:38 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06									15:10 (1)		08:42	
	16:49	13	15:51 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18									15:29 (1)		16:07	
24	08:26		15:40 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08									15:10 (1)		08:43	
	16:50	8	15:48 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17									15:30 (1)		16:08	
25	08:25			07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09									15:10 (1)		08:43	
	16:52			17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16									15:31 (1)		16:08	
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11									15:10 (1)		08:43	
	16:54			17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14									15:32 (1)		16:09	
27	08:22			07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13									15:10 (1)		08:44	
	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13									15:32 (1)		16:10	
28	08:20			07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14									15:10 (1)		08:44	
	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12									15:33 (1)		16:11	
29	08:19				07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16									15:10 (1)		08:44	
	17:00				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12									15:33 (1)		16:11	
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18									15:10 (1)		08:44	
	17:02				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11									15:33 (1)		16:12	
31	08:15				07:04		05:04		05:37	06:31		07:22											08:44		
	17:04				19:58		21:44																		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EU - H151

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	14:46 (4)	08:14	16:22 (3)	07:16	17:03 (2)	07:01	05:52	05:03		
	16:15	26	15:12 (4)	17:06	12	16:34 (3)	18:02	31	17:34 (2)	20:00	21:45
2	08:44	14:47 (4)	08:12	16:22 (3)	07:14	17:02 (2)	06:59	05:50	05:02		
	16:16	25	15:12 (4)	17:08	15	16:37 (3)	18:04	34	17:36 (2)	20:02	21:46
3	08:44	14:48 (4)	08:10	16:22 (3)	07:12	17:02 (2)	06:56	05:48	05:01		
	16:17	24	15:12 (4)	17:10	17	16:39 (3)	18:06	36	17:38 (2)	20:04	21:48
4	08:43	14:49 (4)	08:08	16:22 (3)	07:09	17:02 (2)	06:54	05:46	05:00		
	16:18	23	15:12 (4)	17:12	19	16:41 (3)	18:07	38	17:40 (2)	20:06	21:49
5	08:43	14:49 (4)	08:07	16:22 (3)	07:07	17:01 (2)	06:51	05:44	04:59		
	16:19	23	15:12 (4)	17:14	21	16:43 (3)	18:09	38	17:39 (2)	20:07	21:50
6	08:43	14:51 (4)	08:05	16:22 (3)	07:04	17:01 (2)	06:49	05:42	04:58		
	16:21	21	15:12 (4)	17:16	23	16:45 (3)	18:11	39	17:40 (2)	20:09	21:51
7	08:42	14:52 (4)	08:03	16:23 (3)	07:02	17:00 (2)	06:47	05:40	04:58		
	16:22	20	15:12 (4)	17:18	22	16:45 (3)	18:13	39	17:39 (2)	20:11	21:52
8	08:42	14:53 (4)	08:01	16:24 (3)	07:00	17:01 (2)	06:44	05:38	04:57		
	16:24	18	15:11 (4)	17:20	21	16:45 (3)	18:15	38	17:39 (2)	20:13	21:53
9	08:41	14:55 (4)	07:59	16:25 (3)	06:57	17:00 (2)	06:42	05:36	04:57		
	16:25	16	15:11 (4)	17:22	19	16:44 (3)	18:17	38	17:38 (2)	20:15	21:54
10	08:40	14:57 (4)	07:57	16:26 (3)	06:55	17:01 (2)	06:39	05:34	04:56		
	16:26	13	15:10 (4)	17:24	17	16:43 (3)	18:19	36	17:37 (2)	20:17	21:55
11	08:40	14:59 (4)	07:55	16:28 (3)	06:53	17:02 (2)	06:37	05:33	04:56		
	16:28	10	15:09 (4)	17:26	13	16:41 (3)	18:21	35	17:37 (2)	20:19	21:55
12	08:39	15:03 (4)	07:53	16:32 (3)	06:50	17:02 (2)	06:35	05:31	04:55		
	16:30	3	15:06 (4)	17:28	6	16:38 (3)	18:23	33	17:35 (2)	20:20	21:56
13	08:38		07:51		06:48	17:04 (2)	06:32	05:29	04:55		
	16:31		17:30		18:25	30	17:34 (2)	20:22	21:17	21:57	
14	08:37		07:49		06:45	17:04 (2)	06:30	05:27	04:55		
	16:33		17:32		18:27	28	17:32 (2)	20:24	21:18	21:58	
15	08:36		07:47		06:43	17:06 (2)	06:28	05:26	04:54		
	16:34		17:34		18:28	25	17:31 (2)	20:26	21:20	21:58	
16	08:35		07:45		06:40	17:08 (2)	06:25	05:24	04:54		
	16:36		17:36		18:30	20	17:28 (2)	20:28	21:22	21:59	
17	08:34		07:43		06:38	17:11 (2)	06:23	05:22	04:54		
	16:38		17:38		18:32	14	17:25 (2)	20:30	21:23	21:59	
18	08:33		07:41		06:35		06:21	05:21	04:54		
	16:40		17:40		18:34		20:31	21:25	22:00		
19	08:32		07:39		06:33		06:18	05:19	04:54		
	16:41		17:42		18:36		20:33	21:27	22:00		
20	08:31		07:36		06:31		06:16	05:18	04:54		
	16:43		17:44		18:38		20:35	21:28	22:00		
21	08:30		07:34		06:28		06:14	05:16	04:54		
	16:45		17:46		18:40		20:37	21:30	22:01		
22	08:29		07:32		06:26		06:12	05:15	04:55		
	16:47		17:48	6	17:19 (2)		20:39	21:31	22:01		
23	08:27		07:30		06:23		06:09	05:13	04:55		
	16:49		17:50	11	17:22 (2)		20:41	21:33	22:01		
24	08:26		07:28		06:21		06:07	05:12	04:55		
	16:50		17:52	15	17:24 (2)		20:43	21:34	22:01		
25	08:24		07:25		06:18		06:05	05:11	04:55		
	16:52		17:54	19	17:26 (2)		20:44	21:36	22:01		
26	08:23		07:23		06:16		06:03	05:09	04:56		
	16:54		17:56	22	17:28 (2)		20:46	21:37	22:01		
27	08:22		07:21		06:13		06:00	05:08	04:56		
	16:56		17:58	26	17:31 (2)		20:48	21:39	22:01		
28	08:20	16:23 (3)	07:18		06:11		05:58	05:07	04:57		
	16:58	3	16:26 (3)	18:00	28	17:32 (2)	18:53	20:50	21:40	22:01	
29	08:19	16:22 (3)			07:08		05:56	05:06	04:57		
	17:00	6	16:28 (3)		19:54		20:52	21:41	22:01		
30	08:17	16:22 (3)			07:06		05:54	05:05	04:58		
	17:02	7	16:29 (3)		19:56		20:54	21:43	22:00		
31	08:15	16:21 (3)			07:04			05:04			
	17:04	10	16:31 (3)		19:58			21:44			
Potential sun hours	250		273		367		420	494	510		
Total, worst case	248		332		552						
Sun reduction	0.24		0.23		0.27						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.65		0.67		0.68						
Total reduction	0.16		0.15		0.18						
Total, real	39		51		101						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: EU - H151

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:42 (2) 18:13 (2)	07:24 16:54	15:56 (3) 16:13 (3)	08:19 16:10	14:41 (4) 14:51 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:40 (2) 18:14 (2)	07:26 16:52	15:54 (3) 16:14 (3)	08:21 16:09	14:39 (4) 14:52 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:39 (2) 18:15 (2)	07:28 16:50	15:53 (3) 16:15 (3)	08:22 16:08	14:38 (4) 14:54 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:39 (2) 18:15 (2)	07:30 16:48	15:53 (3) 16:15 (3)	08:24 16:08	14:38 (4) 14:56 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:38 (2) 18:16 (2)	07:32 16:46	15:52 (3) 16:15 (3)	08:25 16:07	14:37 (4) 14:57 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:37 (2) 18:16 (2)	07:34 16:44	15:52 (3) 16:12 (3)	08:26 16:07	14:37 (4) 14:58 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:36 (2) 18:15 (2)	07:36 16:43	15:52 (3) 16:10 (3)	08:28 16:06	14:37 (4) 14:59 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:36 (2) 18:15 (2)	07:38 16:41	15:51 (3) 16:08 (3)	08:29 16:06	14:36 (4) 14:59 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:36 (2) 18:14 (2)	07:40 16:39	15:52 (3) 16:07 (3)	08:30 16:05	14:37 (4) 15:01 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:36 (2) 18:14 (2)	07:42 16:37	15:53 (3) 16:05 (3)	08:31 16:05	14:37 (4) 15:01 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:36 (2) 18:11 (2)	07:44 16:35	15:53 (3) 16:03 (3)	08:33 16:05	14:36 (4) 15:02 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:36 (2) 18:09 (2)	07:45 16:34	15:53 (3) 16:01 (3)	08:34 16:05	14:36 (4) 15:03 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:36 (2) 18:07 (2)	07:47 16:32	15:54 (3) 15:59 (3)	08:35 16:05	14:37 (4) 15:03 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:37 (2) 18:04 (2)	07:49 16:31	15:55 (3) 15:57 (3)	08:36 16:04	14:37 (4) 15:04 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:38 (2) 18:02 (2)	07:51 16:29	08:37 16:04	15:04 (4) 15:04 (4)	14:37 (4) 15:04 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:39 (2) 17:59 (2)	07:53 16:27	08:38 16:05	15:05 (4) 15:05 (4)	14:37 (4) 15:05 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:40 (2) 17:57 (2)	07:55 16:26	08:38 16:05	15:06 (4) 15:06 (4)	14:38 (4) 15:06 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:41 (2) 17:55 (2)	07:57 16:24	08:39 16:05	15:07 (4) 15:07 (4)	14:39 (4) 15:07 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:43 (2) 17:52 (2)	07:59 16:23	08:40 16:05	15:08 (4) 15:08 (4)	14:39 (4) 15:08 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:46 (2) 17:50 (2)	08:00 16:22	08:41 16:06	15:09 (4) 15:07 (4)	14:39 (4) 15:07 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:02 16:20	08:41 16:06	15:10 (4) 15:08 (4)	14:40 (4) 15:08 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:04 16:19	08:42 16:06	15:10 (4) 15:08 (4)	14:40 (4) 15:08 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:06 16:18	08:42 16:07	15:11 (4) 15:09 (4)	14:41 (4) 15:09 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:08 16:17	08:43 16:08	15:11 (4) 15:09 (4)	14:41 (4) 15:09 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:09 16:16	08:43 16:08	15:12 (4) 15:10 (4)	14:41 (4) 15:10 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	17:54 (2) 18:05 (2)	07:13 17:06	08:11 16:14	08:43 16:09	15:12 (4) 15:10 (4)	14:42 (4) 15:10 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	17:50 (2) 18:08 (2)	07:15 17:04	08:13 16:13	08:44 16:10	15:13 (4) 15:11 (4)	14:43 (4) 15:11 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	17:48 (2) 18:11 (2)	07:16 17:02	08:14 16:12	08:44 16:10	15:14 (4) 15:11 (4)	14:44 (4) 15:11 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	17:46 (2) 18:12 (2)	07:18 17:00	08:16 16:12	08:44 16:11	15:15 (4) 15:12 (4)	14:44 (4) 15:12 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:43 (2) 18:13 (2)	07:20 16:58	08:18 16:08 (3)	14:45 (4) 14:46 (4)	15:16 (4) 15:12 (4)	14:44 (4) 15:11 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	15:57 (3) 16:10 (3)	08:11 16:11	08:44 16:12	15:17 (4) 15:11 (4)	14:45 (4) 15:11 (4)
Potential sun hours	512	460	382	328	259		233	770	
Total, worst case			108	604	212				
Sun reduction			0.32	0.29	0.27			0.21	
Oper. time red.			1.00	1.00	1.00			1.00	
Wind dir. red.			0.68	0.68	0.66			0.65	
Total reduction			0.22	0.20	0.17			0.13	
Total, real			23	119	37			103	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: EV - H152

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		15:08 (2)	08:14	07:16		07:01		05:52		05:03		04:59		05:39		06:33		07:26		07:24		08:19		14:53 (2)
	16:15	27	15:35 (2)	17:06	18:02		20:00		20:55		21:45		22:00		21:25		20:18		19:05		16:54		16:10	30	15:23 (2)
2	08:44		15:08 (2)	08:12	07:14		06:59		05:50		05:02		04:59		05:40		06:35		07:28		07:26		08:21		14:53 (2)
	16:16	28	15:36 (2)	17:08	18:04		20:02		20:57		21:47		22:00		21:23		20:16		19:02		16:52		16:09	29	15:22 (2)
3	08:44		15:08 (2)	08:10	07:12		06:56		05:48		05:01		05:00		05:42		06:36		07:30		07:28		08:22		14:54 (2)
	16:17	28	15:36 (2)	17:10	18:06		20:04		20:59		21:48		21:59		21:21		20:13		19:00		16:50		16:08	29	15:23 (2)
4	08:43		15:09 (2)	08:08	07:09		06:54		05:46		05:00		05:01		05:44		06:38		07:31		07:30		08:24		14:55 (2)
	16:18	28	15:37 (2)	17:12	18:07		20:06		21:01		21:49		21:59		21:19		20:11		18:57		16:48		16:08	29	15:24 (2)
5	08:43		15:09 (2)	08:07	07:07		06:51		05:44		04:59		05:02		05:45		06:40		07:33		07:32		08:25		14:55 (2)
	16:19	28	15:37 (2)	17:14	18:09		20:07		21:03		21:50		21:58		21:17		20:09		18:55		16:46		16:07	29	15:24 (2)
6	08:43		15:10 (2)	08:05	07:04		06:49		05:42		04:58		05:03		05:47		06:42		07:35		07:34		08:26		14:56 (2)
	16:21	28	15:38 (2)	17:16	18:11		20:09		21:04		21:51		21:58		21:15		20:06		18:52		16:44		16:07	28	15:24 (2)
7	08:42		15:10 (2)	08:03	07:02		06:47		05:40		04:58		05:04		05:49		06:43		07:37		07:36		08:28		14:56 (2)
	16:22	29	15:39 (2)	17:18	18:13		20:11		21:06		21:52		21:57		21:14		20:04		18:50		16:43		16:06	28	15:24 (2)
8	08:42		15:10 (2)	08:01	07:00		06:44		05:38		04:57		05:05		05:50		06:45		07:39		07:38		08:29		14:56 (2)
	16:23	29	15:39 (2)	17:20	18:15		20:13		21:08		21:53		21:56		21:12		20:01		18:48		16:41		16:06	28	15:24 (2)
9	08:41		15:11 (2)	07:59	06:57		06:42		05:36		04:57		05:06		05:52		06:47		07:41		07:40		08:30		14:57 (2)
	16:25	29	15:40 (2)	17:22	18:17		20:15		21:10		21:54		21:55		21:10		19:59		18:45		16:39		16:05	28	15:25 (2)
10	08:40		15:11 (2)	07:57	06:55		06:39		05:34		04:56		05:07		05:54		06:49		07:42		07:42		08:32		14:57 (2)
	16:26	29	15:40 (2)	17:24	18:19		20:17		21:11		21:55		21:55		21:08		19:56		18:43		16:37		16:05	28	15:25 (2)
11	08:40		15:11 (2)	07:55	06:53		06:37		05:32		04:56		05:08		05:56		06:50		07:44		07:44		08:33		14:58 (2)
	16:28	30	15:41 (2)	17:26	18:21		20:19		21:13		21:55		21:54		21:05		19:54		18:40		16:35		16:05	27	15:25 (2)
12	08:39		15:12 (2)	07:53	06:50		06:35		05:31		04:55		05:09		05:57		06:52		07:46		07:46		08:34		14:58 (2)
	16:29	29	15:41 (2)	17:28	18:23		20:20		21:15		21:56		21:53		21:03		19:51		18:38		16:34		16:05	28	15:26 (2)
13	08:38		15:12 (2)	07:51	06:48		06:32		05:29		04:55		05:10		05:59		06:54		07:48		07:47		08:35		14:59 (2)
	16:31	29	15:41 (2)	17:30	18:25		20:22		21:17		21:57		21:52		21:01		19:49		18:36		16:32		16:04	27	15:26 (2)
14	08:37		15:13 (2)	07:49	06:45		06:30		05:27		04:55		05:12		06:01		06:56		07:50		07:49		08:36		15:00 (2)
	16:33	28	15:41 (2)	17:32	18:27		20:24		21:18		21:58		21:51		20:59		19:47		18:33		16:30		16:04	27	15:27 (2)
15	08:36		15:13 (2)	07:47	06:43		06:28		05:25		04:54		05:13		06:03		06:58		07:52		07:51		08:37		15:00 (2)
	16:34	29	15:42 (2)	17:34	18:28		20:26		21:20		21:58		21:50		20:57		19:44		18:31		16:29		16:04	26	15:26 (2)
16	08:35		15:13 (2)	07:45	06:40		06:25		05:24		04:54		05:14		06:04		06:59		07:54		07:53		14:59 (2)		15:00 (2)
	16:36	28	15:41 (2)	17:36	18:30		20:28		21:22		21:59		21:49		20:55		19:42		18:29		16:27	10	15:09 (2)	26	15:26 (2)
17	08:34		15:14 (2)	07:43	06:38		06:23		05:22		04:54		05:16		06:06		07:01		07:55		07:55		14:56 (2)		15:01 (2)
	16:38	27	15:41 (2)	17:38	18:32		20:30		21:23		21:59		21:47		20:53		19:39		18:26		16:26	15	15:11 (2)	26	15:27 (2)
18	08:33		15:15 (2)	07:41	06:35		06:21		05:21		04:54		05:17		06:08		07:03		07:57		07:57		14:55 (2)		15:02 (2)
	16:40	27	15:42 (2)	17:40	18:34		20:31		21:25		22:00		21:46		20:51		19:37		18:24		16:24	18	15:13 (2)	25	15:27 (2)
19	08:32		15:16 (2)	07:39	06:33		06:18		05:19		04:54		05:18		06:10		07:05		07:59		07:59		14:54 (2)		15:03 (2)
	16:41	26	15:42 (2)	17:42	18:36		20:33		21:27		22:00		21:45		20:48		19:34		18:22		16:23	20	15:14 (2)	25	15:28 (2)
20	08:31		15:16 (2)	07:36	06:31		06:16		05:18		04:54		05:20		06:12		07:06		08:01		08:00		14:53 (2)		15:03 (2)
	16:43	25	15:41 (2)	17:44	18:38		20:35		21:28		22:00		21:44		20:46		19:32		18:20		16:22	22	15:15 (2)	24	15:27 (2)
21	08:30		15:18 (2)	07:34	06:28		06:14		05:16		04:54		05:21		06:13		07:08		08:03		08:02		14:53 (2)		15:04 (2)
	16:45	23	15:41 (2)	17:46	18:40		20:37		21:30		22:01		21:42		20:44		19:29		18:17		16:20	23	15:16 (2)	24	15:28 (2)
22	08:29		15:18 (2)	07:32	06:26		06:11		05:15		04:55		05:23		06:15		07:10		08:05		08:04		14:52 (2)		15:04 (2)
	16:47	22	15:40 (2)	17:48	18:42		20:39		21:31		22:01		21:41		20:42		19:27		18:15		16:19	25	15:17 (2)	24	15:28 (2)
23	08:27		15:20 (2)	07:30	06:23		06:09		05:13		04:55		05:24		06:17		07:12		08:07		08:06		14:52 (2)		15:05 (2)
	16:49	20	15:40 (2)	17:50	18:43		20:41		21:33		22:01		21:39		20:39		19:24		18:13		16:18	26	15:18 (2)	24	15:29 (2)
24	08:26		15:21 (2)	07:28	06:21		06:07		05:12		04:55		05:26		06:19		07:13		08:09		08:08		14:52 (2)		15:05 (2)
	16:50	18	15:39 (2)	17:52	18:45		20:43		21:34		22:01		21:38		20:37		19:22		18:11		16:17	27	15:19 (2)	24	15:29 (2)
25	08:25		15:24 (2)	07:25	06:18		06:05		05:11		04:55		05:27		06:20		07:15		08:11		08:09		14:52 (2)		15:05 (2)
	16:52	14	15:38 (2)	17:54	18:47		20:44		21:36		22:01		21:36		20:35		19:19		17:09		16:16	27	15:19 (2)	25	15:30 (2)
26	08:23		15:26 (2)	07:23	06:16		06:03		05:09		04:56		05:29		06:22		07:17		08:13		08:11		14:52 (2)		15:05 (2)
	16:54	10	15:36 (2)	17:56	18:49		20:46		21:37		22:01		21:35		20:32		19:17		17:06		16:14	28	15:20 (2)	25	15:30 (2)
27	08:22			07:21	06:13		06:00		05:08		04:56		05:30		06:24		07:19		08:15		08:13		14:53 (2)		15:06 (2)
	16:56			17:58	18:51		20:48		21:39		22:01		21:33		20:30		19:14		17:04		16:13	28	15:21 (2)	26	15:32 (2)
28	08:20			07:19	06:11		05:58		05:07		04:57		05:32		06:26		07:21		08:16		08:14		14:53 (2)		15:07 (2)
	16:58			18:00	08:53		20:50		21:40		22:01		21:32		20:28		19:12		17:02		16:12	29	15:22 (2)	26	15:33 (2)
29	08:19				07:08		05:56		05:06		04:57		05:34		06:27		07:22		08:18		08:16		14:52 (2)		15:07 (2)
	17:00				19:55		20:52		21:41		22:01		21:30		20:25		19:09		17:00		16:11	29	15:21 (2)	27	15:34 (2)
30	08:17				07:06		05:54		05:05		04:58		05:35		06:29		07:24		08:20		08:18				

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EW - H153

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EX - H154

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EY - H155

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: EZ - H156

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
2	08:44	08:12	08:58 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
3	08:44	08:10	08:58 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
4	08:43	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
5	08:43	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25
6	08:43	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
7	08:42	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
8	08:42	08:01	08:30 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
9	08:41	07:59	08:30 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
10	08:41	07:57	08:31 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32
11	08:40	07:55	08:32 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
12	08:39	07:53	08:33 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34
13	08:38	07:51	08:34 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
14	08:37	07:49	08:34 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
15	08:36	07:47	08:36 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
16	08:36	07:45	08:39 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38
17	08:35	07:43	08:50 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
18	08:33	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:40	08:41
19	08:32	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:40	08:40
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:41	08:41
21	08:30	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:42	08:42
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:43	08:43
23	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:44	08:44
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:45	08:45
25	08:25	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:46	08:46
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:47	08:47
27	08:22	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:48	08:48
28	08:20	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:49	08:49
29	08:19	07:18	06:10	05:57	05:06	04:58	05:34	06:28	07:23	08:19	08:50	08:50
30	08:17	07:16	06:09	05:56	05:05	04:59	05:35	06:29	07:24	08:20	08:51	08:51
31	08:15	07:14	06:08	05:55	05:04	04:58	05:36	06:31	07:26	08:22	08:52	08:52
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	38	366										242
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.61	0.61										0.62
Total reduction	0.15	0.14										0.13
Total, real	6	52										31

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case **Shadow receptor:** FA - H157

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
2	16:15	17:06	09:02 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:10
3	08:44	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
4	16:16	17:08	09:02 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
5	08:44	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
6	16:17	17:10	09:02 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:08
7	08:43	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
8	16:18	17:12	09:02 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
9	08:43	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25
10	16:20	17:14	09:02 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
11	08:43	08:05	08:33 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
12	16:21	17:16	09:02 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:07
13	08:42	08:03	08:33 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
14	16:22	17:18	09:02 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
15	08:42	08:01	08:34 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
16	16:24	17:20	09:01 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
17	08:41	07:59	08:35 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
18	16:25	17:22	09:01 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:05
19	08:41	07:57	08:36 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32
20	16:27	17:24	09:00 (2)	18:19	20:17	21:12	21:55	21:58	21:08	19:57	18:43	16:05
21	08:40	07:55	08:37 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
22	16:28	17:26	08:59 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
23	08:39	07:53	08:38 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34
24	16:30	17:28	08:58 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
25	08:38	07:51	08:40 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
26	16:31	17:30	08:57 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:05
27	08:37	07:49	08:41 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
28	16:33	17:32	08:53 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:05
29	08:36	07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
30	16:34	17:34		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
31	08:36	07:45		06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38
32	16:36	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
33	08:35	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
34	16:38	17:38		18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
35	08:33	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39
36	16:40	17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
37	08:32	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:40
38	16:41	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:05
39	08:31	07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:41
40	16:43	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:06
41	08:30	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:41
42	16:45	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:06
43	08:29	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
44	16:47	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:07
45	08:27	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
46	16:49	17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:07
47	08:26	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
48	16:51	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:08
49	08:25	08:54 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:09
50	16:52	1 08:55 (2)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:08
51	08:23	08:52 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11
52	16:54	4 08:56 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:09
53	08:22	08:51 (2)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13
54	16:56	7 08:58 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:10
55	08:20	08:49 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14
56	16:58	10 08:59 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:11
57	08:19	08:47 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16
58	17:00	12 08:59 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:11
59	08:17	08:45 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18
60	17:02	15 09:00 (2)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:12
61	08:15	08:44 (2)		07:04		05:04		05:37	06:31		07:22	08:06
62	17:04	17 09:01 (2)		19:58		21:44		21:27	20:21		16:56	16:13
63	Potential sun hours	250	273	367	420	494	510	512	460	382	328	259
64	Total, worst case	66	326								81	323
65	Sun reduction	0.24	0.23								0.29	0.27
66	Oper. time red.	1.00	1.00								1.00	1.00
67	Wind dir. red.	0.61	0.61								0.61	0.61
68	Total reduction	0.15	0.14								0.18	0.16
69	Total, real	10	46								14	52

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FB - H158

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	09:46 (3)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
2	16:15	12:05 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	16:54	16:10
3	08:44	09:47 (3)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
4	16:16	12:06 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	16:52	16:09
5	08:44	09:48 (3)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
6	16:17	12:05 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	16:50	16:08
7	08:43	09:50 (3)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
8	16:18	12:05 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	16:57	16:08
9	08:43	09:53 (3)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25
10	16:20	12:05 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	16:55	16:07
11	08:43	11:27 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
12	16:21	12:05 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	16:53	16:07
13	08:42	11:27 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
14	16:22	12:05 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	16:50	16:06
15	08:42	11:28 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
16	16:24	12:04 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	16:48	16:06
17	08:41	11:30 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
18	16:25	12:05 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	16:45	16:05
19	08:41	11:31 (1)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32
20	16:27	12:04 (1)	17:24	18:22	20:17	21:12	21:55	21:58	21:08	19:57	16:43	16:05
21	08:40	11:33 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
22	16:28	12:03 (1)	17:26	18:28	20:21	21:19	21:56	21:54	21:06	19:54	16:41	16:05
23	08:39	11:34 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34
24	16:30	12:02 (1)	17:28	18:29	20:23	21:21	21:56	21:53	21:04	19:52	16:38	16:05
25	08:38	11:36 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
26	16:31	12:01 (1)	17:30	18:30	20:25	21:27	21:57	21:52	21:01	19:49	16:36	16:05
27	08:37	11:38 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
28	16:33	12:00 (1)	17:32	18:30	20:27	21:29	21:58	21:51	20:59	19:47	16:34	16:05
29	08:36	11:41 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
30	16:35	11:58 (1)	17:34	18:31	20:29	21:30	21:58	21:50	20:57	19:44	16:31	16:05
31	08:36	11:45 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38
1	16:36	11:54 (1)	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	16:28	16:05
2	08:35	17:43	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
3	16:38	17:38	07:41	06:31	06:16	05:15	04:54	05:18	06:12	07:06	08:01	08:41
4	08:33	17:41	07:41	06:28	06:14	05:21	04:54	05:18	06:12	07:06	08:01	08:41
5	16:40	17:40	07:40	06:28	06:14	05:21	04:54	05:18	06:12	07:06	08:01	08:41
6	08:32	17:39	07:39	06:27	06:13	05:19	04:54	05:18	06:10	07:05	07:59	08:40
7	16:41	17:42	07:42	06:29	06:15	05:21	04:54	05:18	06:12	07:06	08:01	08:41
8	08:31	17:42	07:42	06:29	06:15	05:21	04:54	05:18	06:12	07:06	08:01	08:41
9	16:43	17:44	07:44	06:30	06:16	05:22	04:55	05:19	06:13	07:08	08:03	08:42
10	08:30	17:44	07:44	06:30	06:16	05:22	04:55	05:19	06:13	07:08	08:03	08:42
11	16:45	17:46	07:46	06:31	06:17	05:23	04:56	05:20	06:14	07:09	08:04	08:43
12	08:29	17:46	07:46	06:31	06:17	05:23	04:56	05:20	06:14	07:09	08:04	08:43
13	16:47	17:48	07:48	06:32	06:18	05:24	04:57	05:21	06:15	07:10	08:05	08:44
14	08:27	17:50	07:50	06:33	06:19	05:25	04:58	05:22	06:16	07:11	08:06	08:45
15	16:49	17:52	07:52	06:34	06:20	05:26	04:59	05:23	06:17	07:12	08:07	08:46
16	08:26	17:52	07:52	06:34	06:20	05:26	04:59	05:23	06:17	07:12	08:07	08:46
17	16:51	17:53	07:53	06:35	06:21	05:27	04:60	05:24	06:18	07:13	08:08	08:47
18	08:25	17:54	07:54	06:35	06:21	05:27	04:60	05:24	06:18	07:13	08:08	08:47
19	16:52	17:55	07:55	06:36	06:22	05:28	04:61	05:25	06:19	07:14	08:09	08:48
20	08:23	17:56	07:56	06:36	06:22	05:28	04:61	05:25	06:19	07:14	08:09	08:48
21	16:54	17:57	07:57	06:37	06:23	05:29	04:62	05:26	06:20	07:15	08:10	08:49
22	08:22	17:58	07:58	06:37	06:23	05:29	04:62	05:26	06:20	07:15	08:10	08:49
23	16:56	17:59	07:59	06:38	06:24	05:30	04:63	05:27	06:21	07:16	08:11	08:50
24	08:20	18:00	08:00	06:38	06:24	05:30	04:63	05:27	06:21	07:16	08:11	08:50
25	16:58	18:01	08:01	06:39	06:25	05:31	04:64	05:28	06:22	07:17	08:12	08:51
26	08:19	18:02	08:02	06:39	06:25	05:31	04:64	05:28	06:22	07:17	08:12	08:51
27	17:00	18:03	08:03	06:40	06:26	05:32	04:65	05:29	06:23	07:18	08:13	08:52
28	08:17	18:04	08:04	06:40	06:26	05:32	04:65	05:29	06:23	07:18	08:13	08:52
29	17:02	18:05	08:05	06:41	06:27	05:33	04:66	05:30	06:24	07:19	08:14	08:53
30	08:15	18:06	08:06	06:41	06:27	05:33	04:66	05:30	06:24	07:19	08:14	08:53
31	17:04	18:07	08:07	06:42	06:28	05:34	04:67	05:31	06:25	07:20	08:15	08:54
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	565	299										
Sun reduction	0.24	0.23										
Oper. time red.	1.00	1.00										
Wind dir. red.	0.60	0.64										
Total reduction	0.15	0.15										
Total, real	82	44										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FC - H159

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
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18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FD - H160

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FE - H161

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
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13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FF - H162

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FG - H163

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	11:47 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	
2	16:15	25	12:12 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	18
3	08:44	11:48 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	
4	16:16	24	12:12 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	15
5	08:44	11:49 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	
6	16:17	22	12:11 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	13
7	08:43	11:51 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	
8	16:18	20	12:11 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	10
9	08:43	11:52 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	
10	16:20	17	12:09 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	7
11	08:43	11:55 (1)	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	18
12	16:21	13	12:08 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	12
13	08:42	11:59 (1)	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	4
14	16:22	6	12:05 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	16
15	08:42		08:01	08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	1
16	16:24		17:20	18:41 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	20
17	08:41		07:59	08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	1
18	16:25		17:22	18:42 (2)	18:17	20:15	21:10	21:54	21:56	21:10	20:00	22
19	08:41		07:57	08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	1
20	16:27		17:24	18:42 (2)	18:19	20:17	21:12	21:55	21:58	21:08	20:00	23
21	08:40		07:55	08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	1
22	16:28		17:26	18:43 (2)	18:21	20:19	21:13	21:56	21:54	21:06	20:04	25
23	08:39		07:53	08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	1
24	16:30		17:28	18:43 (2)	18:23	20:21	21:15	21:56	21:53	21:04	20:02	26
25	08:38		07:51	08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	1
26	16:31		17:30	18:43 (2)	18:25	20:22	21:17	21:57	21:52	21:01	20:00	28
27	08:37		07:49	08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	1
28	16:33		17:32	18:42 (2)	18:27	20:24	21:19	21:58	21:51	20:59	20:00	29
29	08:36		07:47	08:15 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	1
30	16:35		17:34	18:42 (2)	18:29	20:26	21:20	21:58	21:50	20:57	20:00	30
31	08:36		07:45	08:15 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	1
32	16:36		17:36	18:41 (2)	18:30	20:28	21:22	21:59	21:49	20:55	20:00	31
33	08:35		07:43	08:16 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	1
34	16:38		17:38	18:41 (2)	18:32	20:30	21:24	21:59	21:48	20:53	20:00	31
35	08:33		07:41	08:17 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	1
36	16:40		17:40	18:40 (2)	18:34	20:32	21:25	22:00	21:46	20:51	20:00	30
37	08:32		07:39	08:18 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	1
38	16:41		17:42	18:38 (2)	18:36	20:33	21:27	22:00	21:45	20:48	20:00	31
39	08:31		07:37	08:20 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	1
40	16:43		17:44	18:37 (2)	18:38	20:35	21:28	22:00	21:44	20:46	20:00	31
41	08:30		07:34	08:22 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	1
42	16:45		17:46	18:34 (2)	18:40	20:37	21:30	22:01	21:42	20:44	20:00	31
43	08:29		07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	1
44	16:47		17:48		18:42	20:39	21:31	22:01	21:41	20:42	20:00	17
45	08:27		07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	1
46	16:49		17:50		18:44	20:41	21:33	22:01	21:40	20:39	20:00	21
47	08:26		07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	1
48	16:51		17:52		18:45	20:43	21:35	22:01	21:38	20:37	20:00	23
49	08:25		07:25		06:18	06:05	05:11	04:56	05:27	06:21	07:15	1
50	16:52		17:54		18:47	20:45	21:36	22:01	21:37	20:35	20:00	25
51	08:23		07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	1
52	16:54		17:56		18:49	20:46	21:37	22:01	21:35	20:33	20:00	26
53	08:22		07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	1
54	16:56		17:58		18:51	20:48	21:39	22:01	21:33	20:30	20:00	27
55	08:20		07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	1
56	16:58		18:00		18:53	20:50	21:40	22:01	21:32	20:28	20:00	27
57	08:19				07:09	05:56	05:06	04:58	05:34	06:28	07:23	1
58	17:00				19:55	20:52	21:42	22:01	21:30	20:25	20:00	25
59	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	1
60	17:02				19:56	20:54	21:43	22:00	21:28	20:23	20:00	22
61	08:15				07:04		05:04		05:37	06:31	07:22	1
62	17:04				19:58		21:44		21:27	20:21	20:00	20
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	127	317									68	721
Sun reduction	0.24	0.23									0.27	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.61	0.63									0.63	0.61
Total reduction	0.15	0.15									0.17	0.13
Total, real	19	46									11	91

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FH - H164

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FI - H165

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FJ - H166

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:19 (5)	08:14	15:45 (4)	07:16	17:10 (3)	07:01	05:52	05:03		
	16:15	18	15:37 (5)	17:06	43	16:28 (4)	18:02	24	17:34 (3)	20:00	20:55
2	08:44	15:20 (5)	08:12	15:45 (4)	07:14	17:09 (3)	06:59	19:28 (2)	05:50	05:02	
	16:16	19	15:39 (5)	17:08	42	16:27 (4)	18:04	26	17:35 (3)	20:02	20:57
3	08:44	15:19 (5)	08:10	15:46 (4)	07:12	17:10 (3)	06:56	19:25 (2)	05:48	05:01	
	16:17	20	15:39 (5)	17:10	41	16:27 (4)	18:06	25	17:35 (3)	20:04	20:59
4	08:43	15:20 (5)	08:08	15:46 (4)	07:09	17:11 (3)	06:54	19:23 (2)	05:46	05:00	
	16:18	21	15:41 (5)	17:12	41	16:27 (4)	18:07	23	17:34 (3)	20:06	21:01
5	08:43	15:20 (5)	08:07	15:47 (4)	07:07	17:12 (3)	06:51	19:20 (2)	05:44	04:59	
	16:19	22	15:42 (5)	17:14	40	16:27 (4)	18:09	20	17:32 (3)	20:07	21:03
6	08:43	15:21 (5)	08:05	15:47 (4)	07:04	17:14 (3)	06:49	19:19 (2)	05:42	04:59	
	16:21	23	15:44 (5)	17:16	39	16:26 (4)	18:11	17	17:31 (3)	20:09	21:04
7	08:42	15:21 (5)	08:03	15:48 (4)	07:02	17:15 (3)	06:47	19:17 (2)	05:40	04:58	
	16:22	24	15:45 (5)	17:18	37	16:25 (4)	18:13	13	17:28 (3)	20:11	21:06
8	08:42	15:22 (5)	08:01	15:49 (4)	07:00		06:44		19:16 (2)	05:38	04:57
	16:24	24	15:46 (5)	17:20	36	16:25 (4)	18:15		20:13	19:46 (2)	21:08
9	08:41	15:23 (5)	07:59	15:50 (4)	06:57		06:42		19:16 (2)	05:36	04:57
	16:25	25	15:49 (4)	17:22	34	16:24 (4)	18:17		20:15	19:48 (2)	21:10
10	08:40	15:23 (5)	07:57	15:52 (4)	06:55		06:39		19:14 (2)	05:34	04:56
	16:26	27	15:50 (4)	17:24	31	16:23 (4)	18:19		20:17	19:49 (2)	21:11
11	08:40	15:24 (5)	07:55	15:53 (4)	06:52		06:37		19:14 (2)	05:33	04:56
	16:28	28	15:52 (4)	17:26	29	16:22 (4)	18:21		20:19	19:51 (2)	21:13
12	08:39	15:24 (5)	07:53	15:55 (4)	06:50		06:35		19:13 (2)	05:31	04:55
	16:30	30	15:54 (4)	17:28	25	16:20 (4)	18:23		20:20	19:53 (2)	21:15
13	08:38	15:25 (5)	07:51	15:56 (4)	06:48		06:32		19:12 (2)	05:29	04:55
	16:31	30	15:55 (4)	17:30	22	16:18 (4)	18:25		20:22	19:53 (2)	21:17
14	08:37	15:26 (5)	07:49	16:00 (4)	06:45		06:30		19:12 (2)	05:27	04:55
	16:33	31	15:57 (4)	17:32	15	16:15 (4)	18:27		20:24	19:53 (2)	21:18
15	08:36	15:27 (5)	07:47	16:07 (4)	06:43		06:28		19:12 (2)	05:26	04:54
	16:34	32	15:59 (4)	17:34	1	16:08 (4)	18:28		20:26	19:53 (2)	21:20
16	08:35	15:27 (5)	07:45		06:40		06:25		19:12 (2)	05:24	04:54
	16:36	33	16:00 (4)	17:36		18:30	20:28	41	19:53 (2)	21:22	21:59
17	08:34	15:28 (5)	07:43		06:38		06:23		19:12 (2)	05:22	04:54
	16:38	34	16:02 (4)	17:38		18:32	20:30	40	19:52 (2)	21:23	21:59
18	08:33	15:30 (5)	07:41		06:35		06:21		19:12 (2)	05:21	04:54
	16:40	35	16:05 (4)	17:40		18:34	20:31	40	19:52 (2)	21:25	22:00
19	08:32	15:32 (5)	07:39		06:33		06:18		19:12 (2)	05:19	04:54
	16:41	35	16:07 (4)	17:42		18:36	20:33	39	19:51 (2)	21:27	22:00
20	08:31	15:33 (5)	07:36		06:31		06:16		19:13 (2)	05:18	04:54
	16:43	35	16:08 (4)	17:44		18:38	20:35	38	19:51 (2)	21:28	22:00
21	08:30	15:37 (5)	07:34	17:14 (3)	06:28		06:14		19:12 (2)	05:16	04:54
	16:45	32	16:11 (4)	17:46	4	17:18 (3)	18:40		20:37	19:49 (2)	21:30
22	08:29	15:43 (4)	07:32	17:12 (3)	06:26		06:12		19:13 (2)	05:15	04:55
	16:47	29	16:12 (4)	17:48	7	17:19 (3)	18:42		20:39	19:48 (2)	21:31
23	08:27	15:44 (4)	07:30	17:12 (3)	06:23		06:09		19:14 (2)	05:13	04:55
	16:49	31	16:15 (4)	17:50	10	17:22 (3)	18:43		20:41	19:47 (2)	21:33
24	08:26	15:43 (4)	07:28	17:11 (3)	06:21		06:07		19:15 (2)	05:12	04:55
	16:50	34	16:17 (4)	17:52	13	17:24 (3)	18:45		20:43	19:46 (2)	21:34
25	08:24	15:44 (4)	07:25	17:10 (3)	06:18		06:05		19:16 (2)	05:11	04:55
	16:52	35	16:19 (4)	17:54	16	17:26 (3)	18:47		20:44	19:45 (2)	21:36
26	08:23	15:43 (4)	07:23	17:10 (3)	06:16		06:03		19:18 (2)	05:09	04:56
	16:54	38	16:21 (4)	17:56	18	17:28 (3)	18:49		20:46	19:43 (2)	21:37
27	08:22	15:43 (4)	07:21	17:10 (3)	06:13		06:01		19:20 (2)	05:08	04:56
	16:56	40	16:23 (4)	17:58	21	17:31 (3)	18:51		20:48	19:41 (2)	21:39
28	08:20	15:44 (4)	07:18	17:09 (3)	06:11		05:58		19:22 (2)	05:07	04:57
	16:58	42	16:26 (4)	18:00	23	17:32 (3)	18:53		20:50	19:39 (2)	21:40
29	08:18	15:44 (4)			07:08		05:56		19:26 (2)	05:06	04:57
	17:00	43	16:27 (4)		19:54		20:52	9	19:35 (2)	21:41	22:01
30	08:17	15:44 (4)			07:06		05:54			05:05	04:58
	17:02	43	16:27 (4)		19:56		20:54			21:43	22:00
31	08:15	15:44 (4)			07:04					05:04	
	17:04	43	16:27 (4)		19:58					21:44	
Potential sun hours	250		273		367		420		494		510
Total, worst case	956		588		148		836				
Sun reduction	0.24		0.23		0.27		0.35				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.66		0.66		0.68		0.67				
Total reduction	0.16		0.15		0.18		0.23				
Total, real	153		91		27		196				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FJ - H166

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:13 (2) 19:50 (2)	07:26 19:05	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	19:13 (2) 19:48 (2)	07:28 19:02	16:54 15:54 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	19:13 (2) 19:45 (2)	07:30 19:00	15:53 (4) 15:55 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	19:13 (2) 19:43 (2)	07:31 18:57	15:54 (4) 15:55 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	19:14 (2) 19:41 (2)	07:33 18:55	15:56 (4) 15:56 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	19:15 (2) 19:39 (2)	07:35 18:52	15:16 (4) 15:56 (4)
7	05:04 21:57	05:49 21:13	06:43 20:04	19:15 (2) 19:35 (2)	07:36 18:50	15:16 (4) 15:57 (4)
8	05:05 21:56	05:51 21:12	06:45 20:01	19:17 (2) 19:33 (2)	07:39 18:48	15:15 (4) 15:57 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	19:19 (2) 19:31 (2)	07:41 18:45	15:15 (4) 15:57 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	19:20 (2) 19:28 (2)	07:42 18:43	15:16 (4) 15:58 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	19:25 (2) 19:26 (2)	07:44 18:40	15:16 (4) 15:59 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 17:43 (3)	15:16 (4) 15:59 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 18:07 (3)	15:16 (4) 15:59 (4)
14	05:12 21:51	06:01 20:59	19:32 (2) 19:44 (2)	06:56 19:47	07:50 18:33	15:16 (4) 15:57 (4)
15	05:13 21:50	06:03 20:57	19:29 (2) 19:47 (2)	06:58 19:44	07:52 18:31	15:16 (4) 15:56 (4)
16	05:14 21:49	06:04 20:55	19:26 (2) 19:48 (2)	06:59 19:42	07:54 18:29	15:16 (4) 15:54 (4)
17	05:16 21:47	06:06 20:53	19:24 (2) 19:50 (2)	07:01 19:39	07:55 18:26	15:17 (4) 15:52 (4)
18	05:17 21:46	06:08 20:51	19:23 (2) 19:52 (2)	07:03 19:37	07:57 18:24	15:17 (4) 15:53 (3)
19	05:18 21:45	06:10 20:48	19:21 (2) 19:52 (2)	07:05 19:34	07:59 18:22	15:18 (4) 15:49 (3)
20	05:20 21:44	06:12 20:46	19:20 (2) 19:53 (2)	07:06 19:32	08:01 18:20	15:18 (4) 15:47 (4)
21	05:21 21:42	06:13 20:44	19:19 (2) 19:54 (2)	07:08 19:29	08:03 18:17	15:12 (5) 15:46 (4)
22	05:23 21:41	06:15 20:42	19:17 (2) 19:54 (2)	07:10 19:27	08:05 18:15	15:09 (5) 15:44 (4)
23	05:24 21:39	06:17 20:39	19:16 (2) 19:54 (2)	07:12 19:24	08:07 18:13	15:08 (5) 15:43 (4)
24	05:26 21:38	06:19 20:37	19:16 (2) 19:55 (2)	07:13 19:22	08:09 18:11	15:07 (5) 15:42 (4)
25	05:27 21:36	06:20 20:35	19:15 (2) 19:54 (2)	07:15 19:19	08:09 17:09	15:06 (5) 15:41 (4)
26	05:29 21:35	06:22 20:32	19:14 (2) 19:55 (2)	07:17 19:17	08:11 17:06	15:06 (5) 15:39 (4)
27	05:30 21:33	06:24 20:30	19:14 (2) 19:55 (2)	07:19 19:14	07:15 17:04	15:06 (5) 15:41 (4)
28	05:32 21:32	06:26 20:28	19:13 (2) 19:54 (2)	07:21 19:12	07:16 17:02	15:06 (5) 15:45 (4)
29	05:34 21:30	06:27 20:25	19:13 (2) 19:54 (2)	07:22 19:09	07:18 17:00	15:05 (5) 15:48 (4)
30	05:35 21:28	06:29 20:23	19:13 (2) 19:54 (2)	07:24 19:07	07:20 16:58	15:06 (5) 15:49 (4)
31	05:37 21:27	06:31 20:21	19:12 (2) 19:52 (2)	07:22 16:56	15:21 (4) 15:51 (4)	15:35 (4) 16:12
Potential sun hours	512	460	382	328	259	233
Total, worst case		604	242	370	1089	555
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.66
Total reduction		0.23	0.21	0.20	0.18	0.14
Total, real		137	52	73	191	75

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FK - H167

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		14:39 (4)	08:14		16:16 (3)	07:16		16:54 (2)	07:01		05:52			05:03		
	16:15	21	15:00 (4)	17:06	18	16:34 (3)	18:02	40	17:34 (2)	20:00		20:55			21:45		
2	08:44		14:41 (4)	08:12		16:16 (3)	07:14		16:53 (2)	06:59		20:50			05:02		
	16:16	19	15:00 (4)	17:08	21	16:37 (3)	18:04	41	17:34 (2)	20:02		20:57			21:46		
3	08:44		14:41 (4)	08:10		16:16 (3)	07:12		16:53 (2)	06:56		20:54			05:01		
	16:17	18	14:59 (4)	17:10	23	16:39 (3)	18:06	41	17:34 (2)	20:04		20:59			21:48		
4	08:43		14:43 (4)	08:08		16:16 (3)	07:09		16:54 (2)	06:54		20:56			05:00		
	16:18	17	15:00 (4)	17:12	24	16:40 (3)	18:07	40	17:34 (2)	20:06		21:01			21:49		
5	08:43		14:44 (4)	08:07		16:17 (3)	07:07		16:53 (2)	06:51		20:54			04:59		
	16:19	15	14:59 (4)	17:14	23	16:40 (3)	18:09	40	17:33 (2)	20:07		21:03			21:50		
6	08:43		14:46 (4)	08:05		16:18 (3)	07:04		16:53 (2)	06:49		20:52			04:58		
	16:21	13	14:59 (4)	17:16	22	16:40 (3)	18:11	40	17:33 (2)	20:09		21:04			21:51		
7	08:42		14:47 (4)	08:03		16:19 (3)	07:02		16:53 (2)	06:47		20:50			04:58		
	16:22	10	14:57 (4)	17:18	20	16:39 (3)	18:13	39	17:32 (2)	20:11		21:06			21:52		
8	08:42		14:50 (4)	08:01		16:20 (3)	07:00		16:54 (2)	06:44		20:53			04:57		
	16:24	5	14:55 (4)	17:20	18	16:38 (3)	18:15	38	17:32 (2)	20:13		21:08			21:53		
9	08:41			07:59		16:22 (3)	06:57		16:53 (2)	06:42		20:56			04:57		
	16:25			17:22	14	16:36 (3)	18:17	38	17:31 (2)	20:15		21:10			21:54		
10	08:40			07:57		16:24 (3)	06:55		16:54 (2)	06:39		20:54			04:56		
	16:26			17:24	10	16:34 (3)	18:19	36	17:30 (2)	20:17		21:11			21:55		
11	08:40			07:55			06:53		16:56 (2)	06:37		20:53			04:56		
	16:28			17:26			18:21	33	17:29 (2)	20:19		21:13			21:55		
12	08:39			07:53			06:50		16:56 (2)	06:35		20:51			04:55		
	16:30			17:28			18:23	31	17:27 (2)	20:20		21:15			21:56		
13	08:38			07:51			06:48		16:58 (2)	06:32		20:52			04:55		
	16:31			17:30			18:25	28	17:26 (2)	20:22		21:17			21:57		
14	08:37			07:49			06:45		16:59 (2)	06:30		20:52			04:55		
	16:33			17:32			18:27	25	17:24 (2)	20:24		21:18			21:58		
15	08:36			07:47			06:43		17:01 (2)	06:28		20:52			04:54		
	16:34			17:34			18:28	21	17:22 (2)	20:26		21:20			21:58		
16	08:35			07:45			06:40		17:04 (2)	06:25		20:54			04:54		
	16:36			17:36			18:30	14	17:18 (2)	20:28		21:22			21:59		
17	08:34			07:43			06:38			06:23		20:52			04:54		
	16:38			17:38			18:32			20:30		21:23			21:59		
18	08:33			07:41			06:35			06:21		20:51			04:54		
	16:40			17:40			18:34			20:31		21:25			22:00		
19	08:32			07:39		17:09 (2)	06:33			06:18		20:51			04:54		
	16:41			17:42	4	17:13 (2)	18:36			20:33		21:27			22:00		
20	08:31			07:36		17:06 (2)	06:31			06:16		20:51			04:54		
	16:43			17:44	10	17:16 (2)	18:38			20:35		21:28			22:00		
21	08:30			07:34		17:04 (2)	06:28			06:14		20:51			04:54		
	16:45			17:46	14	17:18 (2)	18:40			20:37		21:30			22:01		
22	08:29			07:32		17:01 (2)	06:26			06:12		20:51			04:55		
	16:47			17:48	18	17:19 (2)	18:42			20:39		21:31			22:01		
23	08:27			07:30		17:00 (2)	06:23			06:09		20:51			04:55		
	16:49			17:50	22	17:22 (2)	18:43			20:41		21:33			22:01		
24	08:26			07:28		16:59 (2)	06:21			06:07		20:52			04:55		
	16:50			17:52	25	17:24 (2)	18:45			20:43		21:34			22:01		
25	08:24		16:17 (3)	07:25		16:57 (2)	06:18			06:05		20:51			04:55		
	16:52	2	16:19 (3)	17:54	29	17:26 (2)	18:47			20:44		21:36			22:01		
26	08:23		16:16 (3)	07:23		16:56 (2)	06:16			06:03		20:50			04:56		
	16:54	5	16:21 (3)	17:56	32	17:28 (2)	18:49			20:46		21:37			22:01		
27	08:22		16:15 (3)	07:21		16:56 (2)	06:13			06:01		20:50			04:56		
	16:56	8	16:23 (3)	17:58	35	17:31 (2)	18:51			20:48		21:39			22:01		
28	08:20		16:16 (3)	07:18		16:55 (2)	06:11			05:58		20:50			04:57		
	16:58	10	16:26 (3)	18:00	37	17:32 (2)	18:53			20:50		21:40			22:01		
29	08:19		16:15 (3)				07:08			05:56		20:56			04:57		
	17:00	13	16:28 (3)				19:54			20:52		21:41			22:01		
30	08:17		16:15 (3)				07:06			05:54		20:55			04:58		
	17:02	14	16:29 (3)				19:56			20:54		21:43			22:00		
31	08:15		16:15 (3)				07:04					20:54					
	17:04	16	16:31 (3)				19:58					21:44					
Potential sun hours		250			273		367			420		494			510		
Total, worst case		186			419		545										
Sun reduction		0.24			0.23		0.27										
Oper. time red.		1.00			1.00		1.00										
Wind dir. red.		0.65			0.67		0.68										
Total reduction		0.16			0.16		0.18										
Total, real		30			65		100										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FK - H167

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		July	August	September		October		November		December	
1	04:59	05:39	06:33		07:26	17:35 (2)	07:24	15:53 (3)	08:19		
	22:00	21:25	20:18		19:05	31 18:06 (2)	16:54	11 16:04 (3)	16:10		
2	04:59	05:40	06:35		07:28	17:34 (2)	07:26	15:51 (3)	08:21		
	22:00	21:23	20:16		19:02	33 18:07 (2)	16:52	15 16:06 (3)	16:09		
3	05:00	05:42	06:36		07:30	17:33 (2)	07:28	15:49 (3)	08:22		
	21:59	21:21	20:13		19:00	35 18:08 (2)	16:50	19 16:08 (3)	16:08		
4	05:01	05:44	06:38		07:31	17:32 (2)	07:30	15:48 (3)	08:24		14:36 (4)
	21:59	21:19	20:11		18:57	36 18:08 (2)	16:48	21 16:09 (3)	16:08	3	14:39 (4)
5	05:02	05:45	06:40		07:33	17:31 (2)	07:32	15:47 (3)	08:25		14:33 (4)
	21:58	21:17	20:09		18:55	38 18:09 (2)	16:46	22 16:09 (3)	16:07	9	14:42 (4)
6	05:03	05:47	06:42		07:35	17:30 (2)	07:34	15:47 (3)	08:26		14:32 (4)
	21:58	21:15	20:06		18:52	39 18:09 (2)	16:44	23 16:10 (3)	16:07	13	14:45 (4)
7	05:04	05:49	06:43		07:37	17:29 (2)	07:36	15:46 (3)	08:28		14:31 (4)
	21:57	21:14	20:04		18:50	39 18:08 (2)	16:43	24 16:10 (3)	16:06	15	14:46 (4)
8	05:05	05:50	06:45		07:39	17:28 (2)	07:38	15:46 (3)	08:29		14:30 (4)
	21:56	21:12	20:01		18:48	40 18:08 (2)	16:41	22 16:08 (3)	16:06	17	14:47 (4)
9	05:06	05:52	06:47		07:41	17:28 (2)	07:40	15:47 (3)	08:30		14:30 (4)
	21:55	21:10	19:59		18:45	40 18:08 (2)	16:39	20 16:07 (3)	16:05	18	14:48 (4)
10	05:07	05:54	06:49		07:42	17:28 (2)	07:42	15:47 (3)	08:31		14:30 (4)
	21:55	21:08	19:56		18:43	40 18:08 (2)	16:37	18 16:05 (3)	16:05	19	14:49 (4)
11	05:08	05:56	06:50		07:44	17:27 (2)	07:44	15:47 (3)	08:33		14:29 (4)
	21:54	21:05	19:54		18:40	41 18:08 (2)	16:35	16 16:03 (3)	16:05	21	14:50 (4)
12	05:09	05:57	06:52		07:46	17:27 (2)	07:45	15:47 (3)	08:34		14:29 (4)
	21:53	21:03	19:51		18:38	40 18:07 (2)	16:34	14 16:01 (3)	16:05	22	14:51 (4)
13	05:10	05:59	06:54		07:48	17:28 (2)	07:47	15:47 (3)	08:35		14:29 (4)
	21:52	21:01	19:49		18:36	39 18:07 (2)	16:32	12 15:59 (3)	16:05	22	14:51 (4)
14	05:12	06:01	06:56		07:50	17:28 (2)	07:49	15:48 (3)	08:36		14:29 (4)
	21:51	20:59	19:47		18:33	36 18:04 (2)	16:31	9 15:57 (3)	16:04	23	14:52 (4)
15	05:13	06:03	06:58		07:52	17:28 (2)	07:51	15:48 (3)	08:37		14:30 (4)
	21:50	20:57	19:44		18:31	34 18:02 (2)	16:29	8 15:56 (3)	16:04	23	14:53 (4)
16	05:14	06:04	06:59		07:54	17:29 (2)	07:53	15:49 (3)	08:38		14:30 (4)
	21:49	20:55	19:42		18:29	30 17:59 (2)	16:27	5 15:54 (3)	16:05	24	14:54 (4)
17	05:16	06:06	07:01		07:55	17:30 (2)	07:55	15:50 (3)	08:38		14:30 (4)
	21:47	20:53	19:39		18:26	27 17:57 (2)	16:26	2 15:52 (3)	16:05	24	14:54 (4)
18	05:17	06:08	07:03		07:57	17:31 (2)	07:57		08:39		14:31 (4)
	21:46	20:51	19:37		18:24	24 17:55 (2)	16:24		16:05	24	14:55 (4)
19	05:18	06:10	07:05		07:59	17:32 (2)	07:59		08:40		14:32 (4)
	21:45	20:48	19:34		18:22	20 17:52 (2)	16:23		16:05	24	14:56 (4)
20	05:20	06:12	07:06		08:01	17:33 (2)	08:00		08:41		14:31 (4)
	21:44	20:46	19:32		18:20	17 17:50 (2)	16:22		16:06	25	14:56 (4)
21	05:21	06:13	07:08		08:03	17:35 (2)	08:02		08:41		14:32 (4)
	21:42	20:44	19:29		18:17	13 17:48 (2)	16:20		16:06	25	14:57 (4)
22	05:23	06:15	07:10		08:05	17:37 (2)	08:04		08:42		14:32 (4)
	21:41	20:42	19:27		18:15	8 17:45 (2)	16:19		16:06	25	14:57 (4)
23	05:24	06:17	07:12		08:07	17:41 (2)	08:06		08:42		14:33 (4)
	21:39	20:39	19:24		18:13	2 17:43 (2)	16:18		16:07	25	14:58 (4)
24	05:26	06:19	07:13		08:09		08:08		08:43		14:33 (4)
	21:38	20:37	19:22		18:11		16:17		16:08	25	14:58 (4)
25	05:27	06:20	07:15		07:11		08:09		08:43		14:34 (4)
	21:36	20:35	19:19		17:09		16:16		16:08	24	14:58 (4)
26	05:29	06:22	07:17		07:13		08:11		08:43		14:34 (4)
	21:35	20:32	19:17		17:06		16:14		16:09	24	14:58 (4)
27	05:30	06:24	07:19		07:15		08:13		08:44		14:36 (4)
	21:33	20:30	19:14	10	17:58 (2)	17:04	16:13		16:10	24	15:00 (4)
28	05:32	06:26	07:21		17:43 (2)	07:16	08:14		08:44		14:36 (4)
	21:32	20:28	19:12	18	18:01 (2)	17:02	16:12		16:11	24	15:00 (4)
29	05:34	06:27	07:22		17:40 (2)	07:18	08:16		08:44		14:37 (4)
	21:30	20:25	19:09	24	18:04 (2)	17:00	16:12		16:11	23	15:00 (4)
30	05:35	06:29	07:24		17:37 (2)	07:20	08:18		08:44		14:37 (4)
	21:28	20:23	19:07	27	18:04 (2)	16:58	16:11		16:12	22	14:59 (4)
31	05:37	06:31			07:22		15:57 (3)		08:44		14:38 (4)
	21:27	20:21			16:56	2	15:59 (3)		16:13	22	15:00 (4)
Potential sun hours	512	460	382		328		259		233		
Total, worst case			79		704		261		589		
Sun reduction			0.32		0.29		0.27		0.21		
Oper. time red.			1.00		1.00		1.00		1.00		
Wind dir. red.			0.68		0.68		0.66		0.65		
Total reduction			0.22		0.20		0.18		0.13		
Total, real			17		139		46		79		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FL - H168
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		15:43 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24					08:19				15:21 (2)	
	16:15		17:06	26	16:09 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54						16:10	13			15:34 (2)
2	08:44		08:12		15:44 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26					08:21				15:22 (2)	
	16:16		17:08	24	16:08 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52					16:09	10			15:32 (2)	
3	08:44		08:10		15:45 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28					08:22				15:23 (2)	
	16:17		17:10	22	16:07 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50					16:08	9			15:32 (2)	
4	08:43		08:08		15:46 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30					08:24				15:25 (2)	
	16:18		17:12	19	16:05 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48					08:24				15:32 (2)	
5	08:43		08:07		15:48 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32					15:21 (2)				15:26 (2)	
	16:19		17:14	16	16:04 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	10				15:31 (2)				15:30 (2)	
6	08:43		08:05		15:51 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34					15:18 (2)				15:28 (2)	
	16:21	2	15:42 (2)	10	16:01 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16				15:34 (2)				15:30 (2)	
7	08:42		08:03		15:41 (2)	07:03	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36					15:16 (2)				15:28 (2)	
	16:22	4	15:45 (2)		15:45 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	17:43	19			15:35 (2)				15:06	
8	08:42		08:01		15:40 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38					15:14 (2)				15:29	
	16:23	6	15:46 (2)		15:46 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	23			15:37 (2)				15:06	
9	08:41		07:59		15:40 (2)	06:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				15:14 (2)				15:30	
	16:25	9	15:49 (2)		15:52 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	25			15:39 (2)				15:05	
10	08:40		07:57		15:39 (2)	07:00	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42				15:13 (2)				15:32	
	16:26	11	15:50 (2)		15:50 (2)	17:24	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	26			15:39 (2)				15:05	
11	08:40		07:55		15:39 (2)	07:00	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44				15:13 (2)				15:33	
	16:28	13	15:52 (2)		15:52 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	27			15:40 (2)				15:05	
12	08:39		07:53		15:39 (2)	07:00	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46				15:12 (2)				15:34	
	16:29	15	15:54 (2)		15:54 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	29			15:41 (2)				15:05	
13	08:38		07:51		15:38 (2)	07:00	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47				15:12 (2)				15:35	
	16:31	17	15:55 (2)		15:55 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	29			15:41 (2)				15:04	
14	08:37		07:49		15:38 (2)	06:59	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				15:12 (2)				15:36	
	16:33	19	15:57 (2)		15:57 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	30			15:42 (2)				15:04	
15	08:36		07:47		15:38 (2)	06:59	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51				15:11 (2)				15:37	
	16:34	21	15:59 (2)		15:59 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	31			15:42 (2)				15:04	
16	08:35		07:45		15:37 (2)	06:59	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53				15:11 (2)				15:38	
	16:36	23	16:00 (2)		16:00 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	31			15:42 (2)				15:05	
17	08:34		07:43		15:37 (2)	06:59	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55				15:11 (2)				15:38	
	16:38	25	16:02 (2)		16:02 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	31			15:42 (2)				15:05	
18	08:33		07:41		15:38 (2)	06:59	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				15:12 (2)				15:39	
	16:40	27	16:05 (2)		16:05 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	31			15:43 (2)				15:05	
19	08:32		07:39		15:38 (2)	06:59	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				15:12 (2)				15:40	
	16:41	29	16:07 (2)		16:07 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	31			15:43 (2)				15:05	
20	08:31		07:36		15:37 (2)	06:56	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00				15:12 (2)				15:41	
	16:43	30	16:07 (2)		16:07 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	31			15:43 (2)				15:06	
21	08:30		07:34		15:38 (2)	06:56	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				15:13 (2)				15:41	
	16:45	30	16:08 (2)		16:08 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	30			15:43 (2)				15:06	
22	08:29		07:32		15:37 (2)	06:52	06:26	06:11	05:15	04:55	05:23	06:15	07:10	08:05	08:04				15:13 (2)				15:42	
	16:47	31	16:08 (2)		16:08 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	30			15:43 (2)				15:06	
23	08:27		07:30		15:38 (2)	06:50	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				15:14 (2)				15:42	
	16:49	31	16:09 (2)		16:09 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	29			15:43 (2)				15:07	
24	08:26		07:28		15:38 (2)	06:50	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08				15:15 (2)				15:43	
	16:50	31	16:09 (2)		16:09 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	27			15:42 (2)				15:08	
25	08:25		07:25		15:39 (2)	06:50	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09				15:15 (2)				15:43	
	16:52	30	16:09 (2)		16:09 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:16	26			15:41 (2)				15:08	
26	08:23		07:23		15:38 (2)	06:50	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11				15:16 (2)				15:43	
	16:54	31	16:09 (2)		16:09 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14	23			15:39 (2)				15:09	
27	08:22		07:21		15:39 (2)	06:50	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13				15:17 (2)				15:44	
	16:56	30	16:09 (2)		16:09 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	21			15:38 (2)				15:10	
28	08:20		07:18		15:40 (2)	06:50	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14				15:18 (2)				15:44	
	16:58	30	16:10 (2)		16:10 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	19			15:37 (2)				15:10	
29	08:19		07:10		15:40 (2)	06:50	07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16				15:18 (2)				15:44	
	17:00	29	16:09 (2)		16:09 (2)	17:50	19:54	20:52	21:41	22:01	21:30	20:25	19:09	18:00	16:11	17			15:35 (2)				15:11	
30	08:17		07:10		15:40 (2)	06:50	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18				15:20 (2)				15:44	
	17:02	29	16:09 (2)		16:09 (2)	17:50	19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	15			15:35 (2)				15:12	
31	08:15		07:10		15:41 (2)	06:50	07:04	05:54	05:04	04:57	05:37	06:31	07:22	08:18	08:16									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FM - H169

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	10:01 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
2	08:44	10:02 (2)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
3	08:44	10:02 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
4	08:43	10:03 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
5	08:43	10:03 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25
6	08:43	10:04 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
7	08:42	10:05 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	08:28
8	08:42	10:05 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
9	08:41	10:07 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
10	08:40	10:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	08:32
11	08:40	10:08 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
12	08:39	10:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34
13	08:38	10:10 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
14	08:37	10:11 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
15	08:36	10:12 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
16	08:35	10:13 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38
17	08:34	10:14 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
18	08:33	10:15 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:40
19	08:32	10:17 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:41
20	08:31	10:18 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:41
21	08:30	10:21 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:42
22	08:29	10:24 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:43
23	08:27	15:02 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:44
24	08:26	15:03 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:45
25	08:25	15:06 (1)	07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11	08:46
26	08:23	15:09 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:47
27	08:22	15:17 (1)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:48
28	08:20		07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:49
29	08:19			07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:50
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:18	08:51
31	08:15			07:04	05:52	05:04	04:58	05:37	06:31	07:26	08:20	08:53
Potential sun hours	250											
Total, worst case	1532	273	367	420	494	510	512	460	382	328	259	233
Sun reduction	0.24										693	2412
Oper. time red.	1.00										0.27	0.21
Wind dir. red.	0.62										1.00	1.00
Total reduction	0.15										0.62	0.61
Total, real	229										114	306

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FN - H170

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:19 (2)	08:14	15:27 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24			08:19		15:01 (2)						
2	16:15	15:37 (2)	17:06	15:56 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54			16:10		15:33 (2)						
3	08:44	15:39 (2)	17:08	15:58 (2)	18:04	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26			08:21		15:01 (2)						
4	16:16	15:39 (2)	17:10	15:58 (2)	18:06	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52			16:09		15:32 (2)						
5	08:44	15:39 (2)	17:10	15:58 (2)	18:06	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			08:22		15:02 (2)						
6	16:17	15:39 (2)	17:10	15:54 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50			16:08		15:32 (2)						
7	08:43	15:19 (2)	17:12	15:32 (2)	18:07	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30			08:24		15:04 (2)						
8	16:18	15:41 (2)	17:12	15:52 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48			16:08		15:32 (2)						
9	08:43	15:19 (2)	17:12	15:34 (2)	18:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32			15:07 (2)		15:04 (2)						
10	16:19	15:42 (2)	17:14	15:50 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	10		15:17 (2)		15:30 (2)						
11	08:43	15:19 (2)	17:14	15:37 (2)	18:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34			15:03 (2)		15:05 (2)						
12	16:21	15:44 (2)	17:16	15:57 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	17		15:20 (2)		15:30 (2)						
13	08:42	15:19 (2)	17:16	15:54 (2)	18:11	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36			15:01 (2)		15:06 (2)						
14	16:22	15:45 (2)	17:18	15:54 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21		15:22 (2)		15:28 (2)						
15	08:42	15:19 (2)	17:18	15:54 (2)	18:13	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38			14:59 (2)		15:06 (2)						
16	16:24	15:46 (2)	17:20	15:56 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	24		15:23 (2)		15:28 (2)						
17	08:41	15:19 (2)	17:20	15:56 (2)	18:15	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			14:59 (2)		15:08 (2)						
18	16:25	15:49 (2)	17:22	15:57 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	27		15:26 (2)		15:30 (2)						
19	08:40	15:19 (2)	17:22	15:57 (2)	18:17	06:45	05:39	05:34	04:56	05:07	05:54	06:49	07:42			14:58 (2)		15:08 (2)						
20	16:26	15:50 (2)	17:24	15:59 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:42	16:37	29		15:27 (2)		15:30 (2)						
21	08:40	15:19 (2)	17:24	15:59 (2)	18:19	06:43	05:37	04:56	05:08	05:56	06:50	07:44	07:44			14:57 (2)		15:09 (2)						
22	16:28	15:51 (2)	17:26	15:59 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	30		15:27 (2)		15:30 (2)						
23	08:39	15:19 (2)	17:26	15:59 (2)	18:21	06:43	05:35	05:31	04:55	05:09	05:57	06:52	07:46			14:57 (2)		15:10 (2)						
24	16:30	15:52 (2)	17:28	15:59 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	31		15:28 (2)		15:30 (2)						
25	08:38	15:19 (2)	17:30	15:59 (2)	18:23	06:48	05:32	05:29	04:55	05:10	05:59	06:54	07:48			14:56 (2)		15:10 (2)						
26	16:31	15:53 (2)	17:30	15:59 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	33		15:29 (2)		15:26 (2)						
27	08:37	15:19 (2)	17:30	15:59 (2)	18:25	06:45	05:30	05:27	04:55	05:12	06:01	06:56	07:50			14:56 (2)		15:12 (2)						
28	16:33	15:53 (2)	17:32	15:59 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	33		15:29 (2)		15:27 (2)						
29	08:36	15:20 (2)	17:32	15:59 (2)	18:27	06:43	05:28	05:26	04:54	05:13	06:03	06:58	07:52			14:55 (2)		15:12 (2)						
30	16:34	15:54 (2)	17:34	15:59 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	35		15:30 (2)		15:26 (2)						
31	08:35	15:19 (2)	17:34	15:59 (2)	18:28	06:40	05:25	05:24	04:54	05:14	06:04	06:59	07:54			14:55 (2)		15:13 (2)						
1	16:36	15:54 (2)	17:36	15:59 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	35		15:30 (2)		15:26 (2)						
2	08:34	15:19 (2)	17:36	15:59 (2)	18:30	06:38	05:23	05:22	04:54	05:16	06:06	07:01	07:55			14:55 (2)		15:14 (2)						
3	16:38	15:55 (2)	17:38	15:59 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	36		15:31 (2)		15:27 (2)						
4	08:33	15:20 (2)	17:38	15:59 (2)	18:32	06:35	05:21	05:21	04:54	05:17	06:08	07:03	07:57			14:55 (2)		15:15 (2)						
5	16:40	15:55 (2)	17:40	15:59 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	36		15:31 (2)		15:27 (2)						
6	08:32	15:20 (2)	17:39	15:59 (2)	18:34	06:33	05:18	05:19	04:54	05:18	06:10	07:05	07:59			14:55 (2)		15:16 (2)						
7	16:41	15:56 (2)	17:42	15:59 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	36		15:31 (2)		15:28 (2)						
8	08:31	15:20 (2)	17:36	15:59 (2)	18:36	06:31	05:16	05:18	04:54	05:20	06:12	07:06	08:01			14:55 (2)		15:16 (2)						
9	16:43	15:56 (2)	17:44	15:59 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	37		15:32 (2)		15:27 (2)						
10	08:30	15:20 (2)	17:34	15:59 (2)	18:38	06:28	05:14	05:16	04:54	05:21	06:13	07:08	08:03			14:55 (2)		15:17 (2)						
11	16:45	15:57 (2)	17:46	15:59 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	37		15:32 (2)		15:28 (2)						
12	08:29	15:20 (2)	17:32	15:59 (2)	18:40	06:26	05:12	05:15	04:55	05:23	06:15	07:10	08:05			14:56 (2)		15:17 (2)						
13	16:47	15:57 (2)	17:48	15:59 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	36		15:32 (2)		15:28 (2)						
14	08:27	15:21 (2)	17:30	15:59 (2)	18:42	06:23	05:09	05:13	04:55	05:24	06:17	07:12	08:07			14:56 (2)		15:18 (2)						
15	16:49	15:57 (2)	17:50	15:59 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	36		15:32 (2)		15:29 (2)						
16	08:26	15:21 (2)	17:28	15:59 (2)	18:43	06:21	05:07	05:12	04:55	05:26	06:19	07:13	08:09			14:57 (2)		15:18 (2)						
17	16:50	15:57 (2)	17:52	15:59 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	36		15:33 (2)		15:29 (2)						
18	08:25	15:22 (2)	17:25	15:59 (2)	18:45	06:18	05:05	05:11	04:55	05:27	06:20	07:15	08:11			14:57 (2)		15:18 (2)						
19	16:52	15:58 (2)	17:54	15:59 (2)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	36		15:33 (2)		15:30 (2)						
20	08:23	15:22 (2)	17:23	15:59 (2)	18:47	06:23	05:16	05:09	04:56	05:29	06:22	07:17	08:13			14:58 (2)		15:18 (2)						
21	16:54	15:57 (2)	17:56	15:59 (2)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	35		15:33 (2)		15:30 (2)						
22	08:22	15:22 (2)	17:21	15:59 (2)	18:49	06:13	05:00	05:08	04:56	05:30	06:24	07:19	08:13			14:59 (2)		15:19 (2)						
23	16:56	15:57 (2)	17:58	15:59 (2)	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	34		15:33 (2)		15:32 (2)						
24	08:20	15:24 (2)	17:19	15:59 (2)	18:51	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:14			14:59 (2)		15:19 (2)						
25	16:58	15:57 (2)	18:00	15:59 (2)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	34		15:33 (2)		15:32 (2)						
26	08:19	15:24 (2)		15:59 (2)																				

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FO - H171

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:11 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FP - H172

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
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18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FQ - H173

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
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29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FR - H174

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FS - H175

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	17:02 (4)	07:01	05:52
	16:15	17:06	18:02	20	17:22 (4)	20:00
2	08:44	08:12	07:14	17:03 (4)	06:59	19:33 (2)
	16:16	17:08	18:04	16	17:19 (4)	20:02
3	08:43	08:10	07:11	17:06 (4)	06:56	19:32 (2)
	16:17	17:10	18:05	11	17:17 (4)	20:04
4	08:43	08:08	07:09		06:54	19:30 (2)
	16:18	17:12	18:07		20:06	9
5	08:43	08:07	07:07		06:51	19:28 (2)
	16:19	17:14	18:09		20:07	12
6	08:42	08:05	07:04		06:49	19:28 (2)
	16:21	17:16	18:11		20:09	14
7	08:42	08:03	07:02		06:47	19:26 (2)
	16:22	17:18	18:13		20:11	17
8	08:42	08:01	07:00		06:44	19:26 (2)
	16:24	17:20	18:15		20:13	20
9	08:41	07:59	06:57		06:42	19:26 (2)
	16:25	17:22	18:17		20:15	22
10	08:40	07:57	06:55		06:39	19:25 (2)
	16:26	17:24	18:19		20:17	24
11	08:40	07:55	06:52		06:37	19:26 (2)
	16:28	17:26	18:21		20:18	24
12	08:39	07:53	06:50		06:35	19:26 (2)
	16:30	17:28	18:23		20:20	24
13	08:38	07:51	06:48		06:32	19:26 (2)
	16:31	17:30	18:25		20:22	22
14	08:37	07:49	06:45		06:30	19:27 (2)
	16:33	17:32	18:27		20:24	20
15	08:36	07:47	17:04 (4)	06:43	06:28	19:28 (2)
	16:34	17:34	1	17:05 (4)	20:26	18
16	08:35	07:45	17:03 (4)	06:40	06:25	19:29 (2)
	16:36	17:36	4	17:07 (4)	20:28	15
17	08:34	07:43	17:02 (4)	06:38	06:23	19:31 (2)
	16:38	17:38	7	17:09 (4)	20:30	10
18	08:33	07:41	17:00 (4)	06:35	06:21	05:21
	16:40	17:40	11	17:11 (4)	20:31	21:25
19	08:32	07:39	17:00 (4)	06:33	06:18	05:19
	16:41	17:42	13	17:13 (4)	20:33	21:27
20	08:31	07:36	16:59 (4)	06:31	06:16	05:18
	16:43	17:44	17	17:16 (4)	20:35	21:28
21	08:30	07:34	16:59 (4)	06:28	06:14	05:16
	16:45	17:46	19	17:18 (4)	20:37	21:30
22	08:28	07:32	16:58 (4)	06:26	06:11	05:15
	16:47	17:48	21	17:19 (4)	20:39	21:31
23	08:27	07:30	16:59 (4)	06:23	06:09	05:13
	16:49	17:50	23	17:22 (4)	20:41	21:33
24	08:26	07:28	16:59 (4)	06:21	06:07	05:12
	16:50	17:52	25	17:24 (4)	20:42	21:34
25	08:24	07:25	16:58 (4)	06:18	06:05	05:11
	16:52	17:54	27	17:25 (4)	20:44	21:36
26	08:23	07:23	16:59 (4)	06:16	06:03	05:09
	16:54	17:56	26	17:25 (4)	20:46	21:37
27	08:22	07:21	17:00 (4)	06:13	06:00	05:08
	16:56	17:58	25	17:25 (4)	20:48	21:39
28	08:20	07:18	17:00 (4)	06:11	05:58	05:07
	16:58	18:00	23	17:23 (4)	20:50	21:40
29	08:18			07:08	05:56	05:06
	17:00			19:54	20:52	21:41
30	08:17			07:06	05:54	05:05
	17:02			19:56	20:53	21:43
31	08:15			07:04		05:04
	17:04			19:58		21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case		242	47	258		
Sun reduction		0.23	0.27	0.35		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.67	0.67	0.67		
Total reduction		0.16	0.18	0.23		
Total, real		38	9	61		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FS - H175

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:24 (2) 19:49 (2)	07:26 19:05	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	19:24 (2) 19:48 (2)	07:28 19:02	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	19:23 (2) 19:45 (2)	07:30 19:00	08:22 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	19:23 (2) 19:43 (2)	07:31 18:57	08:24 16:48
5	05:02 21:58	05:45 21:17	06:40 20:09	19:23 (2) 19:41 (2)	07:33 18:55	08:25 16:46
6	05:03 21:58	05:47 21:15	06:42 20:06	19:24 (2) 19:39 (2)	07:35 18:52	08:26 16:44
7	05:04 21:57	05:49 21:13	06:43 20:04	19:23 (2) 19:35 (2)	07:37 18:50	08:28 16:43
8	05:05 21:56	05:50 21:11	06:45 20:01	19:24 (2) 19:33 (2)	07:39 18:48	08:29 16:41
9	05:06 21:55	05:52 21:09	06:47 19:59	19:26 (2) 19:31 (2)	07:41 18:45	08:30 16:39
10	05:07 21:55	05:54 21:07	06:49 19:56	19:26 (2) 19:28 (2)	07:42 18:43	08:31 16:37
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:43 (4) 17:39 (4)	16:35 16:33
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:36 (4) 17:54 (4)	16:35 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:34 (4) 17:55 (4)	16:37 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:33 (4) 17:56 (4)	16:39 16:31
15	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	17:32 (4) 17:57 (4)	16:37 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:31 (4) 17:57 (4)	16:38 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:31 (4) 17:57 (4)	16:38 16:26
18	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	17:30 (4) 17:55 (4)	16:39 16:24
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:30 (4) 17:52 (4)	16:40 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:30 (4) 17:50 (4)	16:41 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:30 (4) 17:48 (4)	16:42 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:30 (4) 17:45 (4)	16:44 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:30 (4) 17:43 (4)	16:46 16:18
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:31 (4) 17:41 (4)	16:48 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	16:32 (4) 16:38 (4)	16:19 16:16
26	05:29 21:35	06:22 20:32	19:34 (2) 19:44 (2)	07:17 17:13	16:33 (4) 16:36 (4)	16:18 16:14
27	05:30 21:33	06:24 20:30	19:31 (2) 19:47 (2)	07:19 17:04	16:34 (4) 16:13	16:09 16:10
28	05:32 21:32	06:26 20:28	19:29 (2) 19:47 (2)	07:21 17:02	16:14 16:12	16:08 16:10
29	05:34 21:30	06:27 20:25	19:27 (2) 19:48 (2)	07:22 17:00	16:16 16:11	16:08 16:11
30	05:35 21:28	06:29 20:23	19:27 (2) 19:49 (2)	07:24 16:58	16:18 16:11	16:09 16:12
31	05:37 21:26	06:31 20:21	19:25 (2) 19:49 (2)	07:22 16:56	16:11 16:13	16:12 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		111	152	289		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.67	0.67	0.67		
Total reduction		0.23	0.21	0.20		
Total, real		25	32	57		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FT - H176

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:15 (5)	08:14	15:39 (4)	07:16	17:05 (3)	07:01	19:02 (2)	05:52	05:03	
	16:15	22	15:37 (5)	17:06	36	16:15 (4)	18:02	19:33 (2)	20:55	21:45	
2	08:44		15:16 (5)	08:12		15:40 (4)	07:14	19:01 (2)	05:50	05:02	
	16:16	23	15:39 (5)	17:08	34	16:14 (4)	18:04	19:35 (2)	20:57	21:46	
3	08:44		15:16 (5)	08:10		15:41 (4)	07:12	19:01 (2)	05:48	05:01	
	16:17	23	15:39 (5)	17:10	32	16:13 (4)	18:06	19:37 (2)	20:59	21:48	
4	08:43		15:17 (5)	08:08		15:42 (4)	07:09	19:00 (2)	05:46	05:00	
	16:18	24	15:41 (4)	17:12	30	16:12 (4)	18:07	19:39 (2)	21:01	21:49	
5	08:43		15:17 (5)	08:07		15:43 (4)	07:07	18:59 (2)	05:44	04:59	
	16:19	25	15:42 (4)	17:14	28	16:11 (4)	18:09	19:39 (2)	21:03	21:50	
6	08:43		15:18 (5)	08:05		15:45 (4)	07:04	18:59 (2)	05:42	04:59	
	16:21	26	15:44 (4)	17:16	25	16:10 (4)	18:11	19:39 (2)	21:04	21:51	
7	08:42		15:18 (5)	08:03		15:47 (4)	07:02	18:58 (2)	05:40	04:58	
	16:22	27	15:45 (4)	17:18	21	16:08 (4)	18:13	19:38 (2)	21:06	21:52	
8	08:42		15:18 (5)	08:01		15:50 (4)	07:00	18:59 (2)	05:38	04:57	
	16:24	28	15:46 (4)	17:20	16	16:06 (4)	18:15	19:38 (2)	21:08	21:53	
9	08:41		15:20 (5)	07:59		15:54 (4)	06:57	18:59 (2)	05:36	04:57	
	16:25	29	15:49 (4)	17:22	8	16:02 (4)	18:17	19:38 (2)	21:10	21:54	
10	08:40		15:20 (5)	07:57		16:05	06:55	18:58 (2)	05:34	04:56	
	16:26	30	15:50 (4)	17:24		18:19	20:17	19:37 (2)	21:11	21:55	
11	08:40		15:21 (5)	07:55		16:06	06:52	18:59 (2)	05:33	04:56	
	16:28	31	15:52 (4)	17:26		18:21	20:19	19:36 (2)	21:13	21:55	
12	08:39		15:22 (5)	07:53		16:05	06:50	19:00 (2)	05:31	04:55	
	16:30	32	15:54 (4)	17:28		18:23	20:20	19:36 (2)	21:15	21:56	
13	08:38		15:23 (5)	07:51		16:06	06:48	18:59 (2)	05:29	04:55	
	16:31	32	15:55 (4)	17:30		18:25	20:22	19:34 (2)	21:17	21:57	
14	08:37		15:24 (5)	07:49		16:05	06:45	19:00 (2)	05:27	04:55	
	16:33	33	15:57 (4)	17:32		18:27	20:24	19:33 (2)	21:18	21:58	
15	08:36		15:26 (5)	07:47		16:04	06:43	19:02 (2)	05:26	04:54	
	16:34	33	15:59 (4)	17:34		18:28	20:26	19:32 (2)	21:20	21:58	
16	08:35		15:27 (5)	07:45		16:04	06:40	19:03 (2)	05:24	04:54	
	16:36	33	16:00 (4)	17:36		18:30	20:28	19:31 (2)	21:22	21:59	
17	08:34		15:29 (5)	07:43		17:06 (3)	06:38	19:04 (2)	05:22	04:54	
	16:38	33	16:02 (4)	17:38	3	17:09 (3)	18:32	19:28 (2)	21:23	21:59	
18	08:33		15:34 (4)	07:41		17:04 (3)	06:35	19:06 (2)	05:21	04:54	
	16:40	31	16:05 (4)	17:40	7	17:11 (3)	18:34	19:26 (2)	21:25	22:00	
19	08:32		15:34 (4)	07:39		17:03 (3)	06:33	19:09 (2)	05:19	04:54	
	16:41	33	16:07 (4)	17:42	10	17:13 (3)	18:36	19:23 (2)	21:27	22:00	
20	08:31		15:34 (4)	07:36		17:03 (3)	06:31	19:06 (2)	05:18	04:54	
	16:43	34	16:08 (4)	17:44	13	17:16 (3)	18:38	19:23 (2)	21:28	22:00	
21	08:30		15:34 (4)	07:34		17:03 (3)	06:28	19:06 (2)	05:16	04:54	
	16:45	37	16:11 (4)	17:46	15	17:18 (3)	18:40	19:30 (2)	21:30	22:01	
22	08:29		15:34 (4)	07:32		17:02 (3)	06:26	19:05 (2)	05:15	04:55	
	16:47	38	16:12 (4)	17:48	17	17:19 (3)	18:42	19:31 (2)	21:31	22:01	
23	08:27		15:35 (4)	07:30		17:02 (3)	06:23	19:06 (2)	05:13	04:55	
	16:49	40	16:15 (4)	17:50	20	17:22 (3)	18:43	19:33 (2)	21:33	22:01	
24	08:26		15:34 (4)	07:28		17:02 (3)	06:21	19:07 (2)	05:12	04:55	
	16:50	41	16:15 (4)	17:52	22	17:24 (3)	18:45	19:34 (2)	21:34	22:01	
25	08:24		15:35 (4)	07:25		17:02 (3)	06:18	18:17 (2)	06:05	05:11	04:55
	16:52	41	16:16 (4)	17:54	24	17:26 (3)	18:47	18:21 (2)	20:44	21:36	22:01
26	08:23		15:35 (4)	07:23		17:02 (3)	06:16	18:13 (2)	06:03	05:09	04:56
	16:54	40	16:15 (4)	17:56	25	17:27 (3)	18:49	18:23 (2)	20:46	21:37	22:01
27	08:22		15:35 (4)	07:21		17:03 (3)	06:13	18:10 (2)	06:01	05:08	04:56
	16:56	40	16:15 (4)	17:58	23	17:26 (3)	18:51	18:24 (2)	20:48	21:39	22:01
28	08:20		15:37 (4)	07:18		17:03 (3)	06:11	18:08 (2)	05:58	05:07	04:57
	16:58	39	16:16 (4)	18:00	22	17:25 (3)	18:53	18:26 (2)	20:50	21:40	22:01
29	08:18		15:37 (4)			17:08	07:08	19:06 (2)	05:56	05:06	04:57
	17:00	38	16:15 (4)			19:54	22	19:28 (2)	20:52	21:41	22:01
30	08:17		15:37 (4)			17:06	07:06	19:05 (2)	05:54	05:05	04:58
	17:02	38	16:15 (4)			19:56	25	19:30 (2)	20:54	21:43	22:00
31	08:15		15:38 (4)			17:04	07:04	19:03 (2)		05:04	
	17:04	36	16:14 (4)			19:58	28	19:31 (2)		21:44	
Potential sun hours	250		273			367		420		494	510
Total, worst case		1010		431		165		634			
Sun reduction		0.24		0.23		0.27		0.35			
Oper. time red.		1.00		1.00		1.00		1.00			
Wind dir. red.		0.66		0.67		0.67		0.67			
Total reduction		0.16		0.16		0.18		0.24			
Total, real		162		67		30		151			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FT - H176

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:58 (2) 19:35 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:57 (2) 19:36 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:56 (2) 19:35 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:56 (2) 19:35 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:55 (2) 19:35 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:55 (2) 19:35 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:54 (2) 19:34 (2)	07:37 16:43	08:28 16:06
8	05:05 21:56	05:50 21:12	06:45 20:01	18:54 (2) 19:33 (2)	07:39 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	18:55 (2) 19:31 (2)	07:41 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:54 (2) 19:28 (2)	07:42 17:49 (3)	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:55 (2) 19:26 (2)	07:44 17:42 (3)	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:55 (2) 19:24 (2)	07:46 17:56 (3)	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:56 (2) 19:22 (2)	07:48 17:57 (3)	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:56 (2) 19:18 (2)	07:50 17:58 (3)	08:36 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	18:57 (2) 19:16 (2)	07:52 17:59 (3)	08:37 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	18:59 (2) 19:14 (2)	07:54 17:59 (3)	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	19:00 (2) 19:11 (2)	07:55 17:57 (3)	08:38 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	19:03 (2) 19:08 (2)	07:57 17:55 (3)	08:39 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	19:07 (2) 18:22 (2)	07:59 17:52 (3)	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	19:08 (2) 18:20 (2)	08:00 17:50 (3)	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	19:09 (2) 18:17 (2)	08:02 17:48 (3)	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	19:10 (2) 18:15 (2)	08:04 17:45 (3)	08:42 16:06
23	05:24 21:39	06:17 20:39	07:12 19:22 (2)	19:11 (2) 18:13 (2)	08:06 17:43 (3)	08:42 16:07
24	05:26 21:38	06:19 20:37	07:13 19:22 (2)	19:12 (2) 18:11 (2)	08:08 17:41 (3)	08:43 16:08
25	05:27 21:36	06:20 20:35	07:15 19:29 (2)	19:13 (2) 17:09 (2)	08:09 16:36 (3)	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:31 (2)	19:14 (2) 17:06 (2)	08:11 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:05 (2)	19:15 (2) 17:04 (2)	08:13 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:33 (2)	19:16 (2) 17:02 (2)	08:14 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:01 (2)	19:17 (2) 17:00 (2)	08:16 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:35 (2)	19:18 (2) 16:58 (2)	08:18 16:11	08:44 16:12
31	05:37 21:27	06:31 20:21	18:59 (2) 19:35 (2)	19:19 (2) 16:56 (2)	07:22 16:56	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		229	541	247	959	678
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.66
Total reduction		0.23	0.22	0.20	0.18	0.14
Total, real		53	117	49	168	92

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FU - H177

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44		15:09 (5)	08:14		15:33 (4)	07:16		17:04 (3)	07:01		18:58 (2)	05:52		05:03			
	16:15	28	15:37 (4)	17:06	30	16:03 (4)	18:02	12	17:16 (3)	20:00	35	19:33 (2)	20:55		21:45			
2	08:44		15:10 (5)	08:12		15:34 (4)	07:14		17:08 (3)	06:59		18:56 (2)	05:50		05:02			
	16:16	29	15:39 (4)	17:08	27	16:01 (4)	18:04	2	17:10 (3)	20:02	39	19:35 (2)	20:57		21:46			
3	08:44		15:10 (5)	08:10		15:36 (4)	07:12			06:56		18:56 (2)	05:48		05:01			
	16:17	29	15:39 (4)	17:10	24	16:00 (4)	18:06			20:04	41	19:37 (2)	20:59		21:48			
4	08:43		15:11 (5)	08:08		15:38 (4)	07:09			06:54		18:56 (2)	05:46		05:00			
	16:18	30	15:41 (4)	17:12	20	15:58 (4)	18:07			20:06	42	19:38 (2)	21:01		21:49			
5	08:43		15:12 (5)	08:07		15:40 (4)	07:07			06:51		18:55 (2)	05:44		04:59			
	16:19	30	15:42 (4)	17:14	16	15:56 (4)	18:09			20:07	42	19:37 (2)	21:03		21:50			
6	08:43		15:13 (5)	08:05		15:45 (4)	07:04			06:49		18:55 (2)	05:42		04:59			
	16:21	31	15:44 (4)	17:16	6	15:51 (4)	18:11			20:09	42	19:37 (2)	21:04		21:51			
7	08:42		15:13 (5)	08:03			07:02			06:47		18:54 (2)	05:40		04:58			
	16:22	32	15:45 (4)	17:18			18:13			20:11	42	19:36 (2)	21:06		21:52			
8	08:42		15:14 (5)	08:01			07:00			06:44		18:55 (2)	05:38		04:57			
	16:24	32	15:46 (4)	17:20			18:15			20:13	41	19:36 (2)	21:08		21:53			
9	08:41		15:16 (5)	07:59			06:57			06:42		18:55 (2)	05:36		04:57			
	16:25	33	15:49 (4)	17:22			18:17			20:15	41	19:36 (2)	21:10		21:54			
10	08:40		15:17 (5)	07:57			06:55			06:39		18:55 (2)	05:34		04:56			
	16:26	33	15:50 (4)	17:24			18:19			20:17	39	19:34 (2)	21:11		21:55			
11	08:40		15:18 (5)	07:55			06:53			06:37		18:55 (2)	05:33		04:56			
	16:28	34	15:52 (4)	17:26			18:21			20:19	39	19:34 (2)	21:13		21:55			
12	08:39		15:19 (5)	07:53			06:50			06:35		18:56 (2)	05:31		04:55			
	16:30	35	15:54 (4)	17:28			18:23			20:20	37	19:33 (2)	21:15		21:56			
13	08:38		15:21 (5)	07:51			06:48			06:32		18:56 (2)	05:29		04:55			
	16:31	34	15:55 (4)	17:30			18:25			20:22	35	19:31 (2)	21:17		21:57			
14	08:37		15:22 (4)	07:49			06:45			06:30		18:57 (2)	05:27		04:55			
	16:33	35	15:57 (4)	17:32			18:27			20:24	33	19:30 (2)	21:18		21:58			
15	08:36		15:22 (4)	07:47		17:01 (3)	06:43			06:28		18:58 (2)	05:26		04:54			
	16:34	37	15:59 (4)	17:34	4	17:05 (3)	18:28			20:26	31	19:29 (2)	21:20		21:58			
16	08:35		15:22 (4)	07:45		17:00 (3)	06:40			06:25		19:00 (2)	05:24		04:54			
	16:36	38	16:00 (4)	17:36	7	17:07 (3)	18:30			20:28	28	19:28 (2)	21:22		21:59			
17	08:34		15:22 (4)	07:43		16:59 (3)	06:38			06:23		19:01 (2)	05:22		04:54			
	16:38	40	16:02 (4)	17:38	10	17:09 (3)	18:32			20:30	24	19:25 (2)	21:23		21:59			
18	08:33		15:23 (4)	07:41		16:58 (3)	06:35			06:21		19:03 (2)	05:21		04:54			
	16:40	41	16:04 (4)	17:40	13	17:11 (3)	18:34			20:31	20	19:23 (2)	21:25		22:00			
19	08:32		15:23 (4)	07:39		16:58 (3)	06:33			06:18		19:06 (2)	05:19		04:54			
	16:41	42	16:05 (4)	17:42	15	17:13 (3)	18:36			20:33	14	19:20 (2)	21:27		22:00			
20	08:31		15:23 (4)	07:36		16:58 (3)	06:31			06:16			05:18		04:54			
	16:43	42	16:05 (4)	17:44	18	17:16 (3)	18:38			20:35			21:28		22:00			
21	08:30		15:24 (4)	07:34		16:58 (3)	06:28			06:14			05:16		04:54			
	16:45	41	16:05 (4)	17:46	20	17:18 (3)	18:40			20:37			21:30		22:01			
22	08:29		15:24 (4)	07:32		16:57 (3)	06:26			06:12			05:15		04:55			
	16:47	41	16:05 (4)	17:48	22	17:19 (3)	18:42			20:39			21:31		22:01			
23	08:27		15:25 (4)	07:30		16:57 (3)	06:23			06:09			05:13		04:55			
	16:49	41	16:06 (4)	17:50	25	17:22 (3)	18:43			20:41			21:33		22:01			
24	08:26		15:25 (4)	07:28		16:58 (3)	06:21		18:11 (2)	06:07			05:12		04:55			
	16:50	40	16:05 (4)	17:52	26	17:24 (3)	18:45	7	18:18 (2)	20:43			21:34		22:01			
25	08:24		15:26 (4)	07:25		16:58 (3)	06:18		18:08 (2)	06:05			05:11		04:55			
	16:52	40	16:06 (4)	17:54	24	17:22 (3)	18:47	13	18:21 (2)	20:44			21:36		22:01			
26	08:23		15:26 (4)	07:23		16:59 (3)	06:16		18:06 (2)	06:03			05:09		04:56			
	16:54	39	16:05 (4)	17:56	23	17:22 (3)	18:49	17	18:23 (2)	20:46			21:37		22:01			
27	08:22		15:27 (4)	07:21		17:00 (3)	06:13		18:04 (2)	06:01			05:08		04:56			
	16:56	38	16:05 (4)	17:58	21	17:21 (3)	18:51	20	18:24 (2)	20:48			21:39		22:01			
28	08:20		15:28 (4)	07:18		17:01 (3)	06:11		18:03 (2)	05:58			05:07		04:57			
	16:58	37	16:05 (4)	18:00	17	17:18 (3)	18:53	23	18:26 (2)	20:50			21:40		22:01			
29	08:19		15:29 (4)				07:09		19:01 (2)	05:56			05:06		04:57			
	17:00	35	16:04 (4)				19:54	27	19:28 (2)	20:52			21:41		22:01			
30	08:17		15:30 (4)				07:06		19:00 (2)	05:54			05:05		04:58			
	17:02	33	16:03 (4)				19:56	30	19:30 (2)	20:54			21:43		22:00			
31	08:15		15:31 (4)				07:04		18:58 (2)				05:04					
	17:04	32	16:03 (4)				19:58	33	19:31 (2)				21:44					
Potential sun hours	250		273		367		420		494		510							
Total, worst case	1102		368		184		665											
Sun reduction	0.24		0.23		0.27		0.35											
Oper. time red.	1.00		1.00		1.00		1.00											
Wind dir. red.	0.66		0.67		0.67		0.67											
Total reduction	0.16		0.16		0.18		0.24											
Total, real	176		57		34		158											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FU - H177

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:54 (2) 19:33 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:54 (2) 19:33 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:52 (2) 19:33 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:52 (2) 19:33 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:51 (2) 19:33 (2)	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:51 (2) 19:33 (2)	07:34 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:50 (2) 19:32 (2)	07:36 16:43	08:28 16:06
8	05:05 21:56	05:50 21:12	06:45 20:01	18:50 (2) 19:32 (2)	07:39 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	18:50 (2) 19:31 (2)	07:40 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:49 (2) 19:28 (2)	07:42 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:50 (2) 19:26 (2)	07:44 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:50 (2) 19:24 (2)	07:45 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:51 (2) 19:22 (2)	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:51 (2) 19:18 (2)	07:49 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	18:52 (2) 19:16 (2)	07:51 16:29	08:37 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	18:53 (2) 19:14 (2)	07:53 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	18:53 (2) 19:11 (2)	07:55 16:26	08:38 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	18:55 (2) 19:08 (2)	07:57 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	18:58 (2) 19:06 (2)	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	19:02 (2) 19:04 (2)	08:00 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	18:20 18:17	16:22 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	18:05 18:15	08:04 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	07:12 19:24	18:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	19:10 (2) 19:24 (2)	07:13 19:22	16:18 16:17	15:00 (4) 16:08
25	05:27 21:36	06:20 20:35	19:06 (2) 19:26 (2)	07:15 19:19	16:29 (3) 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	19:03 (2) 19:28 (2)	07:17 19:17	16:30 (3) 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	19:02 (2) 19:30 (2)	07:19 19:14	16:30 (3) 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	18:59 (2) 19:30 (2)	07:21 19:12	08:14 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	18:58 (2) 19:31 (2)	07:22 19:09	08:16 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	18:57 (2) 19:32 (2)	07:24 19:07	08:18 16:11	08:44 16:12
31	05:37 21:27	06:31 20:21	18:55 (2) 19:32 (2)	07:22 16:56	08:44 16:13	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		223	622	265	892	844
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.65
Total reduction		0.23	0.22	0.20	0.17	0.14
Total, real		51	134	52	156	115

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FV - H178

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		15:07 (5)	08:14		15:30 (4)	07:16		07:01		18:53 (2)	05:52		05:03			
	16:15	30	15:37 (4)	17:06	24	15:54 (4)	18:02		20:00	40	19:33 (2)	20:55		21:45			
2	08:44		15:08 (5)	08:12		15:32 (4)	07:14		06:59		18:52 (2)	05:50		05:02			
	16:16	31	15:39 (4)	17:08	20	15:52 (4)	18:04		20:02	43	19:35 (2)	20:57		21:46			
3	08:44		15:08 (5)	08:10		15:35 (4)	07:12		06:56		18:52 (2)	05:48		05:01			
	16:17	31	15:39 (4)	17:10	14	15:49 (4)	18:06		20:04	43	19:35 (2)	20:59		21:48			
4	08:43		15:09 (5)	08:08		15:41 (4)	07:09		06:54		18:52 (2)	05:46		05:00			
	16:18	32	15:41 (4)	17:12	2	15:43 (4)	18:07		20:06	43	19:35 (2)	21:01		21:49			
5	08:43		15:09 (5)	08:07			07:07		06:51		18:51 (2)	05:44		04:59			
	16:19	33	15:42 (4)	17:14			18:09		20:07	43	19:34 (2)	21:03		21:50			
6	08:43		15:11 (5)	08:05			07:04		06:49		18:51 (2)	05:42		04:59			
	16:21	33	15:44 (4)	17:16			18:11		20:09	43	19:34 (2)	21:04		21:51			
7	08:42		15:11 (5)	08:03			07:02		06:47		18:51 (2)	05:40		04:58			
	16:22	34	15:45 (4)	17:18			18:13		20:11	42	19:33 (2)	21:06		21:52			
8	08:42		15:12 (5)	08:01			07:00		06:44		18:51 (2)	05:38		04:57			
	16:24	34	15:46 (4)	17:20			18:15		20:13	42	19:33 (2)	21:08		21:53			
9	08:41		15:14 (5)	07:59			06:57		06:42		18:52 (2)	05:36		04:57			
	16:25	35	15:49 (4)	17:22			18:17		20:15	40	19:32 (2)	21:10		21:54			
10	08:40		15:14 (4)	07:57			06:55		06:39		18:51 (2)	05:34		04:56			
	16:26	36	15:50 (4)	17:24			18:19		20:17	40	19:31 (2)	21:11		21:55			
11	08:40		15:14 (4)	07:55			06:53		06:37		18:52 (2)	05:33		04:56			
	16:28	38	15:52 (4)	17:26			18:21		20:19	38	19:30 (2)	21:13		21:55			
12	08:39		15:15 (4)	07:53			06:50		06:35		18:53 (2)	05:31		04:55			
	16:30	39	15:54 (4)	17:28			18:23		20:20	36	19:29 (2)	21:15		21:56			
13	08:38		15:15 (4)	07:51		16:58 (3)	06:48		06:32		18:53 (2)	05:29		04:55			
	16:31	40	15:55 (4)	17:30	2	17:00 (3)	18:25		20:22	34	19:27 (2)	21:17		21:57			
14	08:37		15:15 (4)	07:49			06:45		06:30		18:55 (2)	05:27		04:55			
	16:33	42	15:57 (4)	17:32	5	17:02 (3)	18:27		20:24	31	19:26 (2)	21:18		21:58			
15	08:36		15:16 (4)	07:47			06:43		06:28		18:56 (2)	05:26		04:54			
	16:34	42	15:58 (4)	17:34	9	17:05 (3)	18:28		20:26	29	19:25 (2)	21:20		21:58			
16	08:35		15:15 (4)	07:45			06:40		06:25		18:58 (2)	05:24		04:54			
	16:36	42	15:57 (4)	17:36	12	17:07 (3)	18:30		20:28	25	19:23 (2)	21:22		21:59			
17	08:34		15:16 (4)	07:43			06:38		06:23		18:59 (2)	05:22		04:54			
	16:38	42	15:58 (4)	17:38	14	17:09 (3)	18:32		20:30	21	19:20 (2)	21:23		21:59			
18	08:33		15:17 (4)	07:41			06:35		06:21		19:02 (2)	05:21		04:54			
	16:40	41	15:58 (4)	17:40	17	17:11 (3)	18:34		20:31	15	19:17 (2)	21:25		22:00			
19	08:32		15:18 (4)	07:39			06:33		06:18			05:19		04:54			
	16:41	41	15:59 (4)	17:42	19	17:13 (3)	18:36		20:33			21:27		22:00			
20	08:31		15:17 (4)	07:36			06:31		06:16			05:18		04:54			
	16:43	41	15:58 (4)	17:44	22	17:16 (3)	18:38		20:35			21:28		22:00			
21	08:30		15:18 (4)	07:34			06:28		06:14			05:16		04:54			
	16:45	41	15:59 (4)	17:46	24	17:18 (3)	18:40		20:37			21:30		22:01			
22	08:29		15:18 (4)	07:32			06:26		18:11 (2)			05:15		04:55			
	16:47	40	15:58 (4)	17:48	25	17:19 (3)	18:42	4	18:15 (2)			20:39		22:01			
23	08:27		15:20 (4)	07:30			06:23		18:07 (2)			05:13		04:55			
	16:49	39	15:59 (4)	17:50	25	17:20 (3)	18:43	10	18:17 (2)			20:41		22:01			
24	08:26		15:20 (4)	07:28			06:21		18:04 (2)			05:12		04:55			
	16:50	38	15:58 (4)	17:52	24	17:20 (3)	18:45	14	18:18 (2)			20:43		22:01			
25	08:24		15:21 (4)	07:25			06:18		18:02 (2)			05:11		04:55			
	16:52	38	15:59 (4)	17:54	22	17:18 (3)	18:47	19	18:21 (2)			20:44		22:01			
26	08:23		15:22 (4)	07:23			06:16		18:00 (2)			05:09		04:56			
	16:54	36	15:58 (4)	17:56	20	17:17 (3)	18:49	23	18:23 (2)			20:46		22:01			
27	08:22		15:22 (4)	07:21			06:13		17:58 (2)			05:08		04:56			
	16:56	35	15:57 (4)	17:58	17	17:16 (3)	18:51	26	18:24 (2)			20:48		22:01			
28	08:20		15:24 (4)	07:18			06:11		17:57 (2)			05:07		04:57			
	16:58	33	15:57 (4)	18:00	11	17:12 (3)	18:53	29	18:26 (2)			20:50		22:01			
29	08:19		15:25 (4)				07:09		18:56 (2)			05:06		04:57			
	17:00	31	15:56 (4)				19:54	32	19:28 (2)			20:52		22:01			
30	08:17		15:26 (4)				07:06		18:55 (2)			05:05		04:58			
	17:02	29	15:55 (4)				19:56	35	19:30 (2)			20:54		22:01			
31	08:15		15:27 (4)				07:04		18:53 (2)			05:04					
	17:04	27	15:54 (4)				19:58	38	19:31 (2)			21:44					
Potential sun hours	250			273		367		420			494		510				
Total, worst case	1124			328		230		648									
Sun reduction	0.24			0.23		0.27		0.35									
Oper. time red.	1.00			1.00		1.00		1.00									
Wind dir. red.	0.66			0.67		0.67		0.67									
Total reduction	0.16			0.16		0.18		0.24									
Total, real	179			51		42		154									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FV - H178

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:51 (2) 19:29 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:50 (2) 19:30 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:49 (2) 19:29 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:48 (2) 19:30 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:48 (2) 19:30 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:47 (2) 19:30 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:46 (2) 19:29 (2)	07:37 16:43	08:28 15:15 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	18:45 (2) 19:29 (2)	07:39 16:41	08:29 15:19 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	18:46 (2) 19:29 (2)	07:41 16:39	08:30 15:22 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	18:45 (2) 19:28 (2)	07:42 16:37	08:31 15:25 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	18:45 (2) 19:26 (2)	07:44 16:35	08:33 15:26 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	18:46 (2) 19:24 (2)	07:46 16:34	08:34 15:27 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	18:46 (2) 19:22 (2)	07:48 16:32	08:35 15:28 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	18:46 (2) 19:18 (2)	07:50 16:31	08:36 15:29 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	18:46 (2) 19:16 (2)	07:51 16:29	08:37 15:30 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	18:47 (2) 19:14 (2)	07:53 16:27	08:38 15:31 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	18:48 (2) 19:11 (2)	07:55 16:26	08:38 15:32 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	18:49 (2) 19:08 (2)	07:57 16:24	08:39 15:33 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	18:51 (2) 19:06 (2)	07:59 16:23	08:40 15:33 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	18:53 (2) 19:04 (2)	08:00 16:22	08:41 15:33 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	18:55 (2) 19:01 (2)	08:02 16:20	08:41 15:34 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 15:34 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 15:35 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 15:35 (4)
25	05:27 21:36	06:20 20:35	19:05 (2) 19:20 (2)	07:15 17:09	08:09 16:16	08:43 15:36 (4)
26	05:29 21:35	06:22 20:32	19:02 (2) 19:23 (2)	07:17 17:06	08:11 16:14	08:43 15:36 (4)
27	05:30 21:33	06:24 20:30	19:00 (2) 19:25 (2)	07:19 17:04	08:13 16:13	08:44 15:37 (4)
28	05:32 21:32	06:26 20:28	18:57 (2) 19:26 (2)	07:21 17:02	08:14 16:12	08:44 15:37 (4)
29	05:34 21:30	06:27 20:25	18:55 (2) 19:27 (2)	07:22 17:00	08:16 16:12	08:44 15:36 (4)
30	05:35 21:28	06:29 20:23	18:54 (2) 19:28 (2)	07:24 16:58	08:18 16:11	08:44 15:35 (4)
31	05:37 21:27	06:31 20:21	18:52 (2) 19:28 (2)	07:22 16:56		08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		192	695	278	823	934
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.65
Total reduction		0.23	0.22	0.20	0.17	0.14
Total, real		44	150	54	143	127

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FW - H179

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	14:40 (4)	08:14	07:16		07:01	18:31 (2)	05:52	05:03		
	16:15	42	15:22 (4)	17:06	18:02	20:00	47	19:18 (2)	20:55	21:45	
2	08:44	14:41 (4)	08:12	07:14		06:59	18:31 (2)	05:50	05:02		
	16:16	42	15:23 (4)	17:08	18:04	20:02	46	19:17 (2)	20:57	21:46	
3	08:44	14:41 (4)	08:10	07:12		06:56	18:32 (2)	05:48	05:01		
	16:17	41	15:22 (4)	17:10	18:06	20:04	44	19:16 (2)	20:59	21:48	
4	08:43	14:42 (4)	08:08	07:09		06:54	18:33 (2)	05:46	05:00		
	16:18	41	15:23 (4)	17:12	18:07	20:06	43	19:16 (2)	21:01	21:49	
5	08:43	14:42 (4)	08:07	16:40 (3)	07:07	06:51	18:32 (2)	05:44	04:59		
	16:19	41	15:23 (4)	17:14	16:43 (3)	20:07	42	19:14 (2)	21:03	21:50	
6	08:43	14:44 (4)	08:05	16:39 (3)	07:04	06:49	18:34 (2)	05:42	04:59		
	16:21	40	15:24 (4)	17:16	16:45 (3)	20:09	39	19:13 (2)	21:04	21:51	
7	08:42	14:44 (4)	08:03	16:39 (3)	07:02	06:47	18:34 (2)	05:40	04:58		
	16:22	39	15:23 (4)	17:18	16:47 (3)	20:11	37	19:11 (2)	21:06	21:52	
8	08:42	14:44 (4)	08:01	16:38 (3)	07:00	06:44	18:35 (2)	05:38	04:57		
	16:24	39	15:23 (4)	17:20	16:50 (3)	20:13	35	19:10 (2)	21:08	21:53	
9	08:41	14:46 (4)	07:59	16:38 (3)	06:57	06:42	18:37 (2)	05:36	04:57		
	16:25	38	15:24 (4)	17:22	16:52 (3)	20:15	31	19:08 (2)	21:10	21:54	
10	08:40	14:46 (4)	07:57	16:37 (3)	06:55	06:39	18:38 (2)	05:34	04:56		
	16:26	38	15:24 (4)	17:24	16:54 (3)	20:17	28	19:06 (2)	21:11	21:55	
11	08:40	14:47 (4)	07:55	16:37 (3)	06:53	06:37	18:41 (2)	05:33	04:56		
	16:28	37	15:24 (4)	17:26	16:56 (3)	20:19	22	19:03 (2)	21:13	21:55	
12	08:39	14:48 (4)	07:53	16:37 (3)	06:50	06:35	18:44 (2)	05:31	04:55		
	16:30	36	15:24 (4)	17:28	16:59 (3)	20:20	16	19:00 (2)	21:15	21:56	
13	08:38	14:49 (4)	07:51	16:37 (3)	06:48	17:57 (2)	06:32	05:29	04:55		
	16:31	35	15:24 (4)	17:30	17:00 (3)	17:58 (2)	20:22	21:17	21:57		
14	08:37	14:50 (4)	07:49	16:37 (3)	06:45	17:50 (2)	06:30	05:27	04:55		
	16:33	34	15:24 (4)	17:32	17:02 (3)	18:00 (2)	20:24	21:18	21:58		
15	08:36	14:51 (4)	07:47	16:37 (3)	06:43	17:48 (2)	06:28	05:26	04:54		
	16:34	33	15:24 (4)	17:34	17:05 (3)	18:02 (2)	20:26	21:20	21:58		
16	08:35	14:51 (4)	07:45	16:38 (3)	06:40	17:44 (2)	06:25	05:24	04:54		
	16:36	32	15:23 (4)	17:36	17:05 (3)	18:04 (2)	20:28	21:22	21:59		
17	08:34	14:52 (4)	07:43	16:39 (3)	06:38	17:43 (2)	06:23	05:22	04:54		
	16:38	30	15:22 (4)	17:38	17:05 (3)	18:06 (2)	20:30	21:23	21:59		
18	08:33	14:54 (4)	07:41	16:39 (3)	06:35	17:40 (2)	06:21	05:21	04:54		
	16:40	28	15:22 (4)	17:40	17:03 (3)	18:07 (2)	20:31	21:25	22:00		
19	08:32	14:56 (4)	07:39	16:40 (3)	06:33	17:39 (2)	06:18	05:19	04:54		
	16:41	26	15:22 (4)	17:42	17:02 (3)	18:10 (2)	20:33	21:27	22:00		
20	08:31	14:57 (4)	07:36	16:42 (3)	06:31	17:37 (2)	06:16	05:18	04:54		
	16:43	23	15:20 (4)	17:44	17:01 (3)	18:11 (2)	20:35	21:28	22:00		
21	08:30	14:59 (4)	07:34	16:44 (3)	06:28	17:37 (2)	06:14	05:16	04:54		
	16:45	20	15:19 (4)	17:46	16:59 (3)	18:13 (2)	20:37	21:30	22:01		
22	08:29	15:01 (4)	07:32	16:46 (3)	06:26	17:35 (2)	06:12	05:15	04:55		
	16:47	16	15:17 (4)	17:48	16:55 (3)	18:15 (2)	20:39	21:31	22:01		
23	08:27	15:05 (4)	07:30	06:23		17:35 (2)	06:09	05:13	04:55		
	16:49	10	15:15 (4)	17:50	18:43	18:17 (2)	20:41	21:33	22:01		
24	08:26		07:28	06:21		17:33 (2)	06:07	05:12	04:55		
	16:50		17:52	18:45	45	18:18 (2)	20:43	21:34	22:01		
25	08:24		07:25	06:18		17:33 (2)	06:05	05:11	04:55		
	16:52		17:54	18:47	47	18:20 (2)	20:44	21:36	22:01		
26	08:23		07:23	06:16		17:33 (2)	06:03	05:09	04:56		
	16:54		17:56	18:49	48	18:21 (2)	20:46	21:37	22:01		
27	08:22		07:21	06:13		17:32 (2)	06:01	05:08	04:56		
	16:56		17:58	18:51	48	18:20 (2)	20:48	21:39	22:01		
28	08:20		07:18	06:11		17:32 (2)	05:58	05:07	04:57		
	16:58		18:00	18:53	48	18:20 (2)	20:50	21:40	22:01		
29	08:19			07:09		18:31 (2)	05:56	05:06	04:57		
	17:00			19:55	48	19:19 (2)	20:52	21:41	22:01		
30	08:17			07:06		18:31 (2)	05:54	05:05	04:58		
	17:02			19:56	48	19:19 (2)	20:54	21:43	22:00		
31	08:15			07:04		18:31 (2)		05:04			
	17:04			19:58	47	19:18 (2)		21:44			
Potential sun hours	250		273	367		420		494	510		
Total, worst case	761		319	657		430					
Sun reduction	0.24		0.23	0.27		0.35					
Oper. time red.	1.00		1.00	1.00		1.00					
Wind dir. red.	0.65		0.66	0.68		0.68					
Total reduction	0.16		0.15	0.18		0.24					
Total, real	120		49	120		102					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FW - H179

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:40 (2) 19:02 (2)	07:26 19:05	
2	04:59 22:00	05:40 21:23	06:35 20:16	18:37 (2) 19:05 (2)	07:28 19:02	
3	05:00 21:59	05:42 21:21	06:36 20:13	18:35 (2) 19:06 (2)	07:30 19:00	
4	05:01 21:59	05:44 21:19	06:38 20:11	18:32 (2) 19:07 (2)	07:31 18:57	
5	05:02 21:58	05:45 21:17	06:40 20:09	18:31 (2) 19:08 (2)	07:33 18:55	
6	05:03 21:58	05:47 21:15	06:42 20:06	18:30 (2) 19:09 (2)	07:35 18:52	
7	05:04 21:57	05:49 21:14	06:43 20:04	18:28 (2) 19:09 (2)	07:37 18:50	
8	05:05 21:56	05:51 21:12	06:45 20:01	18:27 (2) 19:10 (2)	07:39 18:48	
9	05:06 21:55	05:52 21:10	06:47 19:59	18:26 (2) 19:10 (2)	07:41 18:45	
10	05:07 21:55	05:54 21:08	06:49 19:56	18:24 (2) 19:10 (2)	07:42 18:43	
11	05:08 21:54	05:56 21:05	06:50 19:54	18:24 (2) 19:10 (2)	07:44 18:40	
12	05:09 21:53	05:57 21:03	06:52 19:51	18:23 (2) 19:11 (2)	07:46 18:38	
13	05:10 21:52	05:59 21:01	06:54 19:49	18:23 (2) 19:11 (2)	07:48 18:36	
14	05:12 21:51	06:01 20:59	06:56 19:47	18:22 (2) 19:10 (2)	07:50 18:33	
15	05:13 21:50	06:03 20:57	06:58 19:44	18:21 (2) 19:10 (2)	07:52 18:31	
16	05:14 21:49	06:04 20:55	06:59 19:42	18:21 (2) 19:10 (2)	07:54 18:29	
17	05:16 21:47	06:06 20:53	07:01 19:39	18:20 (2) 19:08 (2)	07:55 18:26	
18	05:17 21:46	06:08 20:51	07:03 19:37	18:20 (2) 19:08 (2)	07:57 18:24	
19	05:18 21:45	06:10 20:48	07:05 19:34	18:21 (2) 19:06 (2)	07:59 18:22	
20	05:20 21:44	06:12 20:46	07:06 19:32	18:21 (2) 19:04 (2)	08:00 18:20	17:16 (3)
21	05:21 21:42	06:13 20:44	07:08 19:29	18:20 (2) 19:01 (2)	08:03 18:17	17:14 (3)
22	05:23 21:41	06:15 20:42	07:10 19:27	18:21 (2) 18:58 (2)	08:05 18:15	17:12 (3)
23	05:24 21:39	06:17 20:39	07:12 19:24	18:22 (2) 18:56 (2)	08:07 18:13	17:10 (3)
24	05:26 21:38	06:19 20:37	07:13 19:22	18:23 (2) 18:54 (2)	08:09 18:11	17:09 (3)
25	05:27 21:36	06:20 20:35	07:15 19:19	18:23 (2) 18:51 (2)	07:11 17:09	16:08 (3)
26	05:29 21:35	06:22 20:32	07:17 19:17	18:24 (2) 18:48 (2)	07:13 17:06	16:07 (3)
27	05:30 21:33	06:24 20:30	07:19 19:14	18:26 (2) 18:46 (2)	07:15 17:04	16:07 (3)
28	05:32 21:32	06:26 20:28	07:21 19:12	18:27 (2) 18:44 (2)	07:16 17:02	16:06 (3)
29	05:34 21:30	06:28 20:25	07:22 19:09	18:30 (2) 18:41 (2)	07:18 17:00	16:06 (3)
30	05:35 21:28	06:29 20:23	07:24 19:07	18:33 (2) 18:38 (2)	07:20 16:58	16:06 (3)
31	05:37 21:27	06:31 20:21	18:51 (2) 18:53 (2) 18:59 (2)		07:22 16:56 16:25 (3)	
Potential sun hours	512	460	382	328	259	233
Total, worst case		18	1086	265	380	1282
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.68	0.68	0.66	0.65	0.65
Total reduction		0.23	0.22	0.19	0.17	0.13
Total, real		4	235	51	65	172

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FX - H180

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	14:41 (4)	08:14	16:13 (3)	07:16	16:48 (2)	07:01	05:52	05:03		
	16:15	12 14:53 (4)	17:06	21 16:34 (3)	18:02	39 17:27 (2)	20:00	20:55	21:45		
2	08:44	14:43 (4)	08:12	16:13 (3)	07:14	16:47 (2)	06:59	05:50	05:02		
	16:16	10 14:53 (4)	17:08	24 16:37 (3)	18:04	39 17:26 (2)	20:02	20:57	21:46		
3	08:44	14:44 (4)	08:10	16:13 (3)	07:12	16:47 (2)	06:56	05:48	05:01		
	16:17	7 14:51 (4)	17:10	23 16:36 (3)	18:06	39 17:26 (2)	20:04	20:59	21:48		
4	08:43		08:08	16:14 (3)	07:09	16:48 (2)	06:54	05:46	05:00		
	16:18		17:12	21 16:35 (3)	18:07	38 17:26 (2)	20:06	21:01	21:49		
5	08:43		08:07	16:15 (3)	07:07	16:48 (2)	06:51	05:44	04:59		
	16:19		17:14	20 16:35 (3)	18:09	37 17:25 (2)	20:07	21:03	21:50		
6	08:43		08:05	16:16 (3)	07:04	16:49 (2)	06:49	05:42	04:58		
	16:21		17:16	18 16:34 (3)	18:11	35 17:24 (2)	20:09	21:04	21:51		
7	08:42		08:03	16:18 (3)	07:02	16:49 (2)	06:47	05:40	04:58		
	16:22		17:18	14 16:32 (3)	18:13	34 17:23 (2)	20:11	21:06	21:52		
8	08:42		08:01	16:20 (3)	07:00	16:50 (2)	06:44	05:38	04:57		
	16:24		17:20	10 16:30 (3)	18:15	32 17:22 (2)	20:13	21:08	21:53		
9	08:41		07:59		06:57	16:51 (2)	06:42	05:36	04:57		
	16:25		17:22		18:17	29 17:20 (2)	20:15	21:10	21:54		
10	08:40		07:57		06:55	16:53 (2)	06:39	05:34	04:56		
	16:26		17:24		18:19	26 17:19 (2)	20:17	21:11	21:55		
11	08:40		07:55		06:53	16:55 (2)	06:37	05:33	04:56		
	16:28		17:26		18:21	22 17:17 (2)	20:19	21:13	21:55		
12	08:39		07:53		06:50	16:57 (2)	06:35	05:31	04:55		
	16:30		17:28		18:23	16 17:13 (2)	20:20	21:15	21:56		
13	08:38		07:51		06:48	17:03 (2)	06:32	05:29	04:55		
	16:31		17:30		18:25	5 17:08 (2)	20:22	21:17	21:57		
14	08:37		07:49		06:45		06:30	05:27	04:55		
	16:33		17:32		18:27		20:24	21:18	21:58		
15	08:36		07:47		06:43		06:28	05:26	04:54		
	16:34		17:34		18:28		20:26	21:20	21:58		
16	08:35		07:45		17:01 (2)	06:40	06:25	05:24	04:54		
	16:36		17:36	6	17:07 (2)	18:30	20:28	21:22	21:59		
17	08:34		07:43		16:58 (2)	06:38	06:23	05:22	04:54		
	16:38		17:38	11	17:09 (2)	18:32	20:30	21:23	21:59		
18	08:33		07:41		16:56 (2)	06:35	06:21	05:21	04:54		
	16:40		17:40	15	17:11 (2)	18:34	20:31	21:25	22:00		
19	08:32		07:39		16:54 (2)	06:33	06:18	05:19	04:54		
	16:41		17:42	19	17:13 (2)	18:36	20:33	21:27	22:00		
20	08:31		07:36		16:53 (2)	06:31	06:16	05:18	04:54		
	16:43		17:44	23	17:16 (2)	18:38	20:35	21:28	22:00		
21	08:30		07:34		16:52 (2)	06:28	06:14	05:16	04:54		
	16:45		17:46	26	17:18 (2)	18:40	20:37	21:30	22:01		
22	08:29		07:32		16:51 (2)	06:26	06:12	05:15	04:55		
	16:47		17:48	28	17:19 (2)	18:42	20:39	21:31	22:01		
23	08:27	16:12 (3)	07:30		16:50 (2)	06:23	06:09	05:13	04:55		
	16:49	3 16:15 (3)	17:50	32	17:22 (2)	18:43	20:41	21:33	22:01		
24	08:26	16:12 (3)	07:28		16:50 (2)	06:21	06:07	05:12	04:55		
	16:50	5 16:17 (3)	17:52	34	17:24 (2)	18:45	20:43	21:34	22:01		
25	08:24	16:12 (3)	07:25		16:48 (2)	06:18	06:05	05:11	04:55		
	16:52	7 16:19 (3)	17:54	38	17:26 (2)	18:47	20:44	21:36	22:01		
26	08:23	16:11 (3)	07:23		16:48 (2)	06:16	06:03	05:09	04:56		
	16:54	10 16:21 (3)	17:56	39	17:27 (2)	18:49	20:46	21:37	22:01		
27	08:22	16:11 (3)	07:21		16:48 (2)	06:13	06:00	05:08	04:56		
	16:56	12 16:23 (3)	17:58	40	17:28 (2)	18:51	20:48	21:39	22:01		
28	08:20	16:12 (3)	07:18		16:47 (2)	06:11	05:58	05:07	04:57		
	16:58	14 16:26 (3)	18:00	40	17:27 (2)	18:53	20:50	21:40	22:01		
29	08:19	16:11 (3)			07:08		05:56	05:06	04:57		
	17:00	17 16:28 (3)			19:54		20:52	21:41	22:01		
30	08:17	16:11 (3)			07:06		05:54	05:05	04:58		
	17:02	18 16:29 (3)			19:56		20:54	21:43	22:00		
31	08:15	16:11 (3)			07:04			05:04			
	17:04	20 16:31 (3)			19:58			21:44			
Potential sun hours	250		273		367		420	494	510		
Total, worst case	135		502		391						
Sun reduction	0.24		0.23		0.27						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.66		0.67		0.67						
Total reduction	0.16		0.16		0.18						
Total, real	22		78		71						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: FX - H180

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October		November		December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	12	17:38 (2) 17:50 (2)	07:24 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	20	17:34 (2) 17:54 (2)	07:26 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	24	17:32 (2) 17:56 (2)	07:28 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	28	17:29 (2) 17:57 (2)	07:30 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	30	17:28 (2) 17:58 (2)	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	33	17:26 (2) 17:59 (2)	07:34 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	35	17:24 (2) 17:59 (2)	07:36 16:43	08:28 16:06
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	37	17:23 (2) 18:00 (2)	07:38 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	38	17:22 (2) 18:00 (2)	07:40 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	38	17:22 (2) 18:00 (2)	07:42 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	40	17:21 (2) 18:01 (2)	07:44 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	40	17:21 (2) 18:01 (2)	07:45 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	39	17:21 (2) 18:00 (2)	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	40	17:20 (2) 18:00 (2)	07:49 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	40	17:20 (2) 18:00 (2)	07:51 16:29	08:37 16:04
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	39	17:20 (2) 17:59 (2)	07:53 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	36	17:21 (2) 17:57 (2)	07:55 16:26	08:38 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	34	17:21 (2) 17:55 (2)	07:57 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	31	17:21 (2) 17:52 (2)	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	28	17:22 (2) 17:50 (2)	08:00 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	25	17:23 (2) 17:48 (2)	08:02 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	21	17:24 (2) 17:45 (2)	08:04 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	18	17:25 (2) 17:43 (2)	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	15	17:26 (2) 17:41 (2)	08:08 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	10	16:28 (2) 16:38 (2)	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	5	16:31 (2) 16:36 (2)	08:11 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04		08:13 16:13	08:13 16:10	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02		08:14 16:12	08:14 16:10	08:44 16:10
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00		08:16 16:12	08:16 16:11	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58		08:18 16:11	08:18 16:12	08:44 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56			08:44 16:13	08:44 16:13
Potential sun hours	512	460	382	328		259		233
Total, worst case				756		256		382
Sun reduction				0.29		0.27		0.21
Oper. time red.				1.00		1.00		1.00
Wind dir. red.				0.67		0.66		0.65
Total reduction				0.20		0.18		0.13
Total, real				149		45		51

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn.Feeney@jodireland.com Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Assumptions for shadow calculations

Shadow receptor: FY - H181

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	16:04 (3)	07:16	16:33 (2)	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	08:44	17:06	16:15 (3)	18:02	16:51 (2)	20:00	20:55	21:45	22:00	21:25	20:18	19:05
3	08:44	08:12	16:04	07:14	16:36 (2)	06:59	05:50	05:02	04:59	05:40	06:35	07:28
4	08:44	17:08	16:04	07:12	16:47 (2)	20:02	20:57	21:46	22:00	21:23	20:16	19:02
5	08:44	08:10	16:04	07:12	16:47 (2)	20:04	20:59	21:48	21:59	21:21	20:13	19:00
6	08:44	17:10	16:04	07:12	16:47 (2)	20:04	20:59	21:48	21:59	21:21	20:13	19:00
7	08:44	08:08	16:36 (2)	07:09	16:47 (2)	20:06	20:54	05:46	05:00	05:01	05:44	06:38
8	08:44	17:12	16:41 (2)	18:07	16:47 (2)	20:06	21:01	21:49	21:59	21:19	20:11	18:57
9	08:44	08:07	16:33 (2)	07:07	16:47 (2)	20:06	21:01	21:49	21:59	21:19	20:11	18:57
10	08:44	17:14	16:43 (2)	18:09	16:47 (2)	20:07	21:03	21:50	21:58	21:17	20:09	18:55
11	08:44	08:05	16:31 (2)	07:04	16:47 (2)	20:07	21:03	21:50	21:58	21:17	20:09	18:55
12	08:44	17:16	16:45 (2)	18:11	16:47 (2)	20:09	21:04	21:51	21:58	21:15	20:06	18:52
13	08:44	08:03	16:30 (2)	07:02	16:47 (2)	20:09	21:04	21:51	21:58	21:15	20:06	18:52
14	08:44	17:18	16:47 (2)	18:13	16:47 (2)	20:11	21:06	21:52	21:57	21:14	20:04	18:50
15	08:44	08:01	16:29 (2)	07:00	16:47 (2)	20:11	21:06	21:52	21:57	21:14	20:04	18:50
16	08:44	17:20	16:50 (2)	18:15	16:47 (2)	20:13	21:08	21:53	21:56	21:12	20:01	18:48
17	08:44	07:59	16:28 (2)	06:57	16:47 (2)	20:13	21:08	21:53	21:56	21:12	20:01	18:48
18	08:44	17:22	16:52 (2)	18:17	16:47 (2)	20:15	21:10	21:54	21:55	21:10	19:59	18:45
19	08:44	07:57	16:27 (2)	06:55	16:47 (2)	20:15	21:10	21:54	21:55	21:10	19:59	18:45
20	08:44	17:24	16:54 (2)	18:19	16:47 (2)	20:17	21:11	21:55	21:55	21:08	19:56	18:43
21	08:44	07:55	16:26 (2)	06:53	16:47 (2)	20:17	21:11	21:55	21:55	21:08	19:56	18:43
22	08:44	17:26	16:56 (2)	18:21	16:47 (2)	20:19	21:13	21:55	21:54	21:05	19:54	18:40
23	08:39	07:53	16:26 (2)	06:50	16:47 (2)	20:19	21:13	21:55	21:54	21:05	19:54	18:40
24	08:39	17:28	16:59 (2)	18:23	16:47 (2)	20:20	21:15	21:56	21:53	21:03	19:51	18:38
25	08:38	07:51	16:24 (2)	06:48	16:47 (2)	20:20	21:15	21:56	21:53	21:03	19:51	18:38
26	08:38	17:30	16:50 (2)	18:25	16:47 (2)	20:22	21:17	21:57	21:52	21:01	19:49	18:36
27	08:37	07:49	16:24 (2)	06:45	16:47 (2)	20:22	21:17	21:57	21:52	21:01	19:49	18:36
28	08:37	15:55 (3)	17:32	18:27	16:47 (2)	20:24	21:18	21:58	21:51	20:59	19:47	18:33
29	08:36	07:47	16:24 (2)	06:43	16:47 (2)	20:24	21:18	21:58	21:51	20:59	19:47	18:33
30	08:36	15:59 (3)	17:34	18:28	16:47 (2)	20:26	21:20	21:58	21:50	20:57	19:44	18:31
31	08:35	07:45	16:24 (2)	06:40	16:47 (2)	20:26	21:20	21:58	21:50	20:57	19:44	18:31
32	08:35	15:54 (3)	17:36	18:30	16:47 (2)	20:28	21:22	21:59	21:49	20:55	19:42	18:29
33	08:34	07:43	16:24 (2)	06:38	16:47 (2)	20:28	21:22	21:59	21:49	20:55	19:42	18:29
34	08:34	15:54 (3)	17:38	18:32	16:47 (2)	20:30	21:23	21:59	21:47	20:53	19:39	18:26
35	08:33	07:41	16:23 (2)	06:35	16:47 (2)	20:30	21:23	21:59	21:47	20:53	19:39	18:26
36	08:33	15:54 (3)	17:40	18:34	16:47 (2)	20:31	21:25	22:00	21:46	20:51	19:37	18:24
37	08:32	07:39	16:23 (2)	06:33	16:47 (2)	20:31	21:25	22:00	21:46	20:51	19:37	18:24
38	08:31	17:42	16:24 (2)	18:36	16:47 (2)	20:33	21:27	22:00	21:45	20:48	19:34	18:22
39	08:31	15:54 (3)	17:36	18:30	16:47 (2)	20:33	21:27	22:00	21:45	20:48	19:34	18:22
40	08:31	07:36	16:24 (2)	06:31	16:47 (2)	20:35	21:28	22:00	21:44	20:46	19:32	18:20
41	08:30	17:44	16:24 (2)	18:38	16:47 (2)	20:35	21:28	22:00	21:44	20:46	19:32	18:20
42	08:30	15:55 (3)	17:34	18:32	16:47 (2)	20:37	21:30	22:01	21:42	20:44	19:29	18:17
43	08:29	07:32	16:24 (2)	06:26	16:47 (2)	20:37	21:30	22:01	21:42	20:44	19:29	18:17
44	08:29	15:54 (3)	17:36	18:30	16:47 (2)	20:39	21:31	22:01	21:41	20:42	19:27	18:15
45	08:27	07:30	16:25 (2)	06:23	16:47 (2)	20:39	21:31	22:01	21:41	20:42	19:27	18:15
46	08:27	15:55 (3)	17:38	18:34	16:47 (2)	20:41	21:33	22:01	21:39	20:39	19:24	18:13
47	08:26	07:28	16:26 (2)	06:21	16:47 (2)	20:41	21:33	22:01	21:39	20:39	19:24	18:13
48	08:26	15:55 (3)	17:40	18:36	16:47 (2)	20:43	21:34	22:01	21:38	20:37	19:22	18:11
49	08:25	07:25	16:26 (2)	06:18	16:47 (2)	20:43	21:34	22:01	21:38	20:37	19:22	18:11
50	08:25	15:56 (3)	17:42	18:40	16:47 (2)	20:45	21:36	22:01	21:36	20:35	19:19	17:09
51	08:23	07:23	16:28 (2)	06:16	16:47 (2)	20:46	21:37	22:01	21:35	20:32	19:17	17:06
52	08:23	15:56 (3)	17:44	18:42	16:47 (2)	20:46	21:37	22:01	21:35	20:32	19:17	17:06
53	08:22	07:21	16:29 (2)	06:13	16:47 (2)	20:48	21:39	22:01	21:33	20:30	19:14	17:04
54	08:22	15:57 (3)	17:46	18:44	16:47 (2)	20:48	21:39	22:01	21:33	20:30	19:14	17:04
55	08:20	07:18	16:30 (2)	06:11	16:47 (2)	20:50	21:40	22:01	21:32	20:28	19:12	17:02
56	08:20	15:58 (3)	17:48	18:46	16:47 (2)	20:50	21:40	22:01	21:32	20:28	19:12	17:02
57	08:19	07:16	16:31 (2)	06:09	16:47 (2)	20:52	21:42	22:01	21:34	20:30	19:14	17:04
58	08:19	15:59 (3)	17:50	18:48	16:47 (2)	20:52	21:42	22:01	21:34	20:30	19:14	17:04
59	08:17	07:14	16:30 (2)	06:06	16:47 (2)	20:54	21:44	22:01	21:36	20:32	19:16	17:06
60	08:17	15:59 (3)	17:52	18:50	16:47 (2)	20:54	21:44	22:01	21:36	20:32	19:16	17:06
61	08:15	07:12	16:31 (2)	06:04	16:47 (2)	20:54	21:44	22:01	21:36	20:32	19:16	17:06
62	08:15	16:01 (3)	17:54	18:52	16:47 (2)	20:54	21:44	22:01	21:36	20:32	19:16	17:06
63	08:15	16:16 (3)	17:58	18:56	16:47 (2)	20:54	21:44	22:01	21:36	20:32	19:16	17:06
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	274	754	29								667	403
Sun reduction	0.24	0.23	0.27								0.29	0.27
Oper. time red.	1.00	1.00	1.00								1.00	1.00
Wind dir. red.	0.66	0.66	0.66								0.66	0.66
Total reduction	0.16	0.15	0.18								0.19	0.18
Total, real	44	115	5								128	71

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: FZ - H182

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:10 (3)	08:14	15:24 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24			06:33	07:26	07:24		08:19		14:59 (3)		
	16:15	15:37 (2)	17:06	15:59 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54			20:18	19:05	16:54		16:10	35	15:34 (2)		
2	08:44	15:11 (3)	08:12	15:25 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26			06:35	07:28	07:26		15:08 (2)		14:58 (3)		
	16:16	15:39 (2)	17:08	15:58 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	8		20:16	19:02	16:52		15:16 (2)	34	15:32 (2)		
3	08:44	15:11 (3)	08:10	15:26 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			06:36	07:30	07:28		15:04 (2)		14:59 (3)		
	16:17	15:39 (2)	17:10	15:57 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16		20:13	19:00	16:50	16	15:20 (2)	33	15:32 (2)		
4	08:43	15:12 (3)	08:08	15:27 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30			06:38	07:31	07:30		15:01 (2)		14:59 (3)		
	16:18	15:41 (2)	17:12	15:56 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	21		20:11	18:57	16:48	21	15:22 (2)	33	15:32 (2)		
5	08:43	15:12 (3)	08:07	15:28 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32			06:40	07:33	07:32		14:59 (2)		14:59 (3)		
	16:19	15:42 (2)	17:14	15:55 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	25		20:09	18:55	16:46	25	15:24 (2)	31	15:30 (2)		
6	08:43	15:13 (3)	08:05	15:30 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34			06:42	07:35	07:34		14:58 (2)		14:59 (3)		
	16:21	15:44 (2)	17:16	15:54 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	27		20:06	18:52	16:44	27	15:25 (2)	31	15:30 (2)		
7	08:42	15:13 (3)	08:03	15:32 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36			06:43	07:37	07:36		14:56 (2)		14:59 (3)		
	16:22	15:45 (2)	17:18	15:52 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	30		20:04	18:50	16:43	30	15:26 (2)	30	15:29 (2)		
8	08:42	15:14 (3)	08:01	15:35 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38			06:45	07:39	07:38		14:55 (2)		14:59 (3)		
	16:24	15:46 (2)	17:20	15:50 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	32		20:01	18:48	16:41	32	15:27 (2)	29	15:28 (2)		
9	08:41	15:15 (3)	07:59	15:39 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			06:47	07:41	07:40		14:56 (2)		15:00 (3)		
	16:25	15:49 (2)	17:22	15:46 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	33		19:59	18:45	16:39	33	15:29 (2)	28	15:28 (2)		
10	08:40	15:16 (3)	07:57		06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42			06:49	07:42	07:42		14:55 (2)		15:00 (3)		
	16:26	15:50 (2)	17:24		18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:42	16:37	35		19:56	18:42	16:37	35	15:30 (2)	28	15:28 (2)		
11	08:40	15:17 (3)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44			06:50	07:44	07:44		14:54 (2)		15:00 (3)		
	16:28	15:51 (2)	17:26		18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	36		19:54	18:40	16:35	36	15:30 (2)	27	15:27 (2)		
12	08:39	15:18 (3)	07:53		06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46			06:52	07:46	07:46		14:54 (2)		15:00 (3)		
	16:30	15:52 (2)	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	37		19:51	18:38	16:34	37	15:31 (2)	27	15:27 (2)		
13	08:38	15:19 (3)	07:51		06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47			06:54	07:48	07:47		14:53 (2)		15:00 (3)		
	16:31	15:53 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	38		19:49	18:36	16:32	38	15:31 (2)	26	15:26 (2)		
14	08:37	15:19 (3)	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49			06:56	07:50	07:49		14:53 (2)		15:00 (3)		
	16:33	15:54 (2)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	38		19:47	18:33	16:31	38	15:31 (2)	25	15:27 (2)		
15	08:36	15:19 (3)	07:47		06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51			06:58	07:52	07:51		14:53 (2)		15:01 (3)		
	16:34	15:55 (2)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	39		19:44	18:31	16:29	39	15:32 (2)	25	15:26 (2)		
16	08:35	15:18 (3)	07:45		06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53			06:59	07:54	07:53		14:53 (2)		15:02 (3)		
	16:36	15:55 (2)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	39		19:42	18:29	16:27	39	15:32 (2)	24	15:26 (2)		
17	08:34	15:18 (2)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55			07:01	07:55	07:55		14:53 (2)		15:02 (3)		
	16:38	15:55 (2)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	39		19:39	18:26	16:26	39	15:32 (2)	25	15:27 (2)		
18	08:33	15:19 (2)	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57			07:03	07:57	07:57		14:53 (2)		15:03 (3)		
	16:40	15:56 (2)	17:40		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	40		19:37	18:24	16:24	40	15:33 (2)	24	15:27 (3)		
19	08:32	15:19 (3)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59			07:05	07:59	07:59		14:53 (2)		15:04 (3)		
	16:41	15:57 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	40		19:34	18:22	16:23	40	15:33 (2)	24	15:28 (3)		
20	08:31	15:18 (2)	07:36		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00			07:06	08:01	08:00		14:54 (2)		15:04 (3)		
	16:43	15:57 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	39		19:32	18:20	16:22	39	15:33 (2)	23	15:27 (3)		
21	08:30	15:19 (3)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02			07:08	08:03	08:02		14:54 (2)		15:05 (3)		
	16:45	15:58 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	39		19:29	18:17	16:20	39	15:33 (2)	23	15:28 (3)		
22	08:29	15:19 (3)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04			07:10	08:05	08:04		14:55 (2)		15:05 (3)		
	16:47	15:58 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	38		19:27	18:15	16:19	38	15:33 (2)	23	15:28 (3)		
23	08:27	15:19 (3)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06			07:12	08:07	08:06		14:55 (2)		15:06 (3)		
	16:49	15:59 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	38		19:24	18:13	16:18	38	15:33 (2)	23	15:29 (3)		
24	08:26	15:19 (3)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08			07:13	08:09	08:08		14:56 (2)		15:06 (3)		
	16:50	15:59 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	37		19:22	18:11	16:17	37	15:33 (2)	23	15:29 (3)		
25	08:25	15:20 (2)	07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09			07:15	07:11	08:09		14:56 (2)		15:06 (3)		
	16:52	15:59 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	38		19:19	17:09	16:16	38	15:34 (2)	24	15:30 (3)		
26	08:23	15:20 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11			07:17	07:13	08:11		14:57 (2)		15:06 (3)		
	16:54	15:59 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	37		19:17	17:06	16:14	37	15:34 (2)	24	15:30 (3)		
27	08:22	15:20 (2)	07:21		06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13			07:19	07:15	08:13		14:58 (2)		15:08 (3)		
	16:56	15:59 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14													

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GA - H183

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:07 (3)	08:14		15:19 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24							08:19		14:54 (2)
	16:15	30	15:37 (2)	17:06	35	15:54 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54							16:10	36	15:30 (2)
2	08:44		15:08 (3)	08:12		15:20 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26							08:21		14:55 (2)
	16:16	31	15:39 (2)	17:08	33	15:53 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52							16:09	35	15:30 (2)
3	08:44		15:08 (3)	08:10		15:21 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28							15:01 (2)	08:22	14:56 (3)
	16:17	31	15:39 (2)	17:10	31	15:52 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	12						15:13 (2)	16:08	14:50 (2)
4	08:43		15:09 (3)	08:08		15:23 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30							14:58 (2)	08:24	14:57 (3)
	16:18	32	15:41 (2)	17:12	28	15:51 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	18						15:16 (2)	16:08	14:50 (2)
5	08:43		15:09 (3)	08:07		15:24 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32							14:56 (2)	08:25	14:56 (3)
	16:19	33	15:42 (2)	17:14	26	15:50 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	22						15:18 (2)	16:07	14:50 (2)
6	08:43		15:10 (3)	08:05		15:26 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34							14:54 (2)	08:26	14:57 (3)
	16:21	34	15:44 (2)	17:16	22	15:48 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	26						15:20 (2)	16:07	14:50 (2)
7	08:42		15:11 (3)	08:03		15:29 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36							14:52 (2)	08:28	14:56 (3)
	16:22	34	15:45 (2)	17:18	17	15:46 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	29						15:21 (2)	16:06	14:50 (2)
8	08:42		15:11 (3)	08:01		15:32 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38							14:51 (2)	08:29	14:56 (3)
	16:24	34	15:45 (2)	17:20	11	15:43 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	31						15:22 (2)	16:06	14:50 (2)
9	08:41		15:13 (3)	07:59		15:33 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40							14:51 (2)	08:30	14:57 (3)
	16:25	34	15:47 (2)	17:22		18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:33	33						15:24 (2)	16:05	14:50 (2)
10	08:40		15:12 (2)	07:57		15:35 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42							14:50 (2)	08:32	14:57 (3)
	16:26	36	15:48 (2)	17:24		18:19	20:17	21:11	21:51	21:55	21:08	19:56	18:42	16:37	16:35	35						15:25 (2)	16:05	14:50 (2)
11	08:40		15:12 (2)	07:55		15:36 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44							14:50 (2)	08:33	14:57 (3)
	16:28	36	15:48 (2)	17:26		18:21	20:19	21:13	21:51	21:55	21:06	19:54	18:40	16:35	16:35	35						15:25 (2)	16:05	14:50 (2)
12	08:39		15:12 (2)	07:53		15:37 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46							14:49 (2)	08:34	14:57 (3)
	16:30	37	15:49 (2)	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:34	37						15:26 (2)	16:05	14:50 (2)
13	08:38		15:12 (2)	07:51		15:38 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47							14:49 (2)	08:35	14:57 (3)
	16:31	38	15:50 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:32	37						15:26 (2)	16:05	14:50 (2)
14	08:37		15:13 (2)	07:49		15:40 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49							14:48 (2)	08:36	14:59 (3)
	16:33	37	15:50 (2)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:31	39						15:27 (2)	16:04	14:50 (2)
15	08:36		15:13 (2)	07:47		15:43 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51							14:48 (2)	08:37	14:58 (3)
	16:34	38	15:51 (2)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:29	39						15:27 (2)	16:04	14:50 (2)
16	08:35		15:12 (2)	07:45		15:44 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53							14:48 (2)	08:38	14:59 (3)
	16:36	39	15:51 (2)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:27	40						15:28 (2)	16:05	14:50 (2)
17	08:34		15:12 (2)	07:43		15:46 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55							14:48 (2)	08:39	14:59 (3)
	16:38	40	15:52 (2)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:26	40						15:28 (2)	16:05	14:50 (2)
18	08:33		15:13 (2)	07:41		15:48 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57							14:48 (2)	08:39	15:00 (3)
	16:40	39	15:52 (2)	17:40		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:24	40						15:28 (2)	16:05	14:50 (2)
19	08:32		15:13 (2)	07:39		15:50 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59							14:48 (2)	08:40	15:01 (3)
	16:41	40	15:53 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:23	40						15:28 (2)	16:05	14:50 (2)
20	08:31		15:13 (2)	07:36		15:53 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00							14:48 (2)	08:41	15:01 (3)
	16:43	40	15:53 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:22	41						15:29 (2)	16:06	14:50 (2)
21	08:30		15:14 (2)	07:34		15:56 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02							14:49 (2)	08:41	15:01 (3)
	16:45	40	15:54 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:20	40						15:29 (2)	16:06	14:50 (2)
22	08:29		15:13 (2)	07:32		15:58 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04							14:49 (2)	08:42	15:01 (3)
	16:47	41	15:54 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:19	40						15:29 (2)	16:06	14:50 (2)
23	08:27		15:14 (2)	07:30		15:59 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06							14:49 (2)	08:42	15:03 (3)
	16:49	40	15:54 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:18	40						15:29 (2)	16:07	14:50 (2)
24	08:26		15:14 (2)	07:28		15:59 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08							14:50 (2)	08:43	15:03 (3)
	16:50	40	15:54 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:17	40						15:30 (2)	16:08	14:50 (2)
25	08:25		15:15 (2)	07:25		15:59 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09							14:50 (2)	08:43	15:03 (3)
	16:52	40	15:55 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	16:16	40						15:30 (2)	16:08	14:50 (2)
26	08:23		15:15 (2)	07:23		15:59 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11							14:51 (2)	08:43	15:03 (3)
	16:54	40	15:55 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	16:14	39						15:30 (2)	16:09	14:50 (2)
27	08:22		15:15 (2)	07:21		15:59 (2)	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13							14:52 (2)	08:44	15:05 (3)
	16:56	39	15:54 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:13	38						15:30 (2)	16:10	14:50 (2)
28	08:20		15:16 (2)	07:19		15:59 (2)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14									

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GB - H184

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:06 (3)	08:14	15:18 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24			08:19						14:52 (2)		
	16:15	31	15:37 (2)	17:06	15:52 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54			16:10					37	15:29 (2)	
2	08:44	15:07 (3)	08:12	15:19 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26			08:21						14:52 (2)		
	16:16	32	15:39 (2)	17:08	15:51 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52			16:09					36	15:28 (2)	
3	08:44	15:07 (3)	08:10	15:20 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			15:01 (2)						14:53 (2)		
	16:17	32	15:39 (2)	17:10	15:50 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	9		15:10 (2)					36	15:29 (2)	
4	08:43	15:08 (3)	08:08	15:21 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30			14:57 (2)						14:54 (2)		
	16:18	33	15:41 (2)	17:12	15:49 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	17		15:14 (2)					35	15:29 (2)	
5	08:43	15:08 (3)	08:07	15:23 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32			14:54 (2)						14:55 (3)		
	16:19	34	15:42 (2)	17:14	15:48 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	22		15:16 (2)					34	15:29 (2)	
6	08:43	15:09 (3)	08:05	15:25 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34			14:52 (2)						14:56 (3)		
	16:21	34	15:43 (2)	17:16	15:46 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	26		15:18 (2)					33	15:29 (2)	
7	08:42	15:09 (2)	08:03	15:28 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36			14:51 (2)						14:55 (3)		
	16:22	34	15:43 (2)	17:18	15:44 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	28		15:19 (2)					34	15:29 (2)	
8	08:42	15:09 (2)	08:01	15:32 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38			14:49 (2)						14:55 (3)		
	16:24	35	15:44 (2)	17:20	15:39 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	31		15:20 (2)					33	15:28 (2)	
9	08:41	15:10 (2)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			14:49 (2)						14:56 (3)		
	16:25	36	15:46 (2)	17:22		18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	33		15:22 (2)					32	15:28 (2)	
10	08:40	15:10 (2)	07:57		06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42			14:48 (2)						14:56 (3)		
	16:26	36	15:46 (2)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	35		15:23 (2)					32	15:28 (2)	
11	08:40	15:10 (2)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44			14:48 (2)						14:56 (3)		
	16:28	37	15:47 (2)	17:26		18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	35		15:23 (2)					31	15:27 (2)	
12	08:39	15:10 (2)	07:53		06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46			14:47 (2)						14:56 (3)		
	16:30	37	15:47 (2)	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	37		15:24 (2)					31	15:27 (2)	
13	08:38	15:10 (2)	07:51		06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47			14:47 (2)						14:56 (3)		
	16:31	38	15:48 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	38		15:25 (2)					30	15:26 (2)	
14	08:37	15:10 (2)	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49			14:46 (2)						14:58 (3)		
	16:33	39	15:49 (2)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	39		15:25 (2)					29	15:27 (2)	
15	08:36	15:10 (2)	07:47		06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51			14:46 (2)						14:57 (3)		
	16:34	40	15:50 (2)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	39		15:25 (2)					29	15:26 (2)	
16	08:35	15:10 (2)	07:45		06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53			14:46 (2)						14:58 (3)		
	16:36	39	15:49 (2)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	40		15:26 (2)					28	15:26 (2)	
17	08:34	15:10 (2)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55			14:46 (2)						14:58 (3)		
	16:38	40	15:50 (2)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	40		15:26 (2)					29	15:27 (2)	
18	08:33	15:11 (2)	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57			14:46 (2)						14:59 (3)		
	16:40	40	15:51 (2)	17:40		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	40		15:26 (2)					28	15:27 (2)	
19	08:32	15:11 (2)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59			14:46 (2)						15:00 (3)		
	16:41	41	15:52 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	41		15:27 (2)					28	15:28 (2)	
20	08:31	15:11 (2)	07:36		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00			14:46 (2)						14:59 (3)		
	16:43	40	15:51 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	41		15:27 (2)					28	15:27 (2)	
21	08:30	15:11 (2)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02			14:46 (2)						15:00 (3)		
	16:45	41	15:52 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	41		15:27 (2)					28	15:28 (2)	
22	08:29	15:11 (2)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04			14:47 (2)						15:00 (3)		
	16:47	41	15:52 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	40		15:27 (2)					28	15:28 (2)	
23	08:27	15:12 (2)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06			14:47 (2)						15:01 (3)		
	16:49	41	15:53 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	41		15:28 (2)					28	15:29 (2)	
24	08:26	15:12 (2)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08			14:48 (2)						15:01 (3)		
	16:50	40	15:52 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	40		15:28 (2)					28	15:29 (2)	
25	08:25	15:13 (2)	07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09			14:48 (2)						15:02 (3)		
	16:52	40	15:53 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	40		15:28 (2)					28	15:30 (2)	
26	08:23	15:13 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11			14:49 (2)						15:02 (3)		
	16:54	40	15:53 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	39		15:28 (2)					28	15:30 (2)	
27	08:22	15:13 (2)	07:21		06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13			14:50 (2)						15:03 (3)		
	16:56	39	15:52 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	39		15:29 (2)					29	15:32 (2)	
28	08:20	15:14 (2)	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14			14:50 (2)						15:04 (3)		
	16:58	39	15:53 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	39		15:29 (2)					29	15:33 (2)	
29	08:19	15:15 (2)			07:09	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16			14:50 (2)						15:04 (3)		
	17:00	38	15:53 (2)		19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:12	38		15:28 (2)						30	15:34 (2)	
30	08:17	15:15 (2)			07:06	05:54	05:05	04:58	05:35	06:29	07:20													

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GC - H185

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GD - H186

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March	April	May	June	July	August	September	October	November	December							
1	08:44	10:59 (2)	08:14	15:41 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19	10:50 (2)						
	16:15	43	11:42 (2)	17:06	28	16:09 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	47	15:34 (1)		
2	08:44	11:00 (2)	08:12	15:42 (1)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	10:50 (2)					
	16:16	42	11:42 (2)	17:08	26	16:08 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	46	15:33 (1)		
3	08:44	11:00 (2)	08:10	15:43 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	10:49 (2)					
	16:17	42	11:42 (2)	17:10	24	16:07 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08	46	15:32 (1)		
4	08:43	11:01 (2)	08:09	15:44 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	10:49 (2)					
	16:18	41	11:42 (2)	17:12	22	16:06 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	10	15:20 (1)	16:08	46	15:32 (1)
5	08:43	11:01 (2)	08:07	15:46 (1)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	10:49 (2)					
	16:20	41	11:42 (2)	17:14	19	16:05 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16	15:33 (1)	16:07	43	15:30 (1)
6	08:43	11:03 (2)	08:05	15:48 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:26	10:49 (2)					
	16:21	43	15:44 (1)	17:16	15	16:03 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	20	15:35 (1)	16:07	43	15:30 (1)
7	08:42	11:03 (2)	08:03	15:51 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	10:49 (2)					
	16:22	44	15:45 (1)	17:18	9	16:00 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	22	15:36 (1)	16:06	40	11:29 (2)
8	08:42	11:04 (2)	08:01	15:54 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	10:49 (2)					
	16:24	45	15:46 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	24	15:37 (1)	16:06	42	11:31 (2)	10:49 (2)	
9	08:41	11:06 (2)	07:59	15:57 (1)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	10:49 (2)					
	16:25	46	15:49 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	26	15:39 (1)	16:05	42	11:31 (2)	10:49 (2)	
10	08:40	11:07 (2)	07:57	15:50 (1)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32	10:49 (2)					
	16:26	46	15:50 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	28	15:40 (1)	16:05	42	11:31 (2)	10:49 (2)	
11	08:40	11:08 (2)	07:55	15:53 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	10:49 (2)					
	16:28	47	15:52 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36	29	15:40 (1)	16:05	43	11:32 (2)	10:49 (2)	
12	08:39	11:09 (2)	07:53	15:54 (1)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	10:49 (2)					
	16:30	48	15:54 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	30	15:41 (1)	16:05	44	11:33 (2)	10:49 (2)	
13	08:38	11:11 (2)	07:51	15:55 (1)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47	08:35	10:50 (2)					
	16:31	46	15:55 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	31	15:41 (1)	16:05	44	11:34 (2)	10:50 (2)	
14	08:37	11:12 (2)	07:49	15:57 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	10:50 (2)					
	16:33	47	15:57 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	32	15:42 (1)	16:05	45	11:35 (2)	10:51 (2)	
15	08:36	11:14 (2)	07:47	15:59 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37	10:51 (2)					
	16:34	46	15:59 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	32	15:42 (1)	16:05	44	11:35 (2)	10:50 (2)	
16	08:35	11:17 (2)	07:45	16:01 (1)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38	10:50 (2)					
	16:36	44	16:01 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	32	15:40 (1)	16:05	45	11:35 (2)	10:51 (2)	
17	08:34	11:19 (2)	07:43	16:02 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39	10:51 (2)					
	16:38	41	16:02 (1)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	32	15:42 (1)	16:05	45	11:36 (2)	10:52 (2)	
18	08:33	11:24 (2)	07:41	16:03 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:40	10:52 (2)					
	16:40	33	16:05 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	32	15:42 (1)	16:05	46	11:37 (2)	10:52 (2)	
19	08:32	11:26 (2)	07:39	16:07 (1)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:42	10:53 (2)					
	16:41	30	16:07 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	31	15:42 (1)	16:05	45	11:37 (2)	10:52 (2)	
20	08:31	11:27 (2)	07:37	16:08 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:41	10:53 (2)					
	16:43	31	16:07 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	32	15:43 (1)	16:06	45	11:37 (2)	10:53 (2)	
21	08:30	11:28 (2)	07:34	16:09 (1)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	10:53 (2)					
	16:45	31	16:08 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	31	15:43 (1)	16:06	45	11:38 (2)	10:53 (2)	
22	08:29	11:29 (2)	07:32	16:10 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42	10:53 (2)					
	16:47	32	16:08 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	31	15:43 (1)	16:06	45	11:38 (2)	10:54 (2)	
23	08:27	11:30 (2)	07:30	16:11 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:44	10:54 (2)					
	16:49	31	16:08 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	30	15:43 (1)	16:07	45	11:39 (2)	10:54 (2)	
24	08:26	11:31 (2)	07:28	16:12 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:46	10:54 (2)					
	16:51	32	16:08 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	33	15:42 (1)	16:08	45	11:39 (2)	10:54 (2)	
25	08:25	11:32 (2)	07:25	16:13 (1)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09	08:47	10:54 (2)					
	16:52	32	16:09 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09	16:16	41	15:41 (1)	16:08	46	11:40 (2)	10:55 (2)	
26	08:23	11:33 (2)	07:23	16:14 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:49	10:55 (2)					
	16:54	32	16:09 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15	44	15:39 (1)	16:09	46	11:41 (2)	10:56 (2)	
27	08:22	11:34 (2)	07:21	16:15 (1)	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:51	10:56 (2)					
	16:56	32	16:09 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	46	15:38 (1)	16:10	45	11:41 (2)	10:56 (2)	
28	08:20	11:35 (2)	07:19	16:16 (1)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14	08:52	10:56 (2)					
	16:58	32	16:10 (1)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	46	15:37 (1)	16:11	45	11:41 (2)	10:57 (2)	
29	08:19	11:36 (2)	07:17	16:17 (1)	07:09	05:56	05:06	04:57	05:34	06:28	07:22	07:18	08:16	08:54	10:57 (2)					
	17:00	30	16:09 (1)	18:01	19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	47	15:36 (1)	16:11	45	11:42 (2)	10:58 (2)	
30	08:17	11:37 (2)	07:15	16:18 (1)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:56	10:58 (2)					
	17:02	30	16:09 (1)	18:03	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	48	15:35 (1)	16:12	44	11:42 (2)	10:58 (2)	
31	08:15	11:38 (2)	07:13	16:19 (1)	07:04	05:51	05:04	04:57	05:37	06:31	07:22	07:22	08:20	08:58	10:59 (2)					
	17:04	29	16:08 (1)	18:05	19:58	20:56	21:44	22:01	21:27	20:21	19:05	16:56	16:09	49	15:34 (1)	16:13	43	11:41 (2)	10:59 (2)	
Potential sun hours	250	273	143	367	420	494	510	512	460	382	259	856	233	1377	0.21					
Total, worst case	1189	143	0.23									856		1377	0.21					
Sun reduction	0.24	0.23										0.27		0.21						
Oper. time red.	1.00	1.00										1.00		1.00						
Wind dir. red.	0.63	0.66										0.65		0.60						
Total reduction	0.15	0.15										0.17		0.13						
Total, real	183	22										148		172						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GE - H187

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:22 (2)	08:14		09:40 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24							08:19		09:08 (2)
2	16:15	85	15:19 (1)	17:06	28	10:08 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54							16:10	86	15:05 (1)
	08:44		09:23 (2)	08:12		09:42 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26							08:21		09:08 (2)
	16:16	84	15:19 (1)	17:08	24	10:06 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52							16:09	87	15:06 (1)
3	08:44		09:23 (2)	08:10		09:44 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28							08:22		09:08 (2)
	16:17	84	15:19 (1)	17:10	19	10:03 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50							16:08	87	15:06 (1)
	08:43		09:23 (2)	08:09		09:48 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30							08:24		09:09 (2)
	16:18	85	15:20 (1)	17:12	12	10:00 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48							16:08	86	15:06 (1)
5	08:43		09:23 (2)	08:07			07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32							08:25		09:09 (2)
	16:20	85	15:20 (1)	17:14			18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46							16:07	85	15:06 (1)
6	08:43		09:24 (2)	08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34							08:27		09:10 (2)
	16:21	85	15:21 (1)	17:16			18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44							16:07	85	15:07 (1)
7	08:42		09:24 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36					09:17 (2)		08:28		09:10 (2)
	16:22	85	15:21 (1)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				13			09:14 (2)	13	15:07 (1)
8	08:42		09:24 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38							09:11 (2)		09:11 (2)
	16:24	86	15:21 (1)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41				19			09:13 (2)	19	15:08 (1)
9	08:41		09:25 (2)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40							09:12 (2)		09:12 (2)
	16:25	86	15:22 (1)	17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39				24			09:17 (2)	24	15:08 (1)
10	08:40		09:25 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42							09:11 (2)		09:12 (2)
	16:27	87	15:23 (1)	17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37				28			09:19 (2)	28	15:09 (1)
11	08:40		09:26 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44							09:10 (2)		09:12 (2)
	16:28	86	15:23 (1)	17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36				30			09:14 (2)	30	15:09 (1)
12	08:39		09:26 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46							09:09 (2)		09:13 (2)
	16:30	86	15:23 (1)	17:28			18:23	20:20	21:15	21:56	21:53	21:04	19:52	18:38	16:34				32			09:11 (2)	32	15:09 (1)
13	08:38		09:26 (2)	07:51			06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47							09:08 (2)		09:14 (2)
	16:31	85	15:23 (1)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32				44			14:45 (1)	44	15:10 (1)
14	08:37		09:27 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49							09:07 (2)		09:15 (2)
	16:33	86	15:24 (1)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31				52			14:48 (1)	52	15:11 (1)
15	08:36		09:27 (2)	07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51							09:06 (2)		09:15 (2)
	16:34	85	15:24 (1)	17:34			18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				59			14:51 (1)	59	15:11 (1)
16	08:35		09:28 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53							09:06 (2)		09:15 (2)
	16:36	84	15:24 (1)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27				63			14:52 (1)	63	15:11 (1)
17	08:34		09:27 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55							09:05 (2)		09:16 (2)
	16:38	83	15:23 (1)	17:38			18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26				68			14:54 (1)	68	15:11 (1)
18	08:33		09:28 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57							09:05 (2)		09:16 (2)
	16:40	82	15:23 (1)	17:40			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25				71			14:55 (1)	71	15:12 (1)
19	08:32		09:29 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59							09:05 (2)		09:17 (2)
	16:41	81	15:24 (1)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23				73			14:56 (1)	73	15:13 (1)
20	08:31		09:29 (2)	07:37			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01							09:05 (2)		09:17 (2)
	16:43	80	15:23 (1)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22				76			14:57 (1)	76	15:13 (1)
21	08:30		09:30 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02							09:05 (2)		09:18 (2)
	16:45	77	15:23 (1)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20				77			14:58 (1)	77	15:13 (1)
22	08:29		09:30 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04							09:05 (2)		09:18 (2)
	16:47	76	15:22 (1)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19				80			14:59 (1)	80	15:13 (1)
23	08:27		09:31 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06							09:05 (2)		09:19 (2)
	16:49	73	15:22 (1)	17:50			18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18				81			15:00 (1)	81	15:15 (1)
24	08:26		09:31 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08							09:05 (2)		09:19 (2)
	16:51	71	15:21 (1)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17				83			15:01 (1)	83	15:15 (1)
25	08:25		09:33 (2)	07:25			06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09							09:05 (2)		09:19 (2)
	16:52	67	15:21 (1)	17:54			18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16				83			15:01 (1)	83	15:15 (1)
26	08:23		09:33 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11							09:06 (2)		09:21 (2)
	16:54	63	15:19 (1)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15				84			15:02 (1)	84	15:16 (1)
27	08:22		09:34 (2)	07:21			06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13							09:06 (2)		09:21 (2)
	16:56	59	15:19 (1)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13				85			15:03 (1)	85	15:17 (1)
28	08:20		09:35 (2)	07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14							09:07 (2)		09:21 (2)
	16:58	52	15:16 (1)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13				85			15:04 (1)	85	15:17 (1)
29	08:19		09:36 (2)				07:09	05:56	05:06	04:57	05:34	06:28	07:23	07:18	08:16							09:06 (2)		09:22 (2)
	17:00	45	15:13 (1)				19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12				85			15:03 (1)	84	15:18 (1)
30	08:17		09:37 (2)				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18							09:07 (2)		09:22 (2)
	17:02	32	10:09 (2)				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11				86			15:04 (1)	86	15:18 (1)
31	08:15		09:38 (2)				07:04		05:04		05:37	06:31		07:22								08:44		09:22 (2)
	17:04	30	10:08 (2)				19:58		21:44		21:27	20:21												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GF - H188

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44	10:59 (2)	08:14	15:37 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	10:56 (2)										
	16:15	50	15:37 (1)	17:06	10	15:47 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54								16:10	41	15:33 (1)
2	08:44	11:00 (2)	08:12		07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	10:54 (2)								16:09	45	15:33 (1)
	16:16	49	15:38 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52									16:08	47	15:32 (1)	
3	08:44	11:00 (2)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	10:52 (2)							16:08	47	15:32 (1)	
	16:17	51	15:39 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50									16:08	49	15:32 (1)	
4	08:43	11:02 (2)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	10:52 (2)							16:08	49	15:32 (1)	
	16:18	50	15:41 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48									16:08	49	15:32 (1)	
5	08:43	11:03 (2)	08:07		07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	10:50 (2)							16:07	50	15:30 (1)	
	16:20	50	15:42 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46									16:07	50	15:30 (1)	
6	08:43	11:04 (2)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	10:51 (2)							16:07	50	15:30 (1)	
	16:21	51	15:44 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44									16:07	50	15:30 (1)	
7	08:42	11:05 (2)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	10:50 (2)							16:06	49	15:29 (1)	
	16:22	50	15:45 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43									16:06	49	15:29 (1)	
8	08:42	11:06 (2)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	10:50 (2)							16:06	50	15:29 (1)	
	16:24	49	15:46 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41									16:06	50	15:29 (1)	
9	08:41	11:09 (2)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	10:50 (2)							16:05	50	15:28 (1)	
	16:25	48	15:49 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39									16:05	50	15:28 (1)	
10	08:40	11:11 (2)	07:57		06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32	10:49 (2)							15:08 (1)	08:32		10:49 (2)
	16:26	45	15:50 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	10	15:18 (1)	16:05	50	15:28 (1)				15:05 (1)	08:33		10:49 (2)
11	08:40	11:13 (2)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	10:49 (2)							15:05 (1)	08:33		10:49 (2)
	16:28	42	15:51 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36	16	15:21 (1)	16:05	50	15:27 (1)				15:04 (1)	08:34		10:49 (2)
12	08:39	15:21 (1)	07:53		06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	10:49 (2)							15:04 (1)	08:34		10:49 (2)
	16:30	30	15:51 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	19	15:23 (1)	16:05	50	15:27 (1)				15:04 (1)	08:34		10:49 (2)
13	08:38	15:21 (1)	07:51		06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	10:50 (2)							15:02 (1)	08:35		10:50 (2)
	16:31	31	15:52 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	22	15:24 (1)	16:05	49	15:27 (1)				15:01 (1)	08:36		10:50 (2)
14	08:37	15:21 (1)	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	10:50 (2)							15:01 (1)	08:36		10:50 (2)
	16:33	31	15:52 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	24	15:25 (1)	16:05	49	15:27 (1)				15:01 (1)	08:37		10:50 (2)
15	08:36	15:22 (1)	07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37	10:50 (2)							15:00 (1)	08:37		10:50 (2)
	16:34	31	15:53 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	26	15:26 (1)	16:05	49	15:27 (1)				15:00 (1)	08:38		10:50 (2)
16	08:35	15:22 (1)	07:45		06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38	10:50 (2)							15:00 (1)	08:38		10:50 (2)
	16:36	32	15:54 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	27	15:27 (1)	16:05	48	15:26 (1)				15:00 (1)	08:39		10:50 (2)
17	08:34	15:22 (1)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39	10:50 (2)							14:59 (1)	08:39		10:50 (2)
	16:38	31	15:53 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:26	16:26	28	15:27 (1)	16:05	49	15:27 (1)				14:59 (1)	08:40		10:51 (2)
18	08:33	15:22 (1)	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	10:51 (2)							14:59 (1)	08:39		10:51 (2)
	16:40	32	15:54 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	29	15:28 (1)	16:05	48	15:27 (1)				14:59 (1)	08:40		10:51 (2)
19	08:32	15:23 (1)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	10:51 (2)							14:59 (1)	08:40		10:51 (2)
	16:41	32	15:55 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	30	15:29 (1)	16:05	49	15:28 (1)				14:59 (1)	08:41		10:51 (2)
20	08:31	15:23 (1)	07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:41	10:51 (2)							14:59 (1)	08:41		10:51 (2)
	16:43	31	15:54 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	30	15:29 (1)	16:06	48	15:27 (1)				14:59 (1)	08:41		10:52 (2)
21	08:30	15:24 (1)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:42	10:52 (2)							14:59 (1)	08:41		10:52 (2)
	16:45	31	15:55 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	31	15:30 (1)	16:06	48	15:28 (1)				14:59 (1)	08:42		10:52 (2)
22	08:29	15:24 (1)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42	10:52 (2)							14:59 (1)	08:42		10:52 (2)
	16:47	30	15:54 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	31	15:30 (1)	16:06	48	15:28 (1)				14:59 (1)	08:42		10:52 (2)
23	08:27	15:25 (1)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	10:53 (2)							14:59 (1)	08:42		10:53 (2)
	16:49	30	15:55 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	32	15:31 (1)	16:07	48	15:29 (1)				14:59 (1)	08:43		10:53 (2)
24	08:26	15:25 (1)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43	10:53 (2)							14:59 (1)	08:43		10:53 (2)
	16:51	29	15:54 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	32	15:31 (1)	16:08	48	15:29 (1)				14:59 (1)	08:43		10:53 (2)
25	08:25	15:26 (1)	07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09	08:43	10:54 (2)							14:59 (1)	08:43		10:54 (2)
	16:52	29	15:55 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	31	15:31 (1)	16:08	48	15:30 (1)				14:59 (1)	08:43		10:54 (2)
26	08:23	15:27 (1)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43	10:55 (2)							14:59 (1)	08:43		10:55 (2)
	16:54	27	15:54 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15	32	15:32 (1)	16:09	48	15:31 (1)				14:59 (1)	08:44		10:55 (2)
27	08:22	15:27 (1)	07:21		06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:44	10:55 (2)							14:59 (1)	08:44		10:55 (2)
	16:56	26	15:53 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	31	15:32 (1)	16:10	49	15:32 (1)				14:59 (1)	08:44		10:56 (2)
28	08:20	15:29 (1)	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14	08:44	10:56 (2)							14:59 (1)	08:44		10:56 (2)
	16:58	24	15:53 (1)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	32	15										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GG - H189

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		11:35 (2)	08:14		15:48 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19		15:30 (1)					
	16:15	31	12:06 (2)	17:06	26	16:14 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10	4	15:34 (1)					
2	08:44		11:36 (2)	08:12		15:49 (1)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26		08:21		11:33 (2)					
	16:16	30	12:06 (2)	17:08	24	16:13 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09	10	15:33 (1)					
3	08:44		11:37 (2)	08:10		15:50 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22		11:30 (2)					
	16:17	29	12:06 (2)	17:10	23	16:13 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50		16:08	15	11:45 (2)					
4	08:43		11:38 (2)	08:09		15:51 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24		11:29 (2)					
	16:18	28	12:06 (2)	17:12	21	16:12 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48		16:08	18	11:47 (2)					
5	08:43		11:39 (2)	08:07		15:52 (1)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25		11:28 (2)					
	16:19	26	12:05 (2)	17:14	18	16:10 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	14	15:38 (1)	16	11:49 (2)					
6	08:43		11:41 (2)	08:05		15:55 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:26		11:27 (2)					
	16:21	24	12:05 (2)	17:16	13	16:08 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	18	15:40 (1)	16	11:51 (2)					
7	08:42		11:42 (2)	08:03		15:58 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36		08:28		11:26 (2)					
	16:22	22	12:04 (2)	17:18	7	16:05 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16	11:52 (2)					
8	08:42		11:44 (2)	08:01		16:00 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16	11:52 (2)					
	16:24	18	12:02 (2)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	23	15:42 (1)	16	11:54 (2)						
9	08:41		11:47 (2)	07:59		16:57	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	25	15:44 (1)	16	11:55 (2)						
	16:25	15	12:02 (2)	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	25	15:44 (1)	16	11:55 (2)						
10	08:40		11:50 (2)	07:57		16:55	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	26	15:45 (1)	16	11:56 (2)						
	16:26	10	15:50 (1)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	26	15:45 (1)	16	11:56 (2)						
11	08:40		15:48 (1)	07:55		16:53	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	26	15:45 (1)	16	11:56 (2)						
	16:28	4	15:52 (1)	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36	27	15:45 (1)	16	11:56 (2)						
12	08:39		15:47 (1)	07:53		16:50	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36	27	15:45 (1)	16	11:56 (2)						
	16:30	7	15:54 (1)	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	28	15:46 (1)	16	11:57 (2)						
13	08:38		15:46 (1)	07:51		16:48	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	29	15:46 (1)	16	11:58 (2)						
	16:31	9	15:55 (1)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	29	15:46 (1)	16	11:58 (2)						
14	08:37		15:46 (1)	07:49		16:45	20:27	21:18	21:58	21:51	20:59	19:47	18:33	16:31	30	15:47 (1)	16	11:59 (2)						
	16:33	11	15:57 (1)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	30	15:47 (1)	16	11:59 (2)						
15	08:36		15:45 (1)	07:47		16:43	20:28	21:19	21:58	21:51	20:59	19:47	18:33	16:31	30	15:47 (1)	16	11:59 (2)						
	16:34	14	15:59 (1)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	30	15:47 (1)	16	11:59 (2)						
16	08:35		15:45 (1)	07:45		16:40	20:25	21:20	21:58	21:50	20:57	19:44	18:31	16:29	30	15:47 (1)	16	11:59 (2)						
	16:36	16	16:01 (1)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	30	15:47 (1)	16	11:59 (2)						
17	08:34		15:44 (1)	07:43		16:38	20:23	21:22	21:59	21:47	20:53	19:39	18:26	16:26	30	15:47 (1)	16	11:59 (2)						
	16:38	18	16:02 (1)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	30	15:47 (1)	16	11:59 (2)						
18	08:33		15:44 (1)	07:41		16:36	20:21	21:21	21:58	21:47	20:53	19:39	18:26	16:26	30	15:47 (1)	16	11:59 (2)						
	16:40	21	16:05 (1)	17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	29	15:47 (1)	16	11:59 (2)						
19	08:32		15:45 (1)	07:39		16:33	20:18	21:19	21:57	21:46	20:51	19:37	18:24	16:25	29	15:47 (1)	16	11:59 (2)						
	16:41	22	16:07 (1)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	29	15:47 (1)	16	11:59 (2)						
20	08:31		15:44 (1)	07:37		16:31	20:16	21:17	21:55	21:44	20:46	19:32	18:20	16:22	28	15:47 (1)	16	11:59 (2)						
	16:43	24	16:08 (1)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	28	15:47 (1)	16	11:59 (2)						
21	08:30		15:44 (1)	07:34		16:28	20:14	21:15	21:53	21:42	20:44	19:29	18:17	16:20	27	15:46 (1)	16	11:59 (2)						
	16:45	27	16:11 (1)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	27	15:46 (1)	16	11:59 (2)						
22	08:29		15:44 (1)	07:32		16:26	20:12	21:13	21:51	21:40	20:42	19:27	18:15	16:19	24	15:44 (1)	16	11:59 (2)						
	16:47	28	16:12 (1)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	24	15:44 (1)	16	11:59 (2)						
23	08:27		15:44 (1)	07:30		16:23	20:09	21:10	21:48	21:37	20:39	19:24	18:13	16:18	22	15:43 (1)	16	11:59 (2)						
	16:49	29	16:13 (1)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	22	15:43 (1)	16	11:59 (2)						
24	08:26		15:44 (1)	07:28		16:21	20:07	21:08	21:46	21:35	20:37	19:22	18:11	16:17	21	15:42 (1)	16	11:59 (2)						
	16:51	29	16:13 (1)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	21	15:42 (1)	16	11:59 (2)						
25	08:25		15:44 (1)	07:25		16:18	20:05	21:06	21:44	21:33	20:36	19:21	18:09	16:16	19	15:41 (1)	16	11:59 (2)						
	16:52	30	16:14 (1)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	19	15:41 (1)	16	11:59 (2)						
26	08:23		15:44 (1)	07:23		16:16	20:03	21:04	21:42	21:31	20:34	19:17	17:07	16:14	16	15:39 (1)	16	11:59 (2)						
	16:54	30	16:14 (1)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:14	16	15:39 (1)	16	11:59 (2)						
27	08:22		15:44 (1)	07:21		16:13	20:01	21:02	21:40	21:29	20:31	19:14	17:04	16:13	15	15:38 (1)	16	11:59 (2)						
	16:56	30	16:14 (1)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	15	15:38 (1)	16	11:59 (2)						
28	08:20		15:45 (1)	07:19		16:11	20:08	21:07	21:45	21:34	20:32	19:13	17:03	16:12	14	15:37 (1)	16	11:59 (2)						
	16:58	30	16:15 (1)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	11	15:37 (1)	16	11:59 (2)						
29	08:19		15:45 (1)			16:09	20:05	21:04	21:42	21:31	20:29	19:10	17:00	16:12	9	15:35 (1)	16</							

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GH - H190

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:04
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:11 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:41	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GI - H191

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March	April	May	June	July	August	September	October	November	December
1	08:44	15:00 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	15:24 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	15:01 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21
	16:16	15:24 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	15:01 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	15:24 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08
4	08:43	15:02 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24
	16:18	15:25 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	15:02 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25
	16:19	15:24 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07
6	08:43	15:03 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26
	16:21	15:25 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:07
7	08:42	15:04 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28
	16:22	15:25 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06
8	08:42	15:04 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29
	16:23	15:25 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06
9	08:41	15:06 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
	16:25	15:25 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05
10	08:40	15:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32
	16:26	15:25 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05
11	08:40	15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33
	16:28	15:25 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05
12	08:39	15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34
	16:29	15:24 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05
13	08:38	15:11 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35
	16:31	15:23 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04
14	08:37	15:13 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36
	16:33	15:22 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04
15	08:36	15:16 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37
	16:34	15:20 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04
16	08:35	15:17 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38
	16:36	15:18 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05
17	08:34	15:19 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39
	16:38	15:20 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:03
18	08:33	15:21 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39
	16:39	15:22 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05
19	08:32	15:23 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40
	16:41	15:24 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05
20	08:31	15:25 (2)	07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00	08:41
	16:43	15:26 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05
21	08:30	15:27 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41
	16:45	15:28 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06
22	08:29	15:29 (2)	07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42
	16:47	15:30 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06
23	08:27	15:31 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42
	16:49	15:32 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07
24	08:26	15:33 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43
	16:50	15:34 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07
25	08:25	15:35 (2)	07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	08:11	08:09	08:43
	16:52	15:36 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:15	16:08
26	08:23	15:37 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:43
	16:54	15:38 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14	16:09
27	08:22	15:39 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13	14:55 (2)
	16:56	15:40 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	14:59 (2)
28	08:20	15:41 (2)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	14:53 (2)
	16:58	15:42 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	14:51 (2)
29	08:19	15:43 (2)	07:16	07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16	14:51 (2)
	17:00	15:44 (2)	18:01	18:54	20:52	21:41	22:01	21:30	20:25	19:09	18:00	16:11	14:50 (2)
30	08:17	15:45 (2)	07:14	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	14:50 (2)
	17:02	15:46 (2)	18:03	18:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	14:49 (2)
31	08:15	15:47 (2)	07:12	07:04	05:52	05:04	04:57	05:37	06:31	07:26	08:22	08:20	14:49 (2)
	17:04	15:48 (2)	18:05	18:58	20:56	21:45	22:01	21:29	20:24	19:08	18:01	16:12	14:48 (2)
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	233
Total, worst case	273											40	719
Sun reduction	0.24											0.27	0.21
Oper. time red.	1.00											1.00	1.00
Wind dir. red.	0.65											0.65	0.65
Total reduction	0.16											0.17	0.13
Total, real	43											7	96

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: GJ - H192

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44																						
2	08:44																						
3	08:44																						
4	08:43																						
5	08:43																						
6	08:43																						
7	08:42																						
8	08:42																						
9	08:41																						
10	08:40																						
11	08:40																						
12	08:39																						
13	08:38																						
14	08:37																						
15	08:36																						
16	08:35																						
17	08:34																						
18	08:33																						
19	08:32																						
20	08:31																						
21	08:30																						
22	08:29																						
23	08:27																						
24	08:26																						
25	08:25																						
26	08:23																						
27	08:22																						
28	08:20																						
29	08:19																						
30	08:17																						
31	08:15																						
Potential sun hours	250																						
Total, worst case	248																						
Sun reduction	0.24																						
Oper. time red.	1.00																						
Wind dir. red.	0.65																						
Total reduction	0.16																						
Total, real	39																						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GK - H193

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GL - H194

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GM - H195

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GN - H196

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September	October		November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	5	07:41 (1) 07:46 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18		08:10 (1) 08:20 (1)	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	8	07:39 (1) 07:47 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	10	08:06 (1) 08:21 (1)	07:26 16:52
3	08:44 16:16	08:10 17:10	07:12 18:06	11	07:36 (1) 07:47 (1)	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	15	08:05 (1) 08:22 (1)	07:28 16:50
4	08:43 16:18	08:09 17:12	07:09 18:08	14	07:34 (1) 07:48 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	17	08:04 (1) 08:23 (1)	07:30 16:48
5	08:43 16:20	08:07 17:14	07:07 18:10	16	07:31 (1) 07:47 (1)	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	19	08:03 (1) 08:24 (1)	07:32 16:46
6	08:43 16:21	08:05 17:16	07:05 18:12	19	07:29 (1) 07:48 (1)	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	21	08:02 (1) 08:24 (1)	07:34 16:45
7	08:42 16:22	08:03 17:18	07:02 18:13	21	07:27 (1) 07:48 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	22	08:04 (1) 08:24 (1)	07:36 16:43
8	08:42 16:24	08:01 17:20	07:00 18:15	22	07:25 (1) 07:47 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	20	08:06 (1) 08:24 (1)	07:38 16:41
9	08:41 16:25	07:59 17:22	06:58 18:17	20	07:26 (1) 07:46 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	18	08:07 (1) 08:22 (1)	07:40 16:39
10	08:41 16:27	07:57 17:24	06:55 18:19	19	07:26 (1) 07:45 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	06:49 21:08	07:43 19:57	15	08:09 (1) 08:22 (1)	07:42 16:37
11	08:40 16:28	07:55 17:26	06:53 18:21	16	07:28 (1) 07:44 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	06:51 21:06	07:45 19:54	13	08:11 (1) 08:21 (1)	07:44 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	12	07:29 (1) 07:41 (1)	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	06:52 21:04	07:46 19:52	10	08:13 (1) 08:20 (1)	07:46 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	4	07:33 (1) 07:37 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	06:54 21:02	07:48 19:49	7	08:15 (1) 08:18 (1)	07:48 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27			06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47			07:50 16:31
15	08:37 16:35	07:47 17:34	06:43 18:29			06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44			07:52 16:29
16	08:36 16:36	07:45 17:36	06:41 18:31			06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42			07:54 16:28
17	08:35 16:38	07:43 17:38	06:38 18:32			06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39			07:56 16:26
18	08:34 16:40	07:41 17:40	06:36 18:34			06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37			07:58 16:25
19	08:32 16:42	07:39 17:42	06:33 18:36			06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34			07:59 16:23
20	08:31 16:43	07:37 17:44	06:31 18:38			06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32			08:01 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40			06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29			08:03 16:21
22	08:29 16:47	07:32 17:48	06:26 18:42			06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27			08:05 16:19
23	08:27 16:49	07:30 17:50	06:23 18:44			06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24			08:07 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45			06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22			08:09 16:17
25	08:25 16:53	07:26 17:54	06:19 18:47			06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20			08:11 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49			06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17			08:11 16:15
27	08:22 16:56	07:21 17:58	06:14 18:51			06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15			08:13 16:14
28	08:20 16:58	07:19 18:00	06:11 18:53			05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12			08:15 16:13
29	08:19 17:00		07:09 19:55			05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10			08:16 16:12
30	08:17 17:02		07:06 19:57			05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07			08:18 16:13
31	08:16 17:04		07:04 19:58			05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56			08:23 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328		259	233
Total, worst case			187								190			
Sun reduction			0.27								0.29			
Oper. time red.			1.00								1.00			
Wind dir. red.			0.65								0.65			
Total reduction			0.18								0.19			
Total, real			33								36			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GO - H197

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	19 08:00 (1)	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	21 08:00 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	07:38 (1)	06:57	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	21 07:59 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:09	
4	08:44	08:09	07:09	07:39 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	19 07:58 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	07:40 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	17 07:57 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07	
6	08:43	08:05	07:05	07:41 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:22 (1)	07:34	08:27
	16:21	17:16	18:12	14 07:55 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	5 08:27 (1)	16:45	16:07
7	08:42	08:03	07:02	07:44 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:18 (1)	16:46	16:07
	16:22	17:18	18:13	9 07:53 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	12 08:30 (1)	16:43	16:06
8	08:42	08:01	07:00		06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:16 (1)	16:43	16:06
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:12	20:02	18:48	16 08:32 (1)	16:41	16:06
9	08:41	07:59	06:58		06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:14 (1)	16:40	16:06
	16:25	17:22	18:17		20:15	21:10	21:54	21:56	21:10	19:59	18:45	18 08:32 (1)	16:39	16:06
10	08:41	07:57	06:55		06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:13 (1)	16:42	16:06
	16:27	17:24	18:19		20:17	21:12	21:55	21:55	21:08	19:57	18:43	20 08:33 (1)	16:37	16:05
11	08:40	07:55	06:53		06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:12 (1)	16:44	16:05
	16:28	17:26	18:21		20:19	21:13	21:56	21:54	21:06	19:54	18:41	21 08:33 (1)	16:36	16:05
12	08:39	07:53	06:50		06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:13 (1)	16:46	16:05
	16:30	17:28	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	20 08:33 (1)	16:34	16:05
13	08:38	07:51	06:48		06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:15 (1)	16:48	16:05
	16:31	17:30	18:25		20:22	21:17	21:57	21:52	21:02	19:49	18:36	18 08:33 (1)	16:32	16:05
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:17 (1)	16:50	16:05
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16 08:33 (1)	16:31	16:05
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:19 (1)	16:51	16:05
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	13 08:32 (1)	16:29	16:05
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:21 (1)	16:53	16:05
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	11 08:32 (1)	16:28	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:23 (1)	16:55	16:05
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	7 08:30 (1)	16:26	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:25 (1)	16:57	16:05
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	4 08:29 (1)	16:25	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59		16:59	16:05
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22		16:23	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01		16:23	16:05
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20		16:22	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03		16:22	16:06
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18		16:21	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05		16:21	16:06
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15		16:19	16:07
23	08:27	07:30	06:23	07:55 (1)	06:09	05:13	04:55	05:24	06:17	07:12	08:07		16:18	16:07
	16:49	17:50	2 07:57 (1)	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13		16:18	16:07
24	08:26	07:28	07:53 (1)	18:45	06:07	05:12	04:55	05:26	06:19	07:14	08:09		16:18	16:08
	16:51	17:52	5 07:58 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11		16:17	16:08
25	08:25	07:26	07:51 (1)	18:47	06:05	05:11	04:56	05:27	06:21	07:15	08:11		16:17	16:08
	16:53	17:54	9 08:00 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09		16:16	16:08
26	08:23	07:23	07:48 (1)	18:49	06:03	05:09	04:56	05:29	06:22	07:17	08:13		16:16	16:08
	16:54	17:56	12 08:00 (1)	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07		16:15	16:09
27	08:22	07:21	07:46 (1)	18:51	06:01	05:08	04:57	05:31	06:24	07:19	08:15		16:15	16:09
	16:56	17:58	14 08:00 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05		16:14	16:10
28	08:20	07:19	07:43 (1)	18:53	05:59	05:07	04:57	05:32	06:26	07:21	08:17		16:15	16:10
	16:58	18:00	17 08:00 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02		16:13	16:11
29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19		16:16	16:11
	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00		16:12	16:12
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21		16:18	16:12
	17:02			19:57	20:54	21:43	22:01	21:28	20:23	19:07	18:00		16:11	16:13
31	08:16			07:04		05:04		05:37	06:31	07:23	08:23		16:11	16:14
	17:04			19:58		21:44		21:27	20:21	18:56	18:00		16:14	16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328	181	259	233
Total, worst case		59	120									0.29		
Sun reduction		0.23	0.27									1.00		
Oper. time red.		1.00	1.00									0.65		
Wind dir. red.		0.65	0.65									0.19		
Total reduction		0.15	0.18									0.34		
Total, real		9	21											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GP - H198

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GQ - H199

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:40 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case **Shadow receptor:** GR - H200**Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (1)	08:19	
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	23 08:17 (1)	16:10	
2	08:44	08:12	08:40 (1)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:56 (1)	08:21	
	16:16	17:08	2 08:42 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	21 08:17 (1)	16:09
3	08:44	08:10	08:38 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:58 (1)	08:22	
	16:17	17:10	5 08:43 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	18 08:16 (1)	16:09
4	08:43	08:09	08:36 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:00 (1)	08:24
	16:18	17:12	8 08:44 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16 08:16 (1)	16:08
5	08:43	08:07	08:34 (1)	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32	08:02 (1)	08:25
	16:20	17:14	11 08:45 (1)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	13 08:15 (1)	16:07
6	08:43	08:05	08:32 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:04 (1)	08:27
	16:21	17:16	14 08:46 (1)	18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45	11 08:15 (1)	16:07
7	08:42	08:03	08:30 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:06 (1)	08:28
	16:22	17:18	16 08:46 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	8 08:14 (1)	16:06
8	08:42	08:01	08:28 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:09 (1)	08:29
	16:24	17:20	19 08:47 (1)	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:41	5 08:14 (1)	16:06
9	08:41	07:59	08:26 (1)	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:11 (1)	08:31
	16:25	17:22	21 08:47 (1)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	2 08:13 (1)	16:05
10	08:41	07:57	08:24 (1)	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42		08:32
	16:27	17:24	23 08:47 (1)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37		16:05
11	08:40	07:55	08:22 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44		08:33
	16:28	17:26	25 08:47 (1)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36		16:05
12	08:39	07:53	08:23 (1)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46		08:34
	16:30	17:28	24 08:47 (1)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34		16:05
13	08:38	07:51	08:23 (1)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48		08:35
	16:31	17:30	24 08:47 (1)	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32		16:05
14	08:37	07:49	08:23 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50		08:36
	16:33	17:32	22 08:45 (1)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31		16:05
15	08:37	07:47	08:24 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51		08:37
	16:35	17:34	20 08:44 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29		16:05
16	08:36	07:45	08:26 (1)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53		08:38
	16:36	17:36	17 08:43 (1)	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28		16:05
17	08:35	07:43	08:28 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55		08:39
	16:38	17:38	13 08:41 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26		16:05
18	08:34	07:41	08:31 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57		08:39
	16:40	17:40	8 08:39 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25		16:05
19	08:32	07:39		06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59		08:40
	16:41	17:42		18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23		16:05
20	08:31	07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01		08:41
	16:43	17:44		18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22		16:06
21	08:30	07:34		06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:02		08:41
	16:45	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21		16:06
22	08:29	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		08:42
	16:47	17:48		18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19		16:07
23	08:27	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		08:43
	16:49	17:50		18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18		16:07
24	08:26	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09			08:43
	16:51	17:52		18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17		16:08
25	08:25	07:26		06:19	06:05	05:11	04:56	05:27	06:21	07:15	07:11	07:57 (1)		08:43
	16:53	17:54		18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	14 08:11 (1)		16:16
26	08:23	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	07:55 (1)		08:44
	16:54	17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	18 08:13 (1)		16:15
27	08:22	07:21		06:14	06:01	05:08	04:57	05:31	06:24	07:19	07:15	07:54 (1)		08:44
	16:56	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	20 08:14 (1)		16:14
28	08:20	07:19		06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17	07:53 (1)		08:44
	16:58	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	22 08:15 (1)		16:13
29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	07:52 (1)		08:44
	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	23 08:15 (1)		16:12
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21	07:52 (1)		08:44
	17:02			19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	25 08:17 (1)		16:13
31	08:16			07:04		05:04		05:37	06:31		07:22	07:52 (1)		08:44
	17:04			19:58		21:44		21:27	20:21		16:56	25 08:17 (1)		16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259		233	
Total, worst case		272									157	117		
Sun reduction		0.23									0.29	0.27		
Oper. time red.		1.00									1.00	1.00		
Wind dir. red.		0.62									0.62	0.62		
Total reduction		0.14									0.18	0.16		
Total, real		39									29	19		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GS - H201

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GT - H202

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GU - H203

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GV - H204

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GW - H205

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GX - H206

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GY - H207

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: GZ - H208

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HA - H209

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HB - H210

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HC - H211

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
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Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HD - H212

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HE - H213

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HF - H214

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

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	January	February	March	April	May	June	July	August	September	October	November	December
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HG - H215

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HH - H216

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HI - H217

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HJ - H218

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HK - H219

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HL - H220

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HM - H221

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HN - H222

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
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13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HO - H223

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HP - H224

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HQ - H225

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HR - H226

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December						
1	08:44	08:14	07:16	07:01	05:52	05:03	05:33 (5)	04:59	05:32 (5)	05:39	06:33	07:26	07:24	08:19				
2	16:15	17:06	18:02	20:00	20:55	21:45	26	05:59 (5)	22:00	35	06:07 (5)	21:25	20:18	19:05	16:54	16:10		
	08:44	08:12	07:14	06:59	05:50	05:02		05:33 (5)	05:00		05:33 (5)	05:40	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	21:46	27	06:00 (5)	22:00	34	06:07 (5)	21:23	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	06:56	05:48	05:01		05:32 (5)	05:00		05:33 (5)	05:42	06:36	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	21:48	28	06:00 (5)	21:59	34	06:07 (5)	21:21	20:14	19:00	16:50	16:09		
	08:43	08:08	07:09	06:54	05:46	05:00		05:31 (5)	05:01		05:34 (5)	05:44	06:38	07:32	07:30	08:24		
4	16:18	17:12	18:08	20:06	21:01	21:49	29	06:00 (5)	21:59	33	06:07 (5)	21:19	20:11	18:57	16:48	16:08		
	08:43	08:07	07:07	06:52	05:44	04:59		05:31 (5)	05:02		05:35 (5)	05:46	06:40	07:33	07:32	08:25		
	16:20	17:14	18:10	20:08	21:03	21:50	30	06:01 (5)	21:58	32	06:07 (5)	21:17	20:09	18:55	16:46	16:07		
6	08:43	08:05	07:05	06:49	05:42	04:59		05:30 (5)	05:03		05:36 (5)	05:47	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	21:51	31	06:01 (5)	21:58	31	06:07 (5)	21:15	20:06	18:53	16:45	16:07		
	08:42	08:03	07:02	06:47	05:40	04:58		05:30 (5)	05:04		05:37 (5)	05:49	06:44	07:37	07:36	08:28		
8	16:22	17:18	18:13	20:11	21:06	21:52	32	06:02 (5)	21:57	31	06:08 (5)	21:14	20:04	18:50	16:43	16:06		
	08:42	08:01	07:00	06:44	05:38	04:57		05:29 (5)	05:05		05:38 (5)	05:51	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	21:53	33	06:02 (5)	21:56	30	06:08 (5)	21:12	20:01	18:48	16:41	16:06		
9	08:41	07:59	06:57	06:42	05:36	04:57		05:29 (5)	05:06		05:39 (5)	05:52	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	21:54	33	06:02 (5)	21:55	29	06:08 (5)	21:10	19:59	18:45	16:39	16:06		
	08:40	07:57	06:55	06:40	05:35	04:56		05:28 (5)	05:07		05:40 (5)	05:54	06:49	07:43	07:42	08:31		
11	16:27	17:24	18:19	20:17	21:11	21:55	34	06:02 (5)	21:55	28	06:08 (5)	21:08	19:56	18:43	16:37	16:05		
	08:40	07:55	06:53	06:37	05:33	04:56		05:28 (5)	05:08		05:41 (5)	05:56	06:51	07:44	07:44	08:33		
	16:28	17:26	18:21	20:19	21:13	21:55	35	06:03 (5)	21:54	26	06:07 (5)	21:06	19:54	18:41	16:36	16:05		
12	08:39	07:53	06:50	06:35	05:31	04:56		05:28 (5)	05:09		05:42 (5)	05:58	06:52	07:46	07:46	08:34		
	16:30	17:28	18:23	20:20	21:15	21:56	35	06:03 (5)	21:53	25	06:07 (5)	21:03	19:52	18:38	16:34	16:05		
	08:38	07:51	06:48	06:32	05:29	04:55		05:27 (5)	05:11		05:43 (5)	05:59	06:54	07:48	07:47	08:35		
14	16:31	17:30	18:25	20:22	21:17	21:57	36	06:03 (5)	21:52	24	06:07 (5)	21:01	19:49	18:36	16:32	16:05		
	08:37	07:49	06:45	06:30	05:27	04:55		05:27 (5)	05:12		05:44 (5)	06:01	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:18	21:58	36	06:03 (5)	21:51	23	06:07 (5)	20:59	19:47	18:34	16:31	16:05		
15	08:36	07:47	06:43	06:28	05:26	04:55		05:27 (5)	05:13		05:45 (5)	06:03	06:58	07:52	07:51	08:37		
	16:35	17:34	18:29	20:26	21:20	21:58	36	06:03 (5)	21:50	21	06:06 (5)	20:57	19:44	18:31	16:29	16:05		
	08:35	07:45	06:40	06:25	05:24	04:55		05:27 (5)	05:14		05:47 (5)	06:05	06:59	07:54	07:53	08:38		
17	16:36	17:36	18:30	20:28	21:22	21:59	37	06:04 (5)	21:49	20	06:07 (5)	20:55	19:42	18:29	16:28	16:05		
	08:34	07:43	06:38	06:23	05:22	04:54		05:27 (5)	05:16		05:48 (5)	06:06	07:01	07:56	07:55	08:38		
	16:38	17:38	18:32	20:30	21:23	21:59	37	06:04 (5)	21:47	18	06:06 (5)	20:53	19:39	18:27	16:26	16:05		
18	08:33	07:41	06:36	06:21	05:21	04:54		05:27 (5)	05:17		05:49 (5)	06:08	07:03	07:57	07:57	08:39		
	16:40	17:40	18:34	20:32	21:25	22:00	37	06:04 (5)	21:46	16	06:05 (5)	20:51	19:37	18:24	16:25	16:05		
	08:32	07:39	06:33	06:18	05:19	04:54		05:27 (5)	05:19		05:50 (5)	06:10	07:05	07:59	07:59	08:40		
20	16:41	17:42	18:36	20:33	21:27	3	05:51 (5)	22:00	37	06:04 (5)	21:45	15	06:05 (5)	20:48	19:34	18:22	16:23	16:05
	08:31	07:37	06:31	06:16	05:18	04:54		05:27 (5)	05:20		05:52 (5)	06:12	07:06	08:01	08:00	08:41		
	16:43	17:44	18:38	20:35	21:28	5	05:51 (5)	22:00	37	06:04 (5)	21:44	13	06:05 (5)	20:46	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	04:55		05:27 (5)	05:21		05:53 (5)	06:13	07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	21:30	8	05:53 (5)	22:01	38	06:05 (5)	21:42	11	06:04 (5)	20:44	19:29	18:18	16:21	16:06
	08:29	07:32	06:26	06:12	05:15	04:55		05:28 (5)	05:23		05:55 (5)	06:15	07:10	08:05	08:04	08:42		
23	16:47	17:48	18:42	20:39	21:31	10	05:54 (5)	22:01	37	06:05 (5)	21:41	9	06:04 (5)	20:42	19:27	18:15	16:19	16:07
	08:27	07:30	06:23	06:09	05:13	05:43 (5)	04:55		05:28 (5)	05:24		05:56 (5)	06:17	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	21:33	12	05:55 (5)	22:01	37	06:05 (5)	21:39	7	06:03 (5)	20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	05:41 (5)	04:55		05:28 (5)	05:26		05:57 (5)	06:19	07:14	08:09	08:08	08:43	
	16:51	17:52	18:45	20:43	21:34	14	05:55 (5)	22:01	37	06:05 (5)	21:38	4	06:01 (5)	20:37	19:22	18:11	16:17	16:08
	08:25	07:25	06:18	06:05	05:11	05:40 (5)	04:56		05:29 (5)	05:27		05:59 (5)	06:21	07:15	08:11	08:09	08:43	
26	16:53	17:54	18:47	20:44	21:36	16	05:56 (5)	22:01	37	06:06 (5)	21:36	2	06:01 (5)	20:35	19:19	17:09	16:16	16:08
	08:23	07:23	06:16	06:03	05:09	05:39 (5)	04:56		05:29 (5)	05:29			06:22	07:17	08:13	08:11	08:43	
	16:54	17:56	18:49	20:46	21:37	17	05:56 (5)	22:01	37	06:06 (5)	21:35		20:32	19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08	05:38 (5)	04:57		05:30 (5)	05:31			06:24	07:19	08:15	08:13	08:44	
	16:56	17:58	18:51	20:48	21:39	19	05:57 (5)	22:01	37	06:07 (5)	21:33		20:30	19:14	17:04	16:14	16:10	
	08:20	07:19	06:11	05:59	05:07	05:37 (5)	04:57		05:30 (5)	05:32			06:26	07:21	08:17	08:14	08:44	
28	16:58	18:00	18:53	20:50	21:40	20	05:57 (5)	22:01	36	06:06 (5)	21:32		20:28	19:12	17:02	16:13	16:11	
	08:19		07:09	05:56	05:06	05:36 (5)	04:58		05:31 (5)	05:34			06:28	07:23	08:18	08:16	08:44	
	17:00		19:55	20:52	21:41	22	05:58 (5)	22:01	36	06:07 (5)	21:30		20:25	19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05	05:35 (5)	04:58		05:31 (5)	05:35			06:29	07:24	08:20	08:18	08:44	
	17:02		19:56	20:54	21:43	23	05:58 (5)	22:00	35	06:06 (5)	21:28		20:23	19:07	16:58	16:11	16:13	
	08:15		07:04		05:04	05:34 (5)					05:37		06:31		07:22		08:44	
	17:04		19:58		21:44	25	05:59 (5)				21:27		20:21		16:56		16:14	
Potential sun hours	250	273	367	420	494	510					512		460		382	328	259	233
Total, worst case					194			1033			551							
Sun reduction					0.38			0.32										
Oper. time red.					1.00			1.00			1.00							
Wind dir. red.					0.66			0.66			0.66							
Total reduction					0.25			0.21			0.21							
Total, real					49			217			117							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: HS - H227

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		08:14		07:16				07:01			07:57 (5)		05:52		06:18 (4)	05:03
	16:15		17:06		18:02				20:00			4 08:01 (5)		20:55		13 06:31 (4)	21:45
2	08:44		08:12		07:14				06:59					05:50		06:16 (4)	05:02
	16:16		17:08		18:04				20:02					20:57		14 06:30 (4)	21:47
3	08:44		08:10		07:12				06:56					05:48		06:14 (4)	05:01
	16:17		17:10		18:06				20:04					20:59		15 06:29 (4)	21:48
4	08:43		08:09		07:09				06:54					05:46		06:12 (4)	05:00
	16:18		17:12		18:08				20:06					21:01		16 06:28 (4)	21:49
5	08:43		08:07		07:07				06:52					05:44		06:11 (4)	04:59
	16:20		17:14		18:10				20:08					21:03		15 06:26 (4)	21:50
6	08:43		08:05		07:05				06:49					05:42		06:14 (4)	04:59
	16:21		17:16		18:11				20:09					21:04		11 06:25 (4)	21:51
7	08:42		08:03		07:02				06:47					05:40			04:58
	16:22		17:18		18:13				20:11					21:06			21:52
8	08:42		08:01		07:00				06:44					05:38			04:57
	16:24		17:20		18:15				20:13					21:08			21:53
9	08:41		07:59		06:57				06:42					05:36			04:57
	16:25		17:22		18:17				20:15					21:10			21:54
10	08:40		07:57		06:55				06:40					05:35			04:56
	16:27		17:24		18:19				20:17					21:12			21:55
11	08:40		07:55		06:53				06:37					05:33			04:56
	16:28		17:26		18:21				20:19					21:13			21:55
12	08:39		07:53		06:50				07:14 (5)					05:31			04:56
	16:30		17:28		18:23		4		20:20					21:15			21:56
13	08:38		07:51		06:48				07:12 (5)					05:29			04:55
	16:31		17:30		18:25		8		20:22					21:17			21:57
14	08:37		07:49		06:45				07:09 (5)					05:27			04:55
	16:33		17:32		18:27		11		20:24					21:18			21:58
15	08:36		07:47		06:43				07:07 (5)					05:26			04:55
	16:35		17:34		18:29		14		20:26					21:20			21:58
16	08:35		07:45		06:40				07:04 (5)					05:24			04:55
	16:36		17:36		18:30		17		20:28					21:22			21:59
17	08:34		07:43		06:38				07:02 (5)					05:22			04:54
	16:38		17:38		18:32		20		20:30					21:23			21:59
18	08:33		07:41		06:36				06:59 (5)					05:21			04:54
	16:40		17:40		18:34		22		20:32					21:25			22:00
19	08:32		07:39		06:33				06:57 (5)					05:19			04:54
	16:41		17:42		18:36		25		20:33					21:27			22:00
20	08:31		07:37		06:31				06:54 (5)					05:18			04:54
	16:43		17:44		18:38		27		20:35					21:28			22:00
21	08:30		07:34		06:28				06:52 (5)					05:16			04:55
	16:45		17:46		18:40		29		20:37					21:30			22:01
22	08:29		07:32		06:26				06:50 (5)					05:15			04:55
	16:47		17:48		18:42		31		20:39					21:31			22:01
23	08:27		07:30		06:23				06:47 (5)					05:13			04:55
	16:49		17:50		18:43		33		20:41					21:33			22:01
24	08:26		07:28		06:21				06:45 (5)					05:12			04:55
	16:51		17:52		18:45		35		20:43			1 06:33 (4)		21:34			22:01
25	08:25		07:25		06:18				06:44 (5)					05:11			04:56
	16:53		17:54		18:47		34		20:44			3 06:33 (4)		21:36			22:01
26	08:23		07:23		06:16				06:45 (5)					05:09			04:56
	16:54		17:56		18:49		33		20:46			5 06:33 (4)		21:37			22:01
27	08:22		07:21		06:14				06:45 (5)					05:08			04:57
	16:56		17:58		18:51		31		20:48			7 06:33 (4)		21:39			22:01
28	08:20		07:19		06:11				06:47 (5)					05:07			04:57
	16:58		18:00		18:53		28		20:50			9 06:33 (4)		21:40			22:01
29	08:19				07:09				07:47 (5)					05:06			04:58
	17:00				19:55		25		08:12 (5)			10 06:32 (4)		21:41			22:01
30	08:17				07:06				07:49 (5)					05:05			04:58
	17:02				19:56		21		08:10 (5)			12 06:32 (4)		21:43			22:00
31	08:15				07:04				07:51 (5)					05:04			
	17:04				19:58		16		08:07 (5)					21:44			
Potential sun hours	250		273		367				420					494			510
Total, worst case					464				51					84			232
Sun reduction					0.27				0.35					0.38			0.32
Oper. time red.					1.00				1.00					1.00			1.00
Wind dir. red.					0.67				0.67					0.68			0.66
Total reduction					0.18				0.24					0.26			0.21
Total, real					84				12					22			49

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HS - H227

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33		07:26		07:52 (5)	07:24	08:19	
	22:00	8	05:40 (3)	21:25	20:18	19:05	6	07:58 (5)	16:54	16:10	
2	05:00		05:33 (3)	05:40	06:35	07:28		07:54 (5)	07:26	08:21	
	22:00	7	05:40 (3)	21:23	20:16	19:02	2	07:56 (5)	16:52	16:09	
3	05:00		05:33 (3)	05:42	06:36	07:30			07:28	08:22	
	21:59	7	05:40 (3)	21:21	20:14	19:00			16:50	16:09	
4	05:01		05:34 (3)	05:44	06:38	07:32			07:30	08:24	
	21:59	6	05:40 (3)	21:19	20:11	18:57			16:48	16:08	
5	05:02		05:35 (3)	05:46	06:40	07:33			07:32	08:25	
	21:58	5	05:40 (3)	21:17	20:09	18:55			16:46	16:07	
6	05:03		05:36 (3)	05:47	06:42	07:35			07:34	08:26	
	21:58	4	05:40 (3)	21:16	7	06:32 (4)			16:45	16:07	
7	05:04		05:37 (3)	05:49	06:23 (4)	06:44			07:36	08:28	
	21:57	3	05:40 (3)	21:14	12	06:35 (4)			16:43	16:06	
8	05:05		05:38 (3)	05:51	06:20 (4)	06:45			07:38	08:29	
	21:56	2	05:40 (3)	21:12	16	06:36 (4)			16:41	16:06	
9	05:06		05:39 (3)	05:52	06:22 (4)	06:47			07:40	08:30	
	21:55	1	05:40 (3)	21:10	16	06:38 (4)			16:39	16:06	
10	05:07			05:54	06:24 (4)	06:49			07:42	08:32	
	21:55			21:08	15	06:39 (4)			16:37	16:05	
11	05:08			05:56	06:25 (4)	06:51			07:44	08:33	
	21:54			21:06	14	06:39 (4)			16:36	16:05	
12	05:09			05:58	06:27 (4)	06:52		07:44 (5)	07:46	08:34	
	21:53			21:03	13	06:40 (4)	14	07:58 (5)	18:38	16:34	16:05
13	05:11			05:59	06:28 (4)	06:54		07:41 (5)	07:48	08:35	
	21:52			21:01	12	06:40 (4)	20	08:01 (5)	18:36	16:32	16:05
14	05:12			06:01	06:30 (4)	06:56		07:38 (5)	07:50	08:36	
	21:51			20:59	10	06:40 (4)	24	08:02 (5)	18:34	16:31	16:05
15	05:13			06:03	06:32 (4)	06:58		07:36 (5)	07:52	08:37	
	21:50			20:57	8	06:40 (4)	28	08:04 (5)	18:31	16:29	16:05
16	05:14			06:05	06:33 (4)	06:59		07:35 (5)	07:54	08:38	
	21:49			20:55	7	06:40 (4)	30	08:05 (5)	18:29	16:28	16:05
17	05:16			06:06	06:35 (4)	07:01		07:34 (5)	07:56	08:39	
	21:47			20:53	5	06:40 (4)	32	08:06 (5)	18:27	16:26	16:05
18	05:17			06:08	06:37 (4)	07:03		07:32 (5)	07:57	08:39	
	21:46			20:51	3	06:40 (4)	34	08:06 (5)	18:24	16:25	16:05
19	05:19			06:10		07:05		07:31 (5)	07:59	08:40	
	21:45			20:48		19:34	35	08:06 (5)	18:22	16:23	16:05
20	05:20			06:12		07:06		07:33 (5)	08:01	08:41	
	21:44			20:46		19:32	33	08:06 (5)	18:20	16:22	16:06
21	05:21			06:13		07:08		07:35 (5)	08:03	08:42	
	21:42			20:44		19:29	32	08:07 (5)	18:18	16:21	16:06
22	05:23			06:15		07:10		07:36 (5)	08:05	08:43	
	21:41			20:42		19:27	30	08:06 (5)	18:15	16:19	16:07
23	05:24			06:17		07:12		07:38 (5)	08:07	08:44	
	21:39			20:39		19:24	28	08:06 (5)	18:13	16:18	16:07
24	05:26			06:19		07:14		07:40 (5)	08:09	08:45	
	21:38			20:37		19:22	25	08:05 (5)	18:11	16:17	16:08
25	05:27			06:21		07:15		07:42 (5)	07:11	08:46	
	21:36			20:35		19:19	23	08:05 (5)	17:09	16:16	16:08
26	05:29			06:22		07:17		07:43 (5)	07:13	08:47	
	21:35			20:32		19:17	21	08:04 (5)	17:07	16:15	16:09
27	05:31			06:24		07:19		07:45 (5)	07:15	08:48	
	21:33			20:30		19:15	18	08:03 (5)	17:05	16:14	16:10
28	05:32			06:26		07:21		07:47 (5)	07:17	08:49	
	21:32			20:28		19:12	15	08:02 (5)	17:02	16:13	16:11
29	05:34			06:28		07:23		07:49 (5)	07:18	08:50	
	21:30			20:25		19:10	12	08:01 (5)	17:00	16:12	16:12
30	05:35			06:29		07:24		07:51 (5)	07:20	08:51	
	21:28			20:23		19:07	9	08:00 (5)	16:58	16:11	16:13
31	05:37			06:31					07:22		08:44
	21:27			20:21					16:56		16:14
Potential sun hours	512			460		382		328		259	233
Total, worst case		43		138		463		8			
Sun reduction		0.32		0.34		0.32		0.29			
Oper. time red.		1.00		1.00		1.00		1.00			
Wind dir. red.		0.66		0.68		0.67		0.67			
Total reduction		0.21		0.23		0.21		0.20			
Total, real		9		32		99		2			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: HT - H228

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01	07:25 (5)	05:52				05:03	05:34 (3)	
	16:15	17:06	18:02						20:00	5	07:30 (5)	20:55			21:45	7	05:41 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50			05:02		05:33 (3)
	16:16	17:08	18:04						20:02	7	07:30 (5)	20:57			21:47	8	05:41 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48			05:01		05:32 (3)
	16:17	17:10	18:06						20:04	10	07:30 (5)	20:59			21:48	8	05:40 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46			05:00		05:31 (3)
	16:18	17:12	18:08						20:06	12	07:30 (5)	21:01			21:49	9	05:40 (3)
5	08:43	08:07	07:07						06:52		07:15 (5)	05:44			04:59		05:31 (3)
	16:20	17:14	18:10						20:08	14	07:29 (5)	21:03			21:50	10	05:41 (3)
6	08:43	08:05	07:05						06:49		07:13 (5)	05:42			04:59		05:30 (3)
	16:21	17:16	18:11						20:09	16	07:29 (5)	21:04			21:51	11	05:41 (3)
7	08:42	08:03	07:02						06:47		07:11 (5)	05:40			04:58		05:30 (3)
	16:22	17:18	18:13						20:11	18	07:29 (5)	21:06			21:52	11	05:41 (3)
8	08:42	08:01	07:00						06:44		07:08 (5)	05:38			04:57		05:29 (3)
	16:24	17:20	18:15						20:13	19	07:27 (5)	21:08			21:53	12	05:41 (3)
9	08:41	07:59	06:57						06:42		07:06 (5)	05:36			04:57		05:29 (3)
	16:25	17:22	18:17						20:15	21	07:27 (5)	21:10			21:54	13	05:42 (3)
10	08:40	07:57	06:55						06:40		07:05 (5)	05:35			04:56		05:28 (3)
	16:27	17:24	18:19						20:17	19	07:24 (5)	21:12			21:55	13	05:41 (3)
11	08:40	07:55	06:53						06:37		07:07 (5)	05:33			04:56		05:28 (3)
	16:28	17:26	18:21						20:19	16	07:23 (5)	21:13			21:55	13	05:41 (3)
12	08:39	07:53	06:50						06:35		07:09 (5)	05:31			04:56		05:28 (3)
	16:30	17:28	18:23						20:21	12	07:21 (5)	21:15			21:56	14	05:42 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:27 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	14	05:41 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:27 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	15	05:42 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:27 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	15	05:42 (3)
16	08:35	07:45	06:41						06:25			05:24			04:55		05:27 (3)
	16:36	17:36	18:30						20:28			21:22			21:59	15	05:42 (3)
17	08:34	07:43	06:38						06:23			05:22			04:54		05:27 (3)
	16:38	17:38	18:32						20:30			21:23			21:59	15	05:42 (3)
18	08:33	07:41	06:36						06:21			05:21			04:54		05:27 (3)
	16:40	17:40	18:34						20:32			21:25			22:00	15	05:42 (3)
19	08:32	07:39	06:33						06:19			05:19			04:54		05:27 (3)
	16:42	17:42	18:36						20:33			21:27			22:00	15	05:42 (3)
20	08:31	07:37	06:31						06:16			05:18			04:55		05:27 (3)
	16:43	17:44	18:38						20:35			21:28			22:00	16	05:43 (3)
21	08:30	07:34	06:28						06:14			05:16			04:55		05:28 (3)
	16:45	17:46	18:40						20:37			21:30			22:01	16	05:44 (3)
22	08:29	07:32	06:26						06:12			05:15			04:55		05:28 (3)
	16:47	17:48	18:42						20:39			21:31			22:01	16	05:44 (3)
23	08:27	07:30	06:23						06:09			05:13			04:55		05:28 (3)
	16:49	17:50	18:44						20:41			21:33			22:01	15	05:43 (3)
24	08:26	07:28	06:21						06:07			05:12			04:55		05:28 (3)
	16:51	17:52	18:45						20:43			21:34			22:01	15	05:43 (3)
25	08:25	07:25	06:18						06:05			05:11			04:56		05:29 (3)
	16:53	17:54	18:47						20:44			21:36			22:01	15	05:44 (3)
26	08:23	07:23	06:16						06:03			05:10			04:56		05:29 (3)
	16:54	17:56	18:49						20:46			21:37			22:01	15	05:44 (3)
27	08:22	07:21	06:14						06:01			05:08	05:38 (3)		04:57		05:30 (3)
	16:56	17:58	18:51						20:48			21:39	1	05:39 (3)	22:01	15	05:45 (3)
28	08:20	07:19	06:11						05:59			05:07		05:37 (3)	04:57		05:30 (3)
	16:58	18:00	18:53						20:50			21:40	2	05:39 (3)	22:01	15	05:45 (3)
29	08:19		07:09						05:56			05:06		05:36 (3)	04:58		05:31 (3)
	17:00		19:55						20:52			21:41	3	05:39 (3)	22:01	14	05:45 (3)
30	08:17		07:06						05:54			05:05		05:35 (3)	04:58		05:31 (3)
	17:02		19:56						20:54			21:43	4	05:39 (3)	22:00	14	05:45 (3)
31	08:15		07:04					07:27 (5)				05:04		05:34 (3)			
	17:04		19:58	2				07:29 (5)				21:44	6	05:40 (3)			
Potential sun hours	250	273	367					420				494			510		
Total, worst case				2				169				16			399		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.67				0.67				0.66			0.66		
Total reduction				0.18				0.24				0.25			0.21		
Total, real				0				40				4			84		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HT - H228

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 14	05:32 (3) 05:46 (3) 21:25	06:33 20:18 16	07:06 (5) 07:22 (5) 19:05	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 13	05:33 (3) 05:46 (3) 21:23	06:35 20:16 19	07:04 (5) 07:23 (5) 19:02	07:26 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 13	05:33 (3) 05:46 (3) 21:21	06:37 20:14 21	07:04 (5) 07:25 (5) 19:00	07:28 16:50 16:09	08:22 16:09 16:09
4	05:01 21:59 12	05:34 (3) 05:46 (3) 21:19	06:38 20:11 19	07:05 (5) 07:24 (5) 18:57	07:30 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 12	05:35 (3) 05:47 (3) 21:17	06:40 20:09 18	07:07 (5) 07:25 (5) 18:55	07:32 16:46 16:07	08:25 16:07 16:07
6	05:03 21:58 11	05:36 (3) 05:47 (3) 21:16	06:42 20:06 16	07:09 (5) 07:25 (5) 18:53	07:35 16:45 16:07	08:26 16:07 16:07
7	05:04 21:57 10	05:37 (3) 05:47 (3) 21:14	06:44 20:04 14	07:10 (5) 07:24 (5) 18:50	07:36 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 10	05:38 (3) 05:48 (3) 21:12	06:45 20:01 12	07:12 (5) 07:24 (5) 18:48	07:38 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 9	05:39 (3) 05:48 (3) 21:10	06:47 19:59 10	07:14 (5) 07:24 (5) 18:45	07:40 16:39 16:06	08:30 16:06 16:06
10	05:07 21:55 8	05:40 (3) 05:48 (3) 21:08	06:49 19:57 8	07:16 (5) 07:24 (5) 18:43	07:42 16:37 16:05	08:32 16:05 16:05
11	05:08 21:54 7	05:41 (3) 05:48 (3) 21:06	06:51 19:54 5	07:17 (5) 07:22 (5) 18:41	07:44 16:36 16:05	08:33 16:05 16:05
12	05:10 21:53 6	05:42 (3) 05:48 (3) 21:03	06:52 19:52 2	07:19 (5) 07:21 (5) 18:38	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 5	05:43 (3) 05:48 (3) 21:01	06:54 19:49 1	07:21 (5) 18:36 16:32	07:47 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 4	05:44 (3) 05:48 (3) 20:59	06:56 19:47 1	07:23 (5) 18:34 16:31	07:49 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 3	05:45 (3) 05:48 (3) 20:57	06:58 19:44 1	07:25 (5) 18:31 16:29	07:51 16:29 16:05	08:37 16:05 16:05
16	05:15 21:49 1	05:47 (3) 05:48 (3) 20:55	06:59 19:42 1	07:27 (5) 18:29 16:28	07:53 16:28 16:05	08:38 16:05 16:05
17	05:16 21:47 1	06:00 20:53 1	07:01 19:39 1	07:29 (5) 18:27 16:26	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 1	06:01 20:51 1	07:03 19:37 1	07:31 (5) 18:24 16:25	07:57 16:25 16:05	08:40 16:05 16:05
19	05:19 21:45 1	06:02 20:48 1	07:05 19:34 1	07:33 (5) 18:22 16:23	07:59 16:23 16:05	08:41 16:05 16:05
20	05:20 21:44 1	06:03 20:46 1	07:07 19:32 1	07:35 (5) 18:20 16:22	08:01 16:22 16:06	08:42 16:06 16:06
21	05:21 21:42 1	06:04 20:44 1	07:08 19:29 1	07:37 (5) 18:18 16:21	08:03 16:21 16:06	08:43 16:06 16:06
22	05:23 21:41 1	06:05 20:42 1	07:10 19:27 1	07:39 (5) 18:15 16:19	08:05 16:19 16:07	08:44 16:07 16:07
23	05:24 21:39 1	06:06 20:39 1	07:12 19:24 1	07:41 (5) 18:13 16:18	08:07 16:18 16:07	08:45 16:07 16:07
24	05:26 21:38 1	06:07 20:37 1	07:14 19:22 1	07:43 (5) 18:11 16:17	08:09 16:17 16:08	08:46 16:08 16:08
25	05:28 21:36 1	06:08 20:35 1	07:15 19:19 1	07:45 (5) 17:09 16:16	08:11 16:16 16:08	08:47 16:08 16:08
26	05:29 21:35 1	06:09 20:33 1	07:17 19:17 1	07:47 (5) 17:07 16:15	08:13 16:15 16:09	08:48 16:09 16:09
27	05:31 21:33 1	06:10 20:30 1	07:19 19:15 1	07:49 (5) 17:05 16:14	08:15 16:14 16:10	08:49 16:10 16:10
28	05:32 21:32 1	06:11 20:28 1	07:21 19:12 1	07:51 (5) 17:02 16:13	08:17 16:13 16:11	08:50 16:11 16:11
29	05:34 21:30 1	06:12 20:25 1	07:23 19:10 1	07:53 (5) 17:00 16:12	08:19 16:12 16:12	08:51 16:12 16:12
30	05:35 21:28 1	06:13 20:23 1	07:25 19:07 1	07:55 (5) 16:58 16:11	08:21 16:11 16:13	08:52 16:13 16:13
31	05:37 21:27 1	06:14 20:21 12	07:27 19:05 12	07:57 (5) 16:56 16:14	08:23 16:14 16:14	08:53 16:14 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	138	13	160			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.67	0.67			
Total reduction	0.21	0.23	0.22			
Total, real	29	3	35			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HU - H229

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December					
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:26 (1)	06:33	07:26	07:24	08:19			
2	16:15	17:06	18:02	20:00	20:56	17	06:35 (1)	21:45	22:00	21:25	12	06:38 (1)	20:18	19:05	16:54	16:10	
	08:44	08:12	07:14	06:59	05:50		06:16 (1)	05:02	05:00	05:40		06:24 (1)	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	19	06:35 (1)	21:47	22:00	21:23	16	06:40 (1)	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48		06:14 (1)	05:01	05:00	05:42		06:23 (1)	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	21	06:35 (1)	21:48	21:59	21:21	18	06:41 (1)	20:18	19:00	16:09		
4	08:43	08:09	07:09	06:54	05:46		06:12 (1)	05:00	05:01	05:44		06:22 (1)	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01	23	06:35 (1)	21:49	21:59	21:19	20	06:41 (1)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44		06:10 (1)	04:59	05:02	05:46		06:22 (1)	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03	24	06:34 (1)	21:50	21:58	21:18	21	06:43 (1)	20:09	18:55	16:46	16:07	
6	08:43	08:05	07:05	06:49	05:42		06:11 (1)	04:59	05:03	05:47		06:20 (1)	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:09	21:05	23	06:34 (1)	21:51	21:58	21:16	23	06:43 (1)	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40		06:11 (1)	04:58	05:04	05:49		06:20 (1)	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	23	06:34 (1)	21:52	21:57	21:14	24	06:44 (1)	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38		06:12 (1)	04:57	05:05	05:51		06:20 (1)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	21	06:33 (1)	21:53	21:56	21:12	24	06:44 (1)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	05:36		06:12 (1)	04:57	05:06	05:52		06:22 (1)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	19	06:31 (1)	21:54	21:56	21:10	22	06:44 (1)	19:59	18:45	16:39	16:06	
10	08:41	07:57	06:55	06:40	05:35		06:14 (1)	04:56	05:07	05:54		06:24 (1)	06:49	07:43	07:42	08:32	
	16:27	17:24	18:19	20:17	21:12	17	06:31 (1)	21:55	21:55	21:08	21	06:45 (1)	19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33		06:15 (1)	04:56	05:08	05:56		06:25 (1)	06:51	07:44	07:44	08:33	
	16:28	17:26	18:21	20:19	21:13	14	06:29 (1)	21:56	21:54	21:06	19	06:44 (1)	19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		06:16 (1)	04:56	05:10	05:58		06:27 (1)	06:52	07:46	07:46	08:34	
	16:30	17:28	18:23	20:21	21:15	11	06:27 (1)	21:56	21:53	21:04	17	06:44 (1)	19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:33	05:29		06:19 (1)	04:55	05:11	05:59		06:29 (1)	06:54	07:48	07:48	08:35	
	16:31	17:30	18:25	20:22	21:17	6	06:25 (1)	21:57	21:52	21:01	15	06:44 (1)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27			04:55	05:12	06:01		06:30 (1)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:19			21:58	21:51	20:59	13	06:43 (1)	19:47	18:34	16:31	16:05	
15	08:37	07:47	06:43	06:28	05:26			04:55	05:13	06:03		06:32 (1)	06:58	07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	21:20			21:58	21:50	20:57	10	06:42 (1)	19:44	18:31	16:29	16:05	
16	08:36	07:45	06:41	06:25	05:24			04:55	05:15	06:05		06:34 (1)	07:00	07:54	07:53	08:38	
	16:36	17:36	18:31	20:28	21:22			21:59	21:49	20:55	8	06:42 (1)	19:42	18:29	16:28	16:05	
17	08:35	07:43	06:38	06:23	05:22			04:54	05:16	06:06		06:35 (1)	07:01	07:56	07:55	08:39	
	16:38	17:38	18:32	20:30	21:24			21:59	21:48	20:53	5	06:40 (1)	19:39	18:27	16:26	16:05	
18	08:33	07:41	06:36	06:21	05:21			04:54	05:17	06:08		06:37 (1)	07:03	07:58	07:57	08:39	
	16:40	17:40	18:34	20:32	21:25			22:00	21:46	20:51	1	06:38 (1)	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:19	05:19			04:54	05:19	06:10			07:05	07:59	07:59	08:40	
	16:42	17:42	18:36	20:34	21:27			22:00	21:45	20:49			19:34	18:22	16:23	16:05	
20	08:31	07:37	06:31	06:16	05:18			04:55	05:20	06:12			07:07	08:01	08:01	08:41	
	16:43	17:44	18:38	20:35	21:28			22:00	21:44	20:46			19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16			04:55	05:21	06:14			07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30			22:01	21:42	20:44			19:29	18:18	16:21	16:06	
22	08:29	07:32	06:26	06:12	05:15			04:55	05:23	06:15			07:10	08:05	08:04	08:42	
	16:47	17:48	18:42	20:39	21:31			22:01	21:41	20:42			19:27	18:15	16:19	16:07	
23	08:27	07:30	06:23	06:10	05:13			04:55	05:24	06:17			07:12	08:07	08:06	08:42	
	16:49	17:50	18:44	20:41	21:33			22:01	21:40	20:39			19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12			04:55	05:26	06:19			07:14	08:09	08:08	08:43	
	16:51	17:52	18:45	20:43	21:35			22:01	21:38	20:37			19:22	18:11	16:17	16:08	
25	08:25	07:26	06:19	06:05	05:11			04:56	05:28	06:21			07:15	07:11	08:09	08:43	
	16:53	17:54	18:47	20:45	2	06:30 (1)		22:01	21:37	20:35			19:20	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:10			04:56	05:29	06:22			07:17	07:13	08:11	08:44	
	16:55	17:56	18:49	20:46	5	06:33 (1)		22:01	21:35	20:33			17:17	17:07	18:15	16:09	
27	08:22	07:21	06:14	06:01	05:08			04:57	05:31	06:24			07:19	07:15	08:13	08:44	
	16:56	17:58	18:51	20:48	8	06:34 (1)		22:01	21:33	20:30			19:15	17:05	16:14	16:10	
28	08:20	07:19	06:11	05:59	05:07			04:57	05:32	06:26			07:21	07:17	08:15	08:44	
	16:58	18:00	18:53	20:50	11	06:35 (1)		22:01	21:32	20:28			19:12	17:02	16:13	16:11	
29	08:19	07:19	06:12	05:56	05:06			04:58	05:34	06:28			07:23	07:19	08:16	08:44	
	17:00	19:55	20:52	13	06:35 (1)			22:01	21:30	20:26			19:10	17:00	16:12	16:12	
30	08:17	07:06	05:54	05:05	06:20 (1)			04:58	05:36	06:29			07:24	07:21	08:18	08:44	
	17:02	19:57	20:54	15	06:35 (1)			22:00	21:28	20:23			19:07	16:58	16:11	16:13	
31	08:15	07:04			05:04				05:37		06:28 (1)		06:31	07:22		08:44	
	17:04	19:58			21:44				21:27	9	06:37 (1)		20:21	16:56		16:14	
Potential sun hours	250	273	367	420	494			510		512			460	382	328	259	233
Total, worst case				54		238				9			289				
Sun reduction				0.35		0.38				0.32			0.34				
Oper. time red.				1.00		1.00				1.00			1.00				
Wind dir. red.				0.68		0.68				0.68			0.68				
Total reduction				0.24		0.26				0.22			0.23				
Total, real				13		61				2			67				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HV - H230

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August		September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02		07:01 20:00	07:25 (1) 20:56	05:52 21:45	05:03 22:00	04:59 21:25	05:39 21:25	06:33 20:18	07:08 (1) 21:29 (1)	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04		06:59 20:02	07:23 (1) 20:57	05:50 21:47	05:02 22:00	05:00 21:23	05:40 21:23	06:35 20:16	07:07 (1) 21:29 (1)	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06		06:57 20:04	07:20 (1) 20:59	05:48 21:48	05:01 21:59	05:00 21:21	05:42 21:21	06:37 20:14	07:06 (1) 21:30 (1)	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08		06:54 20:06	07:18 (1) 21:01	05:46 21:49	05:00 21:59	05:01 21:19	05:44 21:19	06:38 20:11	07:05 (1) 21:29 (1)	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10		06:52 20:08	07:15 (1) 21:03	05:44 21:50	05:02 21:58	05:02 21:18	05:46 21:18	06:40 20:09	07:07 (1) 21:30 (1)	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12		06:49 20:10	07:13 (1) 21:05	05:42 21:51	05:03 21:58	05:03 21:16	05:47 21:16	06:42 20:06	07:09 (1) 21:30 (1)	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13		06:47 20:11	07:11 (1) 21:06	05:40 21:52	05:04 21:57	05:04 21:14	05:49 21:14	06:44 20:04	07:10 (1) 21:28 (1)	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15		06:44 20:13	07:08 (1) 21:08	05:38 21:53	05:05 21:56	05:05 21:12	05:51 21:12	06:45 20:02	07:12 (1) 21:28 (1)	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17		06:42 20:15	07:08 (1) 21:10	05:36 21:54	05:06 21:56	05:06 21:10	05:52 21:10	06:47 19:59	07:14 (1) 21:27 (1)	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19		06:40 20:17	07:09 (1) 21:12	05:35 21:55	05:07 21:55	05:07 21:08	05:54 21:08	06:49 19:57	07:16 (1) 21:27 (1)	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21		06:37 20:19	07:09 (1) 21:13	05:33 21:56	05:08 21:54	05:08 21:06	05:56 21:06	06:51 19:54	07:17 (1) 21:24 (1)	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23		06:35 20:21	07:10 (1) 21:15	05:31 21:56	05:09 21:53	05:09 21:04	05:58 21:04	06:52 19:52	07:19 (1) 21:23 (1)	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25		06:33 20:22	07:11 (1) 21:17	05:29 21:57	05:11 21:52	05:11 21:02	05:59 21:02	06:54 19:49		07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27		06:30 20:24	07:13 (1) 21:19	05:27 21:58	05:12 21:51	06:01 20:59	06:01 20:59	06:56 19:47		07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29		06:28 20:26		05:26 21:58	05:13 21:50	06:03 20:57	06:03 20:57	06:58 19:44		07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31		06:25 20:28		05:24 21:59	05:15 21:49	06:05 20:55	06:05 20:55	07:00 19:42		07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32		06:23 20:30		05:22 21:59	05:16 21:48	06:06 20:53	06:06 20:53	07:01 19:39		07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34		06:21 20:32		05:21 22:00	05:17 21:46	06:08 20:51	06:08 20:51	07:03 19:37		07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34		05:19 22:00	05:19 21:45	06:10 20:49	06:10 20:49	07:05 19:34		07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35		05:18 22:01	05:20 21:44	06:12 20:46	06:12 20:46	07:07 19:32		08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37		05:16 21:30	05:21 22:01	06:14 20:44	06:14 20:44	07:08 19:29		08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39		05:15 21:32	05:23 22:01	06:15 21:41	06:15 20:42	07:10 19:27		08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44		06:10 20:41		05:13 21:33	05:24 22:01	06:17 21:40	06:17 20:40	07:12 19:24		08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43		05:12 21:35	05:26 22:01	06:19 21:38	06:19 20:37	07:14 19:22		08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45		05:11 21:36	05:28 22:01	06:21 21:37	06:21 20:35	07:15 19:20		07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49		06:03 20:46		05:10 21:37	05:29 22:01	06:22 21:35	06:22 20:33	07:13 19:17		07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51		06:01 20:48		05:08 21:39	05:31 22:01	06:24 21:33	06:24 20:30	07:19 19:15		07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53		05:59 20:50		05:07 21:40	05:32 22:01	06:26 21:32	06:26 20:28	07:21 19:12		07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55		05:56 20:52		05:06 21:42	05:34 22:01	06:28 21:30	06:28 20:26	07:23 10 07:24 (1)		07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57		05:54 20:54		05:05 21:43	05:36 22:01	06:29 21:28	06:29 20:23	07:24 (1) 16 07:27 (1)		07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	07:27 (1) 07:30 (1)		05:04 21:44		05:37 21:27	06:31 20:21	06:31 20:21	07:10 (1) 18 07:28 (1)		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	3	420		494	510	512	460	382		328	259	233
Total, worst case				3	242					44	204				
Sun reduction				0.27	0.35					0.34	0.32				
Oper. time red.				1.00	1.00					1.00	1.00				
Wind dir. red.				0.68	0.68					0.68	0.68				
Total reduction				0.18	0.24					0.23	0.22				
Total, real				1	58					10	44				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HW - H231

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 18:00 (1)	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 18:01 (1)	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:20 (1) 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 18:00 (1)	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	08:17 (1) 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 18:01 (1)	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:15 (1) 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 18:00 (1)	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	08:33 (1) 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 18:00 (1)	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:34 (1) 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 18:00 (1)	05:40 21:06	05:04 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:35 (1) 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 18:00 (1)	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	08:36 (1) 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 18:00 (1)	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:37 (1) 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 18:00 (1)	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:38 (1) 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 18:00 (1)	05:33 21:13	04:55 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:39 (1) 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:53	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:40 (1) 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:52	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:41 (1) 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:42 (1) 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:43 (1) 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	08:44 (1) 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	08:45 (1) 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:46 (1) 16:25	08:40 16:10
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	08:47 (1) 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:48 (1) 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:49 (1) 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:50 (1) 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:51 (1) 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:52 (1) 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 18:17	08:53 (1) 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 18:17	08:54 (1) 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 18:15	08:55 (1) 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 18:12	08:56 (1) 16:13	08:44 16:11
29	08:19 17:00	07:09 17:55	07:09 18:53	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 18:07	08:57 (1) 16:12	08:44 16:12
30	08:17 17:02	07:06 17:57	07:06 18:54	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 18:05	08:58 (1) 16:11	08:44 16:13
31	08:16 17:04	07:04 17:58	07:04 18:58	05:04 21:44	05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	07:22 18:56	07:22 17:56	08:59 (1) 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction		45		230						282		
Oper. time red.		0.23		0.27						0.29		
Wind dir. red.		1.00		1.00						1.00		
Total reduction		0.65		0.65						0.65		
Total, real		0.15		0.18						0.19		
		7		40						53		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: HX - H232

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	08:02 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04	08:03 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	07:12	07:36 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06	08:03 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
4	08:43	08:09	07:09	07:36 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08	08:03 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	08:07	07:07	07:35 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
	16:20	17:14	18:10	08:02 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05	07:05	07:35 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12	08:02 (1)	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03	07:02	07:36 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13	08:02 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01	07:00	07:35 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15	08:01 (1)	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
9	08:41	07:59	06:58	07:36 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
	16:25	17:22	18:17	08:00 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06
10	08:41	07:57	06:55	07:37 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24	18:19	07:59 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55	06:53	07:38 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
	16:28	17:26	18:21	07:57 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
12	08:39	07:53	06:50	07:39 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:34
	16:30	17:28	18:23	07:55 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
13	08:38	07:51	06:48	07:42 (1)	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
	16:31	17:30	18:25	07:52 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:05
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	06:59	07:54	08:38
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:07
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:08
25	08:25	07:26	06:19	07:50 (1)	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:10
	16:53	17:54	18:47	07:57 (1)	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:08
26	08:23	07:23	06:16	07:48 (1)	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11
	16:54	17:56	18:49	07:59 (1)	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:09
27	08:22	07:21	06:14	07:46 (1)	06:01	05:08	04:57	05:31	06:24	07:19	07:15	08:13
	16:56	17:58	18:51	08:01 (1)	20:48	21:39	22:01	21:33	20:30	19:15	17:05	16:10
28	08:20	07:19	06:11	07:43 (1)	05:59	05:07	04:57	05:32	06:26	07:21	07:17	08:15
	16:58	18:00	18:53	08:01 (1)	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:11
29	08:19		06:09		05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12
30	08:17		06:06		05:54	05:05	04:58	05:35	06:29	07:24	07:21	08:18
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	6	16:13
31	08:15		07:04			05:04		05:37	06:31		08:30 (1)	16:13
	17:04		19:58			21:44		21:27	20:21		16:56	16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		259
Total, worst case			296								347	233
Sun reduction		0.23	0.27							6	0.29	
Oper. time red.		1.00	1.00							1.00	1.00	
Wind dir. red.		0.65	0.65							0.65	0.65	
Total reduction		0.15	0.18							0.21	0.19	
Total, real		8	52							1	66	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: HY - H233

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	08:42 (1)	07:16	08:35 (1)	07:01	05:52	05:03			
	16:15	17:06	26 09:08 (1)	18:02	33 09:08 (1)	20:00	20:56	21:45			
2	08:44	08:12	08:40 (1)	07:14	08:37 (1)	06:59	05:50	05:02			
	16:16	17:08	29 09:09 (1)	18:04	29 09:06 (1)	20:02	20:57	21:47			
3	08:44	08:10	08:38 (1)	07:12	08:39 (1)	06:56	05:48	05:01			
	16:17	17:10	32 09:10 (1)	18:06	24 09:03 (1)	20:04	20:59	21:48			
4	08:43	08:09	08:36 (1)	07:09	08:42 (1)	06:54	05:46	05:00			
	16:18	17:12	36 09:12 (1)	18:08	18 09:00 (1)	20:06	21:01	21:49			
5	08:43	08:07	08:34 (1)	07:07	08:49 (1)	06:52	05:44	04:59			
	16:20	17:14	39 09:13 (1)	18:10	2 08:51 (1)	20:08	21:03	21:50			
6	08:43	08:05	08:32 (1)	07:05		06:49	05:42	04:59			
	16:21	17:16	42 09:14 (1)	18:11		20:09	21:05	21:51			
7	08:42	08:03	08:31 (1)	07:02		07:27 (2)	06:47	04:58			
	16:22	17:18	44 09:15 (1)	18:13	1 07:28 (2)	20:11	21:06	21:52			
8	08:42	08:01	08:31 (1)	07:00		07:24 (2)	06:44	04:57			
	16:24	17:20	44 09:15 (1)	18:15	5 07:29 (2)	20:13	21:08	21:53			
9	08:41	07:59	08:30 (1)	06:57		07:22 (2)	06:42	04:57			
	16:25	17:22	46 09:16 (1)	18:17	8 07:30 (2)	20:15	21:10	21:54			
10	08:41	07:57	08:30 (1)	06:55		07:19 (2)	06:40	04:56			
	16:27	17:24	47 09:17 (1)	18:19	10 07:29 (2)	20:17	21:12	21:55			
11	08:40	07:55	08:30 (1)	06:53		07:17 (2)	06:37	04:56			
	16:28	17:26	48 09:18 (1)	18:21	13 07:30 (2)	20:19	21:13	21:56			
12	08:39	07:53	08:29 (1)	06:50		07:14 (2)	06:35	04:55			
	16:30	17:28	49 09:18 (1)	18:23	15 07:29 (2)	20:21	21:15	21:56			
13	08:38	07:51	08:29 (1)	06:48		07:12 (2)	06:32	04:55			
	16:31	17:30	50 09:19 (1)	18:25	17 07:29 (2)	20:22	21:17	21:57			
14	08:37	07:49	08:28 (1)	06:45		07:09 (2)	06:30	04:55			
	16:33	17:32	50 09:18 (1)	18:27	18 07:27 (2)	20:24	21:19	21:58			
15	08:37	07:47	08:28 (1)	06:43		07:09 (2)	06:28	04:55			
	16:35	17:34	50 09:18 (1)	18:29	18 07:27 (2)	20:26	21:20	21:58			
16	08:36	07:45	08:28 (1)	06:41		07:09 (2)	06:25	04:54			
	16:36	17:36	51 09:19 (1)	18:30	16 07:25 (2)	20:28	21:22	21:59			
17	08:35	07:43	08:28 (1)	06:38		07:11 (2)	06:23	04:54			
	16:38	17:38	51 09:19 (1)	18:32	12 07:23 (2)	20:30	21:24	21:59			
18	08:33	07:41	08:29 (1)	06:36		07:13 (2)	06:21	04:54			
	16:40	17:40	50 09:19 (1)	18:34	6 07:19 (2)	20:32	21:25	22:00			
19	08:32	07:39	08:28 (1)	06:33		06:18	05:19	04:54			
	16:41	17:42	50 09:18 (1)	18:36		20:33	21:27	22:00			
20	08:31	07:37	08:29 (1)	06:31		06:16	05:18	04:54			
	16:43	17:44	49 09:18 (1)	18:38		20:35	21:28	22:00			
21	08:30	07:34	08:29 (1)	06:28		06:14	05:16	04:55			
	16:45	17:46	49 09:18 (1)	18:40		20:37	21:30	22:01			
22	08:29	07:32	08:29 (1)	06:26		06:12	05:15	04:55			
	16:47	17:48	47 09:16 (1)	18:42		20:39	21:31	22:01			
23	08:27	07:30	08:30 (1)	06:23		06:09	05:13	04:55			
	16:49	17:50	46 09:16 (1)	18:44		20:41	21:33	22:01			
24	08:26	07:28	08:30 (1)	06:21		06:07	05:12	04:55			
	16:51	17:52	45 09:15 (1)	18:45		20:43	21:35	22:01			
25	08:25	07:26	08:30 (1)	06:18		06:05	05:11	04:56			
	16:53	17:54	44 09:14 (1)	18:47		20:45	21:36	22:01			
26	08:23	07:23	08:32 (1)	06:16		06:03	05:09	04:56			
	16:54	17:56	41 09:13 (1)	18:49		20:46	21:37	22:01			
27	08:22	08:51 (3)	07:21	06:14		06:01	05:08	04:56			
	16:56	1 08:52 (3)	17:58	39 09:12 (1)	18:51	20:48	21:39	22:01			
28	08:20	08:49 (1)	07:19	06:11		05:59	05:07	04:57			
	16:58	7 08:56 (1)	18:00	37 09:10 (1)	18:53	20:50	21:40	22:01			
29	08:19	08:47 (1)		07:09		05:56	05:06	04:58			
	17:00	13 09:00 (1)		19:55		20:52	21:42	22:01			
30	08:17	08:45 (1)		07:06		05:54	05:05	04:58			
	17:02	18 09:03 (1)		19:57		20:54	21:43	22:01			
31	08:15	08:44 (1)		07:04			05:04				
	17:04	22 09:06 (1)		19:58			21:44				
Potential sun hours	250		273	367		420	494	510			
Total, worst case	61		1231	245							
Sun reduction	0.24		0.23	0.27							
Oper. time red.	1.00		1.00	1.00							
Wind dir. red.	0.61		0.61	0.64							
Total reduction	0.15		0.14	0.17							
Total, real	9		175	42							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: HY - H233

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (2) 16:54	08:00 (1) 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (2) 16:52	08:00 (1) 16:09
3	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:56 (2) 16:50	08:01 (1) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:58 (2) 16:48	08:01 (1) 16:08
5	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	08:00 (2) 16:46	08:02 (1) 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:02 (2) 16:45	08:04 (1) 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:06 (1) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:09 (1) 16:06
9	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	09:19 (1) 16:39	08:11 (1) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	09:15 (1) 16:37	08:13 (1) 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	09:12 (1) 16:36	08:15 (1) 16:05
12	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	09:09 (1) 16:34	08:17 (1) 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	09:07 (1) 16:32	08:19 (1) 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	09:06 (1) 16:31	08:21 (1) 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	09:05 (1) 16:29	08:23 (3) 16:05
16	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	09:04 (1) 16:28	08:24 (3) 16:05
17	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	09:02 (1) 16:26	08:25 (3) 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	09:01 (1) 16:25	08:26 (3) 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	09:01 (1) 16:23	08:27 (3) 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	09:00 (1) 16:22	08:28 (3) 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:59 (1) 16:21	08:29 (3) 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:59 (1) 16:19	08:30 (3) 16:07
23	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:58 (1) 16:18	08:31 (3) 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:58 (1) 16:17	08:32 (3) 16:08
25	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	07:58 (1) 16:16	08:33 (3) 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	07:58 (1) 16:15	08:34 (3) 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:04	07:58 (1) 16:14	08:35 (3) 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	07:58 (1) 16:13	08:36 (3) 16:11
29	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	07:58 (1) 16:12	08:37 (3) 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	07:59 (1) 16:11	08:38 (3) 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56	07:59 (1) 16:10	08:39 (3) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case			79	1028	438	
Sun reduction			0.32	0.29	0.27	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.66	0.61	0.61	
Total reduction			0.21	0.18	0.16	
Total, real			17	185	71	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Assumptions for shadow calculations

Shadow receptor: HZ - H234

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	12:16 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	12:50 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54
3	08:44	12:18 (1)	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28
4	16:16	12:51 (1)	17:08	08:44 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
5	08:44	12:18 (1)	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
6	16:17	12:50 (1)	17:10	08:45 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
7	08:43	12:20 (1)	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32
8	16:18	12:50 (1)	17:12	08:46 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
9	08:43	12:21 (1)	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33
10	16:20	12:49 (1)	17:14	08:47 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55
11	08:43	12:22 (1)	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35
12	16:21	12:49 (1)	17:16	08:48 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53
13	08:42	12:24 (1)	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37
14	16:22	12:48 (1)	17:18	08:49 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
15	08:42	12:25 (1)	08:01	08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
16	16:24	12:47 (1)	17:20	08:49 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48
17	08:41	12:28 (1)	07:59	08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
18	16:25	12:47 (1)	17:22	08:50 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45
19	08:40	12:30 (1)	07:57	08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43
20	16:27	12:45 (1)	17:24	08:50 (2)	18:19	20:17	21:12	21:55	21:58	21:08	19:57	18:43
21	08:40	12:34 (1)	07:55	08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
22	16:28	12:42 (1)	17:26	08:50 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41
23	08:39	12:30 (1)	07:53	08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46
24	16:30	12:28 (1)	17:28	08:51 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38
25	08:38	12:29 (1)	07:51	08:20 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48
26	16:31	12:30 (1)	17:30	08:50 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36
27	08:37	12:31 (1)	07:49	08:20 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
28	16:33	12:32 (1)	17:32	08:49 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33
29	08:36	12:33 (1)	07:47	08:21 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52
30	16:34	12:34 (1)	17:34	08:49 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31
31	08:36	12:35 (1)	07:45	08:21 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54
32	16:36	12:36 (1)	17:36	08:49 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29
33	08:35	12:37 (1)	07:43	08:22 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56
34	16:38	12:38 (1)	17:38	08:48 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27
35	08:33	12:39 (1)	07:41	08:23 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57
36	16:40	12:40 (1)	17:40	08:46 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24
37	08:32	12:41 (1)	07:39	08:24 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
38	16:41	12:42 (1)	17:42	08:45 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22
39	08:31	12:43 (1)	07:37	08:26 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
40	16:43	12:44 (1)	17:44	08:43 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20
41	08:30	12:45 (1)	07:34	08:29 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03
42	16:45	12:46 (1)	17:46	08:40 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18
43	08:29	12:47 (1)	07:32	08:27 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05
44	16:47	12:48 (1)	17:48	08:42 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15
45	08:27	12:49 (1)	07:30	08:23 (2)	06:09	05:13	04:55	05:24	06:17	07:12	08:07	09:02
46	16:49	12:50 (1)	17:50	08:43 (2)	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13
47	08:26	12:51 (1)	07:28	08:21 (2)	06:07	05:12	04:55	05:26	06:19	07:14	08:09	09:04
48	16:51	12:52 (1)	17:52	08:45 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11
49	08:25	12:53 (1)	07:25	08:18 (2)	06:05	05:11	04:56	05:27	06:21	07:15	08:10	09:05
50	16:52	12:54 (1)	17:54	08:47 (2)	18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:08
51	08:23	12:55 (1)	07:23	08:16 (2)	06:03	05:09	04:56	05:29	06:22	07:17	08:12	09:07
52	16:54	12:56 (1)	17:56	08:49 (2)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:06
53	08:22	12:57 (1)	07:21	08:14 (2)	06:01	05:08	04:56	05:31	06:24	07:19	08:14	09:09
54	16:56	12:58 (1)	17:58	08:51 (2)	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04
55	08:20	12:59 (1)	07:19	08:11 (2)	05:58	05:07	04:57	05:32	06:26	07:21	08:16	09:11
56	16:58	13:00 (1)	18:00	08:53 (2)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02
57	08:19	13:01 (1)		08:54 (2)	18:54	20:51	21:41	22:02	21:33	20:29	19:13	18:03
58	17:00	13:02 (1)		08:55 (2)	18:55	20:52	21:42	22:03	21:34	20:30	19:14	18:04
59	08:17	13:03 (1)		08:56 (2)	18:56	20:53	21:43	22:04	21:35	20:31	19:15	18:05
60	17:02	13:04 (1)		08:57 (2)	18:57	20:54	21:44	22:05	21:36	20:32	19:16	18:06
61	08:15	13:05 (1)		08:58 (2)	18:58	20:55	21:45	22:06	21:37	20:33	19:17	18:07
62	17:04	13:06 (1)		08:59 (2)	18:59	20:56	21:46	22:07	21:38	20:34	19:18	18:08
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	272	412										1015
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.62	0.62										0.62
Total reduction	0.15	0.14										0.13
Total, real	41	60										131

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Assumptions for shadow calculations

Shadow receptor: IA - H235

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		13:10 (1)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26			07:24		08:11 (2)	08:19			13:11 (1)		
	16:15	32	13:42 (1)	17:06	30	09:12 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	29	08:40 (2)	16:10	4		13:15 (1)		
2	08:44		13:11 (1)	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28			07:26		08:11 (2)	08:21			13:07 (1)		
	16:16	31	13:42 (1)	17:08	33	09:13 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	30	08:41 (2)	16:09	13		13:20 (1)		
3	08:44		13:12 (1)	08:10	08:39 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30			07:28		08:10 (2)	08:22			13:05 (1)		
	16:17	30	13:42 (1)	17:10	34	09:13 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	32	08:42 (2)	16:08	17		13:22 (1)		
4	08:43		13:13 (1)	08:09	08:39 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32			07:30		08:09 (2)	08:24			13:04 (1)		
	16:18	29	13:42 (1)	17:12	34	09:13 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	33	08:42 (2)	16:08	20		13:24 (1)		
5	08:43		13:14 (1)	08:07	08:39 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33			07:32		08:09 (2)	08:25			13:02 (1)		
	16:20	27	13:41 (1)	17:14	34	09:13 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	33	08:42 (2)	16:07	23		13:25 (1)		
6	08:43		13:16 (1)	08:05	08:39 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35			07:34		08:09 (2)	08:27			13:02 (1)		
	16:21	25	13:41 (1)	17:16	33	09:12 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:44	33	08:42 (2)	16:07	25		13:27 (1)		
7	08:42		13:17 (1)	08:03	08:40 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37			07:36		08:08 (2)	08:28			13:01 (1)		
	16:22	23	13:40 (1)	17:18	32	09:12 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	34	08:42 (2)	16:06	27		13:28 (1)		
8	08:42		13:19 (1)	08:01	08:40 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39			07:38		08:09 (2)	08:29			13:02 (1)		
	16:24	20	13:39 (1)	17:20	32	09:12 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	34	08:43 (2)	16:06	28		13:30 (1)		
9	08:41		13:21 (1)	07:59	08:41 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41			07:40		08:11 (2)	08:30			13:01 (1)		
	16:25	18	13:39 (1)	17:22	30	09:11 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	32	08:43 (2)	16:05	30		13:31 (1)		
10	08:40		13:24 (1)	07:57	08:42 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43			07:42		08:13 (2)	08:32			13:01 (1)		
	16:27	13	13:37 (1)	17:24	29	09:11 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	30	08:43 (2)	16:05	30		13:31 (1)		
11	08:40		13:28 (1)	07:55	08:43 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44			07:44		08:15 (2)	08:33			13:00 (1)		
	16:28	5	13:33 (1)	17:26	27	09:10 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	28	08:43 (2)	16:05	32		13:32 (1)		
12	08:39			07:53	08:44 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46			07:46		08:17 (2)	08:34			13:00 (1)		
	16:30			17:28	25	09:09 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	26	08:43 (2)	16:05	33		13:33 (1)		
13	08:38			07:51	08:45 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48			07:48		08:19 (2)	08:35			13:01 (1)		
	16:31			17:30	21	09:06 (2)	18:17	20:22	21:17	21:57	21:54	21:07	19:49	18:36		16:32	23	08:42 (2)	16:05	34		13:35 (1)		
14	08:37			07:49	08:47 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50			07:49		08:21 (2)	08:36			13:01 (1)		
	16:33			17:32	17	09:04 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31	21	08:42 (2)	16:05	34		13:35 (1)		
15	08:36			07:47	08:50 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52			07:51		08:23 (2)	08:37			13:01 (1)		
	16:34			17:34	11	09:01 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	19	08:42 (2)	16:05	35		13:36 (1)		
16	08:36			07:45		06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54			07:53		08:25 (2)	08:38			13:01 (1)		
	16:36			17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29			16:28	16	08:41 (2)	16:05	35		13:36 (1)		
17	08:34			07:43		08:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56			07:55		08:27 (2)	08:39			13:01 (1)		
	16:38			17:38		18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27			16:26	14	08:41 (2)	16:05	36		13:37 (1)		
18	08:33			07:41		08:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57			07:57		08:29 (2)	08:39			13:02 (1)		
	16:40			17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24			16:25	11	08:40 (2)	16:05	36		13:38 (1)		
19	08:32			07:39		08:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59			07:59		08:31 (2)	08:40			13:02 (1)		
	16:41			17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22			16:23	8	08:39 (2)	16:05	36		13:38 (1)		
20	08:31			07:37		08:31	06:16	05:18	04:54	05:21	06:12	07:06	08:01			08:01		08:33 (2)	08:41			13:03 (1)		
	16:43			17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20			16:22	5	08:38 (2)	16:06	36		13:38 (1)		
21	08:30		09:00 (2)	07:34		08:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03			08:02		08:35 (2)	08:41			13:03 (1)		
	16:45	2	09:02 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17			16:20	2	08:37 (2)	16:06	36		13:39 (1)		
22	08:29		08:58 (2)	07:32		08:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05			08:04			08:42			13:03 (1)		
	16:47	5	09:03 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15			16:19			16:07	36		13:39 (1)		
23	08:27		08:57 (2)	07:30		08:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07			08:06			08:42			13:04 (1)		
	16:49	8	09:05 (2)	17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13			16:18			16:07	36		13:40 (1)		
24	08:26		08:55 (2)	07:28		08:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09			08:08			08:43			13:04 (1)		
	16:51	11	09:06 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11			16:17			16:08	36		13:40 (1)		
25	08:25		08:54 (2)	07:25		08:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11			08:09			08:43			13:04 (1)		
	16:52	14	09:08 (2)	17:54		18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09			16:16			16:08	37		13:41 (1)		
26	08:23		08:52 (2)	07:23		08:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13			08:11			08:44			13:06 (1)		
	16:54	16	09:08 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07			16:15			16:09	36		13:42 (1)		
27	08:22		08:51 (2)	07:21		08:14	06:01	05:08	04:54	05:26	06:24	07:19	07:15			08:13		08:32 (2)	08:41			13:06 (1)		
	16:56	19	09:10 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	13		08:19 (2)		08:32 (2)	16:14			16:10	36	
28	08:20		08:49 (2)	07:19		08:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17			08:16 (2)		08:14	08:44			13:07 (1)		
	16:58	21	09:10 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	18		08:34 (2)		16:13	16:11	35		13:42 (1)		
29	08:19		08:47 (2)			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19			08:14 (2)		08:16	08:44			13:08 (1)		
	17:00	24	09:11 (2)			19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	22		08:36 (2)		16:12	16:11	34		13:42 (1)		
30	08:17		08:45 (2)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20			08:13 (2)		08:18	08:44			13:09 (1)		
	17:02	26	09:11 (2)			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	25										

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Assumptions for shadow calculations

Shadow receptor: IB - H236

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	13:12 (1)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:13 (2)	08:19	13:12 (1)								
	16:15	33	13:45 (1)	17:06	32	09:14 (2)	18:02	20:00	20:55	21:45	22:00	19:05	16:54	28	08:41 (2)	16:10	7							
2	08:44	13:14 (1)	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26		08:12 (2)	08:21								
	16:16	31	13:45 (1)	17:08	34	09:14 (2)	18:04	20:02	20:57	21:47	22:00	19:02	16:52	30	08:42 (2)	16:09	14							
3	08:44	13:14 (1)	08:10	08:40 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:11 (2)	08:22								
	16:17	30	13:44 (1)	17:10	30	09:14 (2)	18:06	20:04	20:59	21:48	21:59	19:00	16:50	32	08:43 (2)	16:08	18							
4	08:43	13:16 (1)	08:09	08:40 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:11 (2)	08:24								
	16:18	28	13:44 (1)	17:12	34	09:14 (2)	18:08	20:06	21:01	21:49	21:19	18:57	16:48	32	08:43 (2)	16:08	21							
5	08:43	13:16 (1)	08:07	08:40 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:10 (2)	08:25								
	16:20	28	13:44 (1)	17:14	34	09:14 (2)	18:09	20:08	21:03	21:50	21:58	18:55	16:46	33	08:43 (2)	16:07	24							
6	08:43	13:18 (1)	08:05	08:41 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:10 (2)	08:27								
	16:21	26	13:44 (1)	17:16	33	09:14 (2)	18:11	20:09	21:05	21:51	21:58	18:53	16:44	34	08:44 (2)	16:07	26							
7	08:42	13:19 (1)	08:03	08:41 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36		08:10 (2)	08:28								
	16:22	24	13:43 (1)	17:18	32	09:13 (2)	18:13	20:11	21:06	21:52	21:57	18:50	16:43	34	08:44 (2)	16:06	28							
8	08:42	13:21 (1)	08:01	08:42 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38		08:11 (2)	08:29								
	16:24	21	13:42 (1)	17:20	31	09:13 (2)	18:15	20:13	21:08	21:53	21:56	18:48	16:41	34	08:45 (2)	16:06	29							
9	08:41	13:23 (1)	07:59	08:43 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:11 (2)	08:30								
	16:25	19	13:42 (1)	17:22	29	09:12 (2)	18:17	20:15	21:10	21:54	21:56	18:45	16:39	34	08:45 (2)	16:05	30							
10	08:40	13:26 (1)	07:57	08:44 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42		08:13 (2)	08:32								
	16:27	14	13:40 (1)	17:24	28	09:12 (2)	18:19	20:17	21:12	21:55	21:58	18:43	16:37	32	08:45 (2)	16:05	31							
11	08:40	13:29 (1)	07:55	08:45 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44		08:15 (2)	08:33								
	16:28	8	13:37 (1)	17:26	26	09:11 (2)	18:13	20:11	21:06	21:54	21:59	18:44	16:36	30	08:45 (2)	16:05	33							
12	08:39		07:53	08:46 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46		08:17 (2)	08:34								
	16:30		17:28	24	09:10 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	16:34	27	08:44 (2)	16:05	33							
13	08:38		07:51	08:47 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48		08:19 (2)	08:35								
	16:31		17:30	20	09:07 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	16:32	25	08:44 (2)	16:05	34							
14	08:37		07:49	08:49 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49		08:21 (2)	08:36								
	16:33		17:32	16	09:05 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	16:31	23	08:44 (2)	16:05	35							
15	08:36		07:47	08:53 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51		08:23 (2)	08:37								
	16:34		17:34	8	09:01 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	16:29	20	08:43 (2)	16:05	35							
16	08:36		07:45		06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53		08:25 (2)	08:38								
	16:36		17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	18	08:43 (2)	16:05	35							
17	08:34		07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55		08:27 (2)	08:39								
	16:38		17:38		18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	15	08:42 (2)	16:05	36							
18	08:33		07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57		08:29 (2)	08:39								
	16:40		17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:14	16:25	13	08:42 (2)	16:05	36							
19	08:32		07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59		08:31 (2)	08:40								
	16:41		17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	10	08:41 (2)	16:05	36							
20	08:31		07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01		08:33 (2)	08:41								
	16:43	1	09:02 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	7	08:40 (2)	16:06	37							
21	08:30		09:00 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02		08:35 (2)	08:41								
	16:45	4	09:04 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	5	08:40 (2)	16:06	37							
22	08:29		08:58 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		08:37 (2)	08:42								
	16:47	7	09:05 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	2	08:39 (2)	16:07	37							
23	08:27		08:57 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06			08:42								
	16:49	10	09:07 (2)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18			16:07	37							
24	08:26		08:55 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08			08:43								
	16:51	13	09:08 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17			16:08								
25	08:25		08:54 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:09	08:09			16:08								
	16:52	15	09:09 (2)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16			16:08	36							
26	08:23		08:52 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11			08:44								
	16:54	18	09:10 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15			16:09	36							
27	08:22		08:51 (2)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13		08:21 (2)									
	16:56	20	09:11 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	11		08:32 (2)	16:14								
28	08:20		08:49 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:18		08:18 (2)	16:14								
	16:58	23	09:12 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	17		08:35 (2)	16:13								
29	08:19		08:47 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16		08:16 (2)	16:16								
	17:00	25	09:12 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	21		08:37 (2)	16:12								
30	08:17		08:45 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:14		08:14 (2)	16:18								
	17:02	27	09:12 (2)		19:56	20:54	21:43	22:00	21:28	20:23	19:07		16:58	24	08:38 (2)	16:11								
31	08:15		08:44 (2)		07:04	05:54	05:04		05:37	06:31	07:27		08:14		08:14 (2)									
	17:04	30	09:14 (2)		19:58	21:44			20:27	20:21		16:56	27		08:41 (2)									
Potential sun hours	250		273		367		420		494		510		512		460		382		328		259		100	
Total, worst case	455		415																			518		971
Sun reduction	0.24		0.23																			0.29		0.21
Oper. time red.	1.00		1.00										</											

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IC - H237

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: ID - H238

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December																						
1	08:44	08:14	07:16	07:01	05:52	05:03	20:11 (5)	04:59	20:17 (5)	05:39	20:29 (5)	06:33	07:26	07:24	08:19																			
2	16:15	17:06	18:02	20:00	20:55	21:45	54	21:05 (5)	22:00	55	21:12 (5)	21:25	24	20:53 (5)	20:18	19:05	16:54	16:10																
3	08:43	08:12	07:14	06:59	05:50	05:02	20:12 (5)	05:00	20:18 (5)	05:40	20:31 (5)	06:35	07:28	07:26	08:21	16:16	17:08	18:04	20:02	20:57	21:48	54	21:06 (5)	22:00	54	21:12 (5)	21:23	21	20:52 (5)	20:16	19:02	16:52	16:09	
4	08:43	08:10	07:12	06:56	05:48	05:01	20:12 (5)	05:00	20:17 (5)	05:42	20:32 (5)	06:36	07:30	07:28	08:22	16:17	17:10	18:06	20:04	20:59	21:48	54	21:06 (5)	21:59	55	21:12 (5)	21:21	18	20:50 (5)	20:13	19:00	16:50	16:08	
5	08:42	08:08	07:09	06:54	05:46	05:00	20:11 (5)	05:01	20:18 (5)	05:44	20:34 (5)	06:38	07:31	07:30	08:24	16:18	17:12	18:08	20:06	21:01	21:49	54	21:06 (5)	21:59	54	21:12 (5)	21:19	14	20:48 (5)	20:11	18:57	16:48	16:08	
6	08:43	08:07	07:07	06:51	05:44	04:59	20:12 (5)	05:02	20:18 (5)	05:45	20:35 (5)	06:40	07:33	07:32	08:25	16:20	17:14	18:09	20:07	21:03	21:50	55	21:07 (5)	21:58	54	21:12 (5)	21:17	11	20:46 (5)	20:09	18:55	16:46	16:07	
7	08:42	08:05	07:04	06:49	05:42	20:31 (5)	04:59	20:12 (5)	05:03	20:18 (5)	05:47	20:38 (5)	06:42	07:35	07:34	08:26	16:21	17:16	18:11	20:09	21:04	2	20:33 (5)	21:51	54	21:06 (5)	21:57	55	21:13 (5)	21:15	20:06	18:52	16:44	16:07
8	08:42	08:03	07:02	06:47	05:40	20:28 (5)	04:58	20:12 (5)	05:04	20:19 (5)	05:49	20:43 (5)	06:43	07:37	07:36	08:28	16:22	17:18	18:13	20:11	21:06	8	20:36 (5)	21:52	54	21:06 (5)	21:57	54	21:13 (5)	21:13	20:04	18:50	16:43	16:06
9	08:41	08:01	07:00	06:44	05:38	20:25 (5)	04:57	20:12 (5)	05:05	20:19 (5)	05:51	20:45 (5)	06:45	07:39	07:38	08:29	16:24	17:20	18:15	20:13	21:08	12	20:37 (5)	21:53	55	21:07 (5)	21:56	54	21:13 (5)	21:11	20:01	18:48	16:41	16:06
10	08:41	07:59	06:57	06:42	05:36	20:23 (5)	04:57	20:13 (5)	05:06	20:19 (5)	05:52	20:47 (5)	06:47	07:41	07:40	08:30	16:25	17:22	18:17	20:15	21:10	15	20:38 (5)	21:54	54	21:07 (5)	21:55	54	21:13 (5)	21:10	19:59	18:45	16:39	16:05
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12	08:40	07:55	06:53	06:37	05:33	20:20 (5)	04:56	20:13 (5)	05:08	20:19 (5)	05:56	20:51 (5)	06:51	07:44	07:44	08:33	16:28	17:26	18:21	20:19	21:13	22	20:42 (5)	21:55	55	21:08 (5)	21:54	55	21:14 (5)	21:05	19:54	18:40	16:34	16:05
13	08:39	07:53	06:50	06:35	05:31	20:18 (5)	04:55	20:14 (5)	05:09	20:19 (5)	05:58	20:52 (5)	06:52	07:46	07:45	08:34	16:30	17:28	18:23	20:20	21:15	25	20:43 (5)	21:56	54	21:08 (5)	21:53	55	21:14 (5)	21:03	19:51	18:38	16:34	16:05
14	08:38	07:51	06:48	06:32	05:29	20:18 (5)	04:55	20:13 (5)	05:11	20:20 (5)	05:59	20:54 (5)	06:54	07:48	07:47	08:35	16:31	17:30	18:25	20:22	21:17	27	20:45 (5)	21:57	54	21:07 (5)	21:52	53	21:13 (5)	21:01	19:49	18:36	16:32	16:05
15	08:37	07:49	06:45	06:30	05:27	20:16 (5)	04:55	20:14 (5)	05:12	20:20 (5)	06:01	20:55 (5)	06:56	07:50	07:49	08:36	16:33	17:32	18:27	20:24	21:18	31	20:47 (5)	21:57	54	21:08 (5)	21:51	53	21:13 (5)	20:59	19:47	18:33	16:31	16:05
16	08:36	07:47	06:43	06:28	05:26	20:15 (5)	04:55	20:14 (5)	05:13	20:20 (5)	06:03	20:56 (5)	06:58	07:52	07:51	08:37	16:35	17:34	18:28	20:26	21:20	33	20:48 (5)	21:58	54	21:08 (5)	21:50	53	21:13 (5)	20:57	19:44	18:31	16:29	16:05
17	08:35	07:45	06:40	06:25	05:24	20:15 (5)	04:54	20:14 (5)	05:14	20:21 (5)	06:05	20:58 (5)	06:59	07:54	07:53	08:38	16:36	17:36	18:30	20:28	21:22	35	20:50 (5)	21:59	54	21:08 (5)	21:49	53	21:14 (5)	20:55	19:42	18:29	16:28	16:05
18	08:34	07:43	06:38	06:23	05:22	20:14 (5)	04:54	20:14 (5)	05:16	20:21 (5)	06:06	20:59 (5)	06:59	07:54	07:53	08:38	16:38	17:38	18:32	20:30	21:23	37	20:51 (5)	21:59	55	21:09 (5)	21:47	53	21:14 (5)	20:53	19:39	18:26	16:26	16:05
19	08:33	07:41	06:36	06:21	05:21	20:14 (5)	04:54	20:15 (5)	05:17	20:21 (5)	06:08	20:59 (5)	06:59	07:54	07:53	08:39	16:40	17:40	18:34	20:31	21:25	38	20:52 (5)	22:00	54	21:09 (5)	21:46	51	21:12 (5)	20:51	19:37	18:24	16:25	16:05
20	08:32	07:39	06:33	06:18	05:19	20:14 (5)	04:54	20:15 (5)	05:18	20:21 (5)	06:10	20:59 (5)	06:59	07:54	07:53	08:40	16:41	17:42	18:36	20:33	21:27	40	20:54 (5)	22:00	54	21:09 (5)	21:45	50	21:11 (5)	20:48	19:34	18:22	16:23	16:05
21	08:31	07:36	06:31	06:16	05:18	20:12 (5)	04:54	20:15 (5)	05:20	20:22 (5)	06:12	20:59 (5)	06:59	07:54	07:53	08:41	16:43	17:44	18:38	20:35	21:28	43	20:55 (5)	22:00	54	21:09 (5)	21:44	48	21:10 (5)	20:46	19:32	18:20	16:22	16:06
22	08:30	07:34	06:28	06:14	05:16	20:12 (5)	04:55	20:15 (5)	05:21	20:22 (5)	06:13	20:59 (5)	06:59	07:54	07:53	08:42	16:45	17:46	18:40	20:37	21:30	45	20:57 (5)	22:00	54	21:09 (5)	21:42	47	21:09 (5)	20:44	19:29	18:17	16:20	16:06
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25	08:26	07:28	06:21	06:07	05:12	20:11 (5)	04:55	20:16 (5)	05:26	20:23 (5)	06:19	20:59 (5)	06:59	07:54	07:53	08:45	16:51	17:52	18:45	20:43	21:34	50	21:01 (5)	22:01	54	21:10 (5)	21:38	42	21:05 (5)	20:37	19:22	18:11	16:17	16:08
26	08:24	07:25	06:18	06:05	05:11	20:11 (5)	04:56	20:17 (5)	05:27	20:24 (5)	06:20	20:59 (5)	06:59	07:54	07:53	08:46	16:52	17:54	18:48	20:44	21:36	51	21:02 (5)	22:01	54	21:11 (5)	21:36	40	21:04 (5)	20:35	19:19	17:09	16:16	16:08
27	08:23	07:23	06:16	06:03	05:09	20:11 (5)	04:57	20:16 (5)	05:29	20:25 (5)	06:22	20:59 (5)	06:59	07:54	07:53	08:47	16:54	17:56	18:49	20:46	21:37	52	21:03 (5)	22:01	54	21:12 (5)	21:35	38	21:02 (5)	20:32	19:17	17:07	16:15	16:09
28	08:22	07:21	06:13	06:01	05:08	20:11 (5)	04:56	20:17 (5)	05:31	20:25 (5)	06:24	20:59 (5)	06:59	07:54	07:53	08:48	16:56	17:58	18:51	20:48	21:39	53	21:04 (5)	22:01	54	21:11 (5)	21:33	36	21:01 (5)	20:30	19:14	17:04	16:14	16:10
29	08:20	07:18	06:11	05:58	05:07	20:11 (5)	04:57	20:17 (5)	05:32	20:26 (5)	06:26	20:59 (5)	06:59	07:54	07:53	08:49	16:58	18:00	18:53	20:50	21:40	54	21:05 (5)	22:01	54	21:11 (5)	21:32	33	20:59 (5)	20:28	19:12	17:02	16:13	16:11
30	08:18	07:16	06:09	05:56	05:06	20:11 (5)	04:58	20:17 (5)	05:34	20:27 (5)	06:28	20:59 (5)	06:59	07:54	07:53	08:50	17:00	18:01	18:54	20:52	21:41	54	21:05 (5)	22:01	55	21:12 (5)	21:30	31	20:58 (5)	20:25	19:09	17:00	16:12	16:12
31	08:17	07:15	06:07	05:54	05:05	20:11 (5)	04:58	20:17 (5)	05:35	20:27 (5)	06:29	20:59 (5)	06:59	07:54	07:53	08:51	17:02	18:03	18:56	20:53	21:43	54	21:05 (5)	22:00	54	21:11 (5)	21:28	29	20:56 (5)	20:23	19:07	16:58	16:11	16:12
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233																						
Total, worst case					948	1626	1478	95																										
Sun reduction					0.38	0.32	0.32	0.34																										
Oper. time red.					1.00	1.00	1.00	1.00																										
Wind dir. red.					0.63	0.63	0.63	0.63																										
Total reduction					0.24	0.20	0.20	0.22																										
Total, real					228	328	302	20																										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IE - H239

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December									
1	08:44	08:14	07:16	07:01	05:52	05:03	20:20 (5)	04:59	20:30 (5)	05:39	20:32 (5)	06:33	07:26	07:24	08:19						
2	16:15	17:06	18:02	20:00	20:55	21:45	35	20:55 (5)	22:00	29	20:59 (5)	21:25	21	20:53 (5)	20:18	19:05	16:54	16:10			
	08:44	08:12	07:14	06:59	05:50	05:02		20:22 (5)	05:00		20:30 (5)	05:40		20:34 (5)	06:35	07:28	07:26	08:21			
3	16:16	17:08	18:04	20:02	20:57	21:48	33	20:55 (5)	22:00	29	20:59 (5)	21:23	18	20:52 (5)	20:16	19:02	16:52	16:09			
4	08:43	08:10	07:12	06:56	05:48	05:01		20:22 (5)	05:00		20:29 (5)	05:42		20:34 (5)	06:36	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	21:48	33	20:55 (5)	21:59	30	20:59 (5)	21:21	16	20:50 (5)	20:13	19:00	16:50	16:08			
5	08:43	08:08	07:09	06:54	05:46	05:00		20:22 (5)	05:01		20:29 (5)	05:44		20:36 (5)	06:38	07:31	07:30	08:24			
	16:18	17:12	18:07	20:06	21:01	21:49	32	20:54 (5)	21:59	31	21:00 (5)	21:19	12	20:48 (5)	20:11	18:57	16:48	16:08			
6	08:43	08:07	07:07	06:51	05:44	04:59		20:23 (5)	05:02		20:29 (5)	05:45		20:37 (5)	06:40	07:33	07:32	08:25			
	16:20	17:14	18:09	20:07	21:03	21:50	32	20:55 (5)	21:58	31	21:00 (5)	21:17	9	20:46 (5)	20:09	18:55	16:46	16:07			
7	08:42	08:05	07:04	06:49	05:42	20:31 (5)	04:59	20:23 (5)	05:03		20:29 (5)	05:47		20:39 (5)	06:42	07:35	07:34	08:26			
	16:21	17:16	18:11	20:09	21:04	2	20:33 (5)	21:51	32	20:55 (5)	21:57	32	21	20:51 (5)	21:15	2	20:45 (5)	20:06	18:52	16:44	16:07
8	08:42	08:03	07:02	06:47	05:40	20:29 (5)	04:58	20:23 (5)	05:04		20:29 (5)	05:49		20:40 (5)	06:43	07:37	07:36	08:28			
	16:22	17:18	18:13	20:11	21:06	7	20:36 (5)	21:52	31	20:54 (5)	21:57	32	21	20:51 (5)	21:13	20:04	18:50	16:43	16:06		
9	08:41	08:01	07:00	06:44	05:38	20:27 (5)	04:57	20:24 (5)	05:05		20:29 (5)	05:51		20:41 (5)	06:45	07:39	07:38	08:29			
	16:24	17:20	18:15	20:13	21:08	10	20:37 (5)	21:53	30	20:54 (5)	21:56	33	21	21:02 (5)	21:11	20:01	18:48	16:41	16:06		
10	08:41	07:59	06:57	06:42	05:36	20:25 (5)	04:57	20:25 (5)	05:06		20:29 (5)	05:52		20:42 (5)	06:47	07:41	07:40	08:30			
	16:25	17:22	18:17	20:15	21:10	13	20:38 (5)	21:54	30	20:55 (5)	21:55	33	21	21:02 (5)	21:09	19:59	18:45	16:39	16:05		
11	08:40	07:57	06:55	06:39	05:34	20:23 (5)	04:56	20:25 (5)	05:07		20:29 (5)	05:54		20:43 (5)	06:49	07:42	07:42	08:31			
	16:27	17:24	18:19	20:17	21:11	17	20:40 (5)	21:55	29	20:54 (5)	21:54	34	21	21:03 (5)	21:07	19:56	18:43	16:37	16:05		
12	08:40	07:55	06:52	06:37	05:33	20:23 (5)	04:56	20:25 (5)	05:08		20:29 (5)	05:56		20:44 (5)	06:50	07:44	07:44	08:33			
	16:28	17:26	18:21	20:19	21:13	19	20:42 (5)	21:55	29	20:54 (5)	21:54	34	21	21:03 (5)	21:05	19:54	18:40	16:36	16:05		
13	08:39	07:53	06:50	06:35	05:31	20:22 (5)	04:55	20:26 (5)	05:09		20:29 (5)	05:58		20:45 (5)	06:52	07:46	07:45	08:34			
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14	08:38	07:51	06:48	06:32	05:29	20:21 (5)	04:55	20:26 (5)	05:11		20:29 (5)	05:59		20:46 (5)	06:54	07:48	07:47	08:35			
	16:31	17:30	18:25	20:22	21:17	23	20:44 (5)	21:57	28	20:54 (5)	21:52	34	21	21:03 (5)	21:01	19:49	18:36	16:32	16:05		
15	08:37	07:49	06:45	06:30	05:27	20:21 (5)	04:55	20:26 (5)	05:12		20:28 (5)	06:01		20:47 (5)	06:56	07:50	07:49	08:36			
	16:33	17:32	18:27	20:24	21:18	26	20:47 (5)	21:57	28	20:54 (5)	21:51	35	21	21:03 (5)	20:59	19:47	18:33	16:31	16:05		
16	08:36	07:47	06:43	06:28	05:26	20:20 (5)	04:55	20:27 (5)	05:13		20:28 (5)	06:03		20:48 (5)	06:58	07:52	07:51	08:37			
	16:34	17:34	18:28	20:26	21:20	28	20:48 (5)	21:58	27	20:54 (5)	21:50	36	21	21:04 (5)	20:57	19:44	18:31	16:29	16:05		
17	08:35	07:45	06:40	06:25	05:24	20:20 (5)	04:54	20:27 (5)	05:14		20:29 (5)	06:05		20:49 (5)	06:59	07:54	07:53	08:38			
	16:36	17:36	18:30	20:28	21:22	30	20:50 (5)	21:59	27	20:54 (5)	21:48	36	21	21:05 (5)	20:55	19:42	18:29	16:28	16:05		
18	08:34	07:43	06:38	06:23	05:22	20:19 (5)	04:54	20:27 (5)	05:16		20:29 (5)	06:06		20:50 (5)	07:01	07:55	07:55	08:38			
	16:38	17:38	18:32	20:30	21:23	32	20:51 (5)	21:59	28	20:55 (5)	21:47	36	21	21:05 (5)	20:53	19:39	18:26	16:26	16:05		
19	08:33	07:41	06:35	06:21	05:21	20:19 (5)	04:54	20:28 (5)	05:17		20:28 (5)	06:08		20:51 (5)	07:03	07:57	07:57	08:39			
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21	08:31	07:36	06:31	06:16	05:18	20:18 (5)	04:54	20:28 (5)	05:20		20:29 (5)	06:12		20:50 (5)	07:06	08:01	08:00	08:41			
	16:43	17:44	18:38	20:35	21:28	36	20:54 (5)	22:00	27	20:55 (5)	21:44	36	21	21:05 (5)	20:46	19:32	18:20	16:22	16:06		
22	08:30	07:34	06:28	06:14	05:16	20:19 (5)	04:55	20:28 (5)	05:21		20:29 (5)	06:13		20:50 (5)	07:08	08:03	08:02	08:41			
	16:45	17:46	18:40	20:37	21:30	36	20:55 (5)	22:00	27	20:55 (5)	21:42	36	21	21:05 (5)	20:44	19:29	18:17	16:20	16:06		
23	08:28	07:32	06:26	06:12	05:15	20:19 (5)	04:55	20:29 (5)	05:23		20:28 (5)	06:15		20:50 (5)	07:10	08:05	08:04	08:42			
	16:47	17:48	18:42	20:39	21:31	36	20:55 (5)	22:01	27	20:56 (5)	21:41	37	21	21:05 (5)	20:42	19:27	18:15	16:19	16:07		
24	08:27	07:30	06:23	06:09	05:13	20:18 (5)	04:55	20:29 (5)	05:24		20:29 (5)	06:17		20:50 (5)	07:12	08:07	08:06	08:42			
	16:49	17:50	18:43	20:41	21:33	36	20:54 (5)	22:01	27	20:56 (5)	21:39	36	21	21:05 (5)	20:39	19:24	18:13	16:18	16:07		
25	08:26	07:28	06:21	06:07	05:12	20:18 (5)	04:55	20:29 (5)	05:26		20:29 (5)	06:19		20:50 (5)	07:13	08:09	08:07	08:43			
	16:51	17:52	18:45	20:42	21:34	37	20:55 (5)	22:01	27	20:56 (5)	21:38	36	21	21:05 (5)	20:37	19:22	18:11	16:17	16:08		
26	08:24	07:25	06:18	06:05	05:11	20:19 (5)	04:56	20:30 (5)	05:27		20:30 (5)	06:20		20:50 (5)	07:15	07:11	08:09	08:43			
	16:52	17:54	18:47	20:44	21:36	36	20:55 (5)	22:01	27	20:57 (5)	21:36	34	21	21:04 (5)	20:35	19:19	17:09	16:16	16:08		
27	08:23	07:23	06:16	06:03	05:09	20:19 (5)	04:56	20:29 (5)	05:29		20:29 (5)	06:22		20:50 (5)	07:17	07:13	08:11	08:43			
	16:54	17:56	18:49	20:46	21:37	36	20:55 (5)	22:01	28	20:57 (5)	21:35	33	21	21:02 (5)	20:32	19:17	17:07	16:15	16:09		
28	08:22	07:21	06:13	06:01	05:08	20:19 (5)	04:56	20:30 (5)	05:31		20:30 (5)	06:24		20:50 (5)	07:19	07:14	08:13	08:44			
	16:56	17:58	18:51	20:48	21:39	36	20:55 (5)	22:01	27	20:57 (5)	21:33	31	21	21:01 (5)	20:30	19:14	17:04	16:14	16:10		
29	08:20	07:18	06:11	05:58	05:07	20:20 (5)	04:57	20:29 (5)	05:32		20:30 (5)	06:26		20:50 (5)	07:21	07:16	08:14	08:44			
	16:58	18:00	18:53	20:50	21:40	35	20:55 (5)	22:01	28	20:57 (5)	21:32	29	20	20:59 (5)	20:28	19:12	17:02	16:13	16:11		
30	08:18	07:09	05:59	05:56	05:06	20:20 (5)	04:58	20:30 (5)	05:34		20:31 (5)	06:28		20:50 (5)	07:22	07:18	08:16	08:44			
	17:00	19:54	20:52	21:41	35	20:55 (5)	22:00	28	20:58 (5)	21:30	27	20:58 (5)	20:25	19:09	17:00	16:12	16:12				
31	08:17	07:06	05:54	05:05	05:05	20:20 (5)	04:58	20:29 (5)	05:35		20:31 (5)	06:29		20:50 (5)	07:24	07:20	08:17	08:44			
	17:02	19:56	20:53	21:43	35	20:55 (5)	22:00	29	20:58 (5)	21:28	25	20:56 (5)	20:23	19:07	16:58	16:11	16:12				
	08:15	07:04	06:04	05:04	05:04	20:20 (5)			05:37		20:32 (5)	06:31		20:50 (5)	07:22	07:18	08:16	08:44			
	17:04	19:58	20:55	21:44	35	20:55 (5)			21:26	23	20:55 (5)	20:21		20:50 (5)	16:56	16:11	16:12				
Potential sun hours	250	273	367	420	494	510	512	460	382	259	233										
Total, worst case					725	869	1015	82													
Sun reduction					0.38	0.32	0.32	0.34													
Oper. time red.					1.00	1.00	1.00	1.00													
Wind dir. red.					0.63	0.63	0.63	0.63													
Total reduction					0.24	0.20	0.21	0.22													
Total, real																					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IF - H240

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IG - H241

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IH - H242

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June	
1	08:44		08:14	16:27 (5)	07:16	17:21 (4)	07:01		05:52	20:05 (2)	05:03	
	16:15		17:06	7 16:34 (5)	18:02	13 17:34 (4)	20:00		20:55	21 20:26 (2)	21:45	
2	08:44		08:12	16:27 (5)	07:14	17:19 (4)	06:59		05:50	20:04 (2)	05:02	
	16:16		17:08	10 16:37 (5)	18:04	17 17:36 (4)	20:02		20:57	23 20:27 (2)	21:46	
3	08:43		08:10	16:27 (5)	07:11	17:19 (4)	06:56		05:48	20:04 (2)	05:01	
	16:17		17:10	12 16:39 (5)	18:06	19 17:38 (4)	20:04		20:59	25 20:29 (2)	21:48	
4	08:43		08:08	16:26 (5)	07:09	17:18 (4)	06:54		05:46	20:04 (2)	05:00	
	16:18		17:12	15 16:41 (5)	18:07	23 17:41 (4)	20:06		21:01	26 20:30 (2)	21:49	
5	08:43		08:07	16:26 (5)	07:07	17:17 (4)	06:51		05:44	20:03 (2)	04:59	
	16:19		17:14	17 16:43 (5)	18:09	25 17:42 (4)	20:07		21:03	29 20:32 (2)	21:50	
6	08:42		08:05	16:26 (5)	07:04	17:16 (4)	06:49		05:42	20:03 (2)	04:59	
	16:21		17:16	19 16:45 (5)	18:11	29 17:45 (4)	20:09		21:04	30 20:33 (2)	21:51	
7	08:42		08:03	16:26 (5)	07:02	17:15 (4)	06:47		05:40	20:04 (2)	04:58	
	16:22		17:18	21 16:47 (5)	18:13	31 17:46 (4)	20:11		21:06	31 20:35 (2)	21:52	
8	08:42		08:01	16:26 (5)	07:00	17:15 (4)	06:44		05:38	20:04 (2)	04:57	
	16:24		17:20	24 16:50 (5)	18:15	33 17:48 (4)	20:13		21:08	30 20:34 (2)	21:53	
9	08:41		07:59	16:27 (5)	06:57	17:14 (4)	06:42		05:36	20:04 (2)	04:57	
	16:25		17:22	23 16:50 (5)	18:17	36 17:50 (4)	20:15		21:10	29 20:33 (2)	21:54	
10	08:40		07:57	16:28 (5)	06:55	17:15 (4)	06:39		05:34	20:04 (2)	04:56	
	16:26		17:24	21 16:49 (5)	18:19	37 17:52 (4)	20:17		21:11	29 20:33 (2)	21:55	
11	08:40		07:55	16:28 (5)	06:52	17:15 (4)	06:37		05:33	20:05 (2)	04:56	
	16:28		17:26	21 16:49 (5)	18:21	38 17:53 (4)	20:19		21:13	28 20:33 (2)	21:55	
12	08:39		07:53	16:29 (5)	06:50	17:15 (4)	06:35		05:31	20:05 (2)	04:55	
	16:30		17:28	18 16:47 (5)	18:23	36 17:51 (4)	20:20		21:15	27 20:32 (2)	21:56	
13	08:38		07:51	16:30 (5)	06:48	17:15 (4)	06:32		05:29	20:05 (2)	04:55	
	16:31		17:30	16 16:46 (5)	18:25	36 17:51 (4)	20:22		21:17	26 20:31 (2)	21:57	
14	08:37		07:49	16:32 (5)	06:45	17:15 (4)	06:30		05:27	20:07 (2)	04:55	
	16:33		17:32	12 16:44 (5)	18:27	35 17:50 (4)	20:24		21:18	24 20:31 (2)	21:57	
15	08:36		07:47	16:37 (5)	06:43	17:16 (4)	06:28		05:26	20:07 (2)	04:54	
	16:34		17:34	3 16:40 (5)	18:28	33 17:49 (4)	20:26		21:20	22 20:29 (2)	21:58	
16	08:35		07:45		06:40	17:17 (4)	06:25		05:24	20:09 (2)	04:54	
	16:36		17:36		18:30	34 18:04 (3)	20:28		21:22	20 20:29 (2)	21:59	
17	08:34		07:43		06:38	17:18 (4)	06:23		05:22	20:10 (2)	04:54	
	16:38		17:38		18:32	35 18:06 (3)	20:30		21:23	17 20:27 (2)	21:59	
18	08:33		07:41		06:35	17:19 (4)	06:21		05:21	20:12 (2)	04:54	
	16:40		17:40		18:34	35 18:07 (3)	20:31		21:25	14 20:26 (2)	22:00	
19	08:32		07:39		06:33	17:21 (4)	06:18		05:19	20:14 (2)	04:54	
	16:41		17:42		18:36	34 18:10 (3)	20:33		21:27	10 20:24 (2)	22:00	
20	08:31		07:36		06:31	17:24 (4)	06:16		05:18	20:18 (2)	04:54	
	16:43		17:44		18:38	29 18:11 (3)	20:35		21:28	1 20:19 (2)	22:00	
21	08:30		07:34		06:28	17:56 (3)	06:14		05:16		04:54	
	16:45		17:46		18:40	17 18:13 (3)	20:37		21:30		22:01	
22	08:28		07:32		06:26	17:56 (3)	06:12		05:15		04:55	
	16:47		17:48		18:41	19 18:15 (3)	20:39		21:31		22:01	
23	08:27		07:30		06:23	17:56 (3)	06:09		05:13		04:55	
	16:49		17:50		18:43	21 18:17 (3)	20:41		21:33		22:01	
24	08:26		07:28		06:21	17:56 (3)	06:07		05:12		04:55	
	16:50		17:52		18:45	21 18:17 (3)	20:42		21:34		22:01	
25	08:24		07:25		06:18	17:57 (3)	06:05	20:12 (2)	05:11		04:55	
	16:52		17:54		18:47	19 18:16 (3)	20:44	3 20:15 (2)	21:36		22:01	
26	08:23		07:23	17:27 (4)	06:16	17:58 (3)	06:03	20:10 (2)	05:09		04:56	
	16:54		17:56	1 17:28 (4)	18:49	16 18:14 (3)	20:46	7 20:17 (2)	21:37		22:01	
27	08:22		07:21	17:25 (4)	06:13	18:00 (3)	06:01	20:09 (2)	05:08		04:56	
	16:56		17:58	6 17:31 (4)	18:51	12 18:12 (3)	20:48	10 20:19 (2)	21:39		22:01	
28	08:20		07:18	17:22 (4)	06:11	18:05 (3)	05:58		05:07		04:57	
	16:58		18:00	10 17:32 (4)	18:53	2 18:07 (3)	20:50	13 20:21 (2)	21:40		22:01	
29	08:18				07:08		05:56		20:07 (2)	05:06	04:57	
	17:00				19:54		20:52	15 20:22 (2)	21:41		22:01	
30	08:17	16:29 (5)			07:06		05:54		20:06 (2)	05:05	04:58	
	17:02	1 16:30 (5)			19:56		20:53	18 20:24 (2)	21:43		22:00	
31	08:15	16:28 (5)			07:04				05:04			
	17:04	4 16:32 (5)			19:58				21:44			
Potential sun hours	250		273		367		420		494		510	
Total, worst case	5		256		735		66		462			
Sun reduction	0.24		0.23		0.27		0.35		0.38			
Oper. time red.	1.00		1.00		1.00		1.00		1.00			
Wind dir. red.	0.66		0.66		0.68		0.65		0.65			
Total reduction	0.16		0.15		0.18		0.23		0.25			
Total, real	1		39		135		15		114			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IH - H242

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:15 (2)	06:33		07:26	17:54 (4)	07:24		15:57 (5)	08:19
	22:00	21:25	27	20:42 (2)	20:18	19:05	36	18:30 (4)	16:54	22	16:19 (5)
2	04:59	05:40	20:15 (2)	06:35		07:28	17:53 (4)	07:26		15:57 (5)	08:21
	22:00	21:23	28	20:43 (2)	20:16	19:02	37	18:30 (4)	16:52	22	16:19 (5)
3	05:00	05:42	20:14 (2)	06:36		07:30	17:53 (4)	07:28		15:56 (5)	08:22
	21:59	21:21	29	20:43 (2)	20:13	19:00	37	18:30 (4)	16:50	23	16:19 (5)
4	05:01	05:44	20:14 (2)	06:38		07:31	17:52 (4)	07:30		15:56 (5)	08:24
	21:59	21:19	30	20:44 (2)	20:11	18:57	37	18:29 (4)	16:48	21	16:17 (5)
5	05:02	05:45	20:13 (2)	06:40		07:33	17:52 (4)	07:32		15:56 (5)	08:25
	21:58	21:17	30	20:43 (2)	20:09	18:55	34	18:26 (4)	16:46	19	16:15 (5)
6	05:03	05:47	20:13 (2)	06:42		07:35	17:52 (4)	07:34		15:56 (5)	08:26
	21:58	21:15	31	20:44 (2)	20:06	18:52	32	18:24 (4)	16:44	16	16:12 (5)
7	05:04	05:49	20:13 (2)	06:43		07:37	17:51 (4)	07:36		15:56 (5)	08:28
	21:57	21:13	30	20:43 (2)	20:04	18:50	30	18:21 (4)	16:43	14	16:10 (5)
8	05:05	05:50	20:13 (2)	06:45		07:39	17:51 (4)	07:38		15:56 (5)	08:29
	21:56	21:11	28	20:41 (2)	20:01	18:48	27	18:18 (4)	16:41	12	16:08 (5)
9	05:06	05:52	20:13 (2)	06:47		07:41	17:52 (4)	07:40		15:57 (5)	08:30
	21:55	21:10	26	20:39 (2)	19:59	18:45	24	18:16 (4)	16:39	9	16:06 (5)
10	05:07	05:54	20:13 (2)	06:49		07:42	17:52 (4)	07:42		15:59 (5)	08:31
	21:55	21:07	24	20:37 (2)	19:56	18:43	22	18:14 (4)	16:37	6	16:05 (5)
11	05:08	05:56	20:13 (2)	06:50		07:44	17:53 (4)	07:44		16:00 (5)	08:33
	21:54	21:05	22	20:35 (2)	19:54	18:40	18	18:11 (4)	16:35	3	16:03 (5)
12	05:09	05:57	20:14 (2)	06:52		07:46	17:54 (4)	07:45			08:34
	21:53	21:03	20	20:34 (2)	19:51	18:38	15	18:09 (4)	16:34		16:05
13	05:10	05:59	20:13 (2)	06:54		07:48	17:55 (4)	07:47			08:35
	21:52	21:01	18	20:31 (2)	19:49	18:36	12	18:07 (4)	16:32		16:05
14	05:12	06:01	20:14 (2)	06:56		07:50	17:56 (4)	07:49			08:36
	21:51	20:59	15	20:29 (2)	19:47	18:33	8	18:04 (4)	16:31		16:04
15	05:13	06:03	20:15 (2)	06:58		07:52	17:58 (4)	07:51			08:37
	21:50	20:57	13	20:28 (2)	19:44	18:31	4	18:02 (4)	16:29		16:05
16	05:14	06:04	20:16 (2)	06:59		07:54		07:53			08:38
	21:49	20:55	9	20:25 (2)	19:42	18:50 (3)	11	19:01 (3)	18:29		16:05
17	05:16	06:06	20:17 (2)	07:01		07:55		07:55			08:38
	21:47	20:53	6	20:23 (2)	19:39	18:47 (3)		18:26			16:05
18	05:17	06:08	20:19 (2)	07:03		07:57		07:57			08:39
	21:46	20:50	3	20:22 (2)	19:37	18:45 (3)		18:24			16:05
19	05:18	06:10		07:05		19:03 (3)	18	18:24			16:05
	21:45	20:48		19:34		18:44 (3)	20	18:04 (3)	18:22		08:40
20	05:20	06:12		07:06		19:04 (3)		18:22			16:05
	21:44	20:46		19:32		18:43 (3)	21	18:03 (3)	18:20		08:41
21	05:21	06:13		07:08		19:04 (3)		18:20			16:06
	21:42	20:44		19:29		18:41 (3)	20	19:01 (3)	18:17		08:41
22	05:23	06:15		07:10		19:01 (3)		18:17			16:06
	21:41	20:42		19:27		18:41 (3)		18:05			08:42
23	05:24	06:17		07:12		19:02 (3)	17	18:06 (3)	18:15		16:06
	21:39	20:39		19:24		18:58 (3)		18:15			08:42
24	05:26	06:19		07:13		18:10 (4)	26	18:07 (3)	18:13		16:07
	21:38	20:37		19:22		18:56 (3)		18:13			08:43
25	05:27	06:20		07:15		18:06 (4)	32	18:04 (3)	18:11		16:08
	21:36	20:36 (2)	13	20:35		18:02 (4)		18:11			08:43
26	05:29	20:32 (2)		07:17		18:02 (4)	35	18:09 (3)	17:09		16:08
	21:35	20:37 (2)	16	20:32		18:51 (3)		18:00 (4)	17:13		08:43
27	05:30	20:19 (2)		07:19		18:00 (4)		17:06			16:09
	21:33	20:38 (2)	19	20:30		18:48 (3)	35	18:08 (3)	17:06		08:44
28	05:32	20:19 (2)		07:21		17:59 (4)		16:05 (5)	08:13		16:10
	21:32	20:40 (2)	21	20:28		18:46 (3)	34	18:04 (3)	17:04	6	16:11 (5)
29	05:34	20:17 (2)		07:22		17:58 (4)		16:01 (5)	08:14		16:10
	21:30	20:40 (2)	23	20:25		18:44 (3)	33	18:04 (3)	17:02	13	16:14 (5)
30	05:35	20:17 (2)		07:24		17:56 (4)		15:59 (5)	08:16		16:11
	21:28	20:41 (2)	24	20:23		17:55 (4)	34	18:30 (4)	17:00	17	16:16 (5)
31	05:37	20:16 (2)		06:31		17:55 (4)		15:58 (5)	08:18		16:11
	21:26	20:42 (2)	26	20:21		18:30 (4)	35	18:30 (4)	16:58	19	16:17 (5)
Potential sun hours	512		460		382			07:22	15:57 (5)		08:44
Total, worst case								16:56	20	16:17 (5)	16:13
Sun reduction	0.32		0.34		0.32			448		259	233
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.65		0.65		0.68						
Total reduction	0.21		0.22		0.22						
Total, real	31		86		84					29	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: II - H243

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	18:02	07:01	17:48 (5)	20:13	05:52	20:08 (3)	05:03	20:17 (4)		
2	08:44	16:16	08:12	17:08	18:04	07:11	18:04	18:04	20:00	17:45 (5)	20:12	20:55	20:26 (3)	21:45	43	21:00 (4)	
3	08:43	16:17	08:10	17:10	18:06	07:09	18:06	18:06	20:04	17:44 (5)	20:11	20:50	20:08 (3)	05:02	20:18 (4)		
4	08:43	16:18	08:08	17:12	18:07	07:07	18:07	18:07	20:06	17:43 (5)	20:10	20:57	20:27 (3)	21:46	43	21:01 (4)	
5	08:43	16:20	08:07	17:14	18:09	07:04	18:09	18:09	20:07	17:42 (5)	20:09	20:54	20:08 (3)	05:01	20:18 (4)		
6	08:42	16:21	08:05	17:16	18:11	07:00	18:11	18:11	20:09	17:41 (5)	20:08	20:59	20:29 (3)	21:48	43	21:01 (4)	
7	08:42	16:22	08:03	17:18	18:13	06:57	18:13	18:13	20:11	17:40 (5)	20:07	20:56	20:30 (3)	21:49	42	21:00 (4)	
8	08:41	16:24	08:01	17:20	18:15	06:55	18:15	18:15	20:13	17:39 (5)	20:06	21:03	20:32 (3)	21:50	42	21:01 (4)	
9	08:41	16:25	07:59	17:22	18:17	06:52	18:17	18:17	20:15	17:38 (5)	20:05	21:04	20:33 (4)	21:51	42	21:01 (4)	
10	08:40	16:27	07:57	17:24	18:19	06:50	18:19	18:19	20:17	17:37 (5)	20:04	21:06	20:34 (4)	21:52	41	21:00 (4)	
11	08:40	16:28	07:55	17:26	18:21	06:48	18:21	18:21	20:19	17:36 (5)	20:03	21:08	20:35 (4)	21:53	41	21:01 (4)	
12	08:39	16:30	07:53	17:28	18:23	06:46	18:23	18:23	20:20	17:35 (5)	20:02	21:10	20:36 (4)	21:54	40	21:00 (4)	
13	08:38	16:31	07:51	17:30	18:25	06:44	18:25	18:25	20:22	17:34 (5)	20:01	21:11	20:37 (4)	21:55	40	21:01 (4)	
14	08:37	16:33	07:49	17:32	18:27	06:42	18:27	18:27	20:24	17:33 (5)	20:00	21:13	20:38 (4)	21:56	39	21:01 (4)	
15	08:36	16:34	07:47	17:34	18:28	06:40	18:28	18:28	20:26	17:32 (5)	20:00	21:15	20:39 (4)	21:57	40	21:00 (4)	
16	08:35	16:36	07:45	17:36	18:30	06:38	18:30	18:30	20:28	17:31 (5)	20:00	21:17	20:40 (4)	21:58	39	21:01 (4)	
17	08:34	16:38	07:43	17:38	18:32	06:36	18:32	18:32	20:30	17:30 (5)	20:00	21:19	20:41 (4)	21:59	39	21:02 (4)	
18	08:33	16:40	07:41	17:40	18:34	06:34	18:34	18:34	20:31	17:29 (5)	20:00	21:21	20:42 (4)	22:00	39	21:02 (4)	
19	08:32	16:41	07:39	17:42	18:36	06:32	18:36	18:36	20:33	17:28 (5)	20:00	21:23	20:43 (4)	22:01	39	21:03 (4)	
20	08:31	16:43	07:36	17:44	18:38	06:30	18:38	18:38	20:35	17:27 (5)	20:00	21:25	20:44 (4)	22:02	39	21:02 (4)	
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	18:40	20:37	17:26 (5)	20:00	21:27	20:45 (4)	22:03	39	21:03 (4)	
22	08:28	16:47	07:32	17:48	18:42	06:26	18:42	18:42	20:39	17:25 (5)	20:00	21:29	20:46 (4)	22:04	39	21:04 (4)	
23	08:27	16:49	07:30	17:50	18:44	06:24	18:44	18:44	20:41	17:24 (5)	20:00	21:31	20:47 (4)	22:05	39	21:05 (4)	
24	08:26	16:51	07:28	17:52	18:46	06:22	18:46	18:46	20:43	17:23 (5)	20:00	21:33	20:48 (4)	22:06	39	21:06 (4)	
25	08:24	16:52	07:25	17:54	18:48	06:20	18:48	18:48	20:45	17:22 (5)	20:00	21:35	20:49 (4)	22:07	39	21:07 (4)	
26	08:23	16:54	07:23	17:56	18:50	06:18	18:50	18:50	20:47	17:21 (5)	20:00	21:37	20:50 (4)	22:08	39	21:08 (4)	
27	08:22	16:56	07:21	17:58	18:52	06:16	18:52	18:52	20:49	17:20 (5)	20:00	21:39	20:51 (4)	22:09	39	21:09 (4)	
28	08:20	16:58	07:18	18:00	18:54	06:14	18:54	18:54	20:51	17:19 (5)	20:00	21:41	20:52 (4)	22:10	39	21:10 (4)	
29	08:18	17:00	07:16	18:02	18:56	06:12	18:56	18:56	20:53	17:18 (5)	20:00	21:43	20:53 (4)	22:11	39	21:11 (4)	
30	08:17	17:02	07:14	18:04	18:58	06:10	18:58	18:58	20:55	17:17 (5)	20:00	21:45	20:54 (4)	22:12	39	21:12 (4)	
31	08:15	17:04	07:12	18:06	19:00	06:08	19:00	19:00	20:57	17:16 (5)	20:00	21:47	20:55 (4)	22:13	39	21:13 (4)	
Potential sun hours	250	273	367	402	420	494	510	1201	1036	1201	1036	1201	1036	1201	1036	1201	1036
Total, worst case				0.27	0.35	0.38	0.32	1.00	0.65	0.64	0.63	0.20	0.24	0.20	0.24	0.20	0.24
Sun reduction				1.00	0.65	0.64	0.63	0.20	0.24	0.20	0.24	0.20	0.24	0.20	0.24	0.20	0.24
Oper. time red.				0.67	0.23	0.24	0.20	0.20	0.24	0.20	0.24	0.20	0.24	0.20	0.24	0.20	0.24
Wind dir. red.				0.18	0.23	0.24	0.20	0.20	0.24	0.20	0.24	0.20	0.24	0.20	0.24	0.20	0.24
Total reduction				0.18	0.23	0.24	0.20	0.20	0.24	0.20	0.24	0.20	0.24	0.20	0.24	0.20	0.24
Total, real				73	12	251	243										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: II - H243

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:25 (4)	05:39	20:24 (3)	06:33	07:26	18:15 (5)	07:24	08:19		
	22:00	40	21:05 (4)	21:25	29	20:53 (4)	20:18				
2	05:00	20:26 (4)	05:40	20:23 (3)	06:35	07:28	18:16 (5)	07:26	08:21		
	22:00	40	21:06 (4)	21:23	29	20:52 (4)	20:16				
3	05:00	20:25 (4)	05:42	20:21 (3)	06:36	07:30	18:17 (5)	07:28	08:22		
	21:59	40	21:05 (4)	21:21	29	20:50 (4)	20:13				
4	05:01	20:25 (4)	05:44	20:20 (3)	06:38	07:31	18:19 (5)	07:30	08:24		
	21:59	41	21:06 (4)	21:19	28	20:48 (4)	20:11				
5	05:02	20:25 (4)	05:45	20:19 (3)	06:40	07:33	18:21 (5)	07:32	08:25		
	21:58	41	21:06 (4)	21:17	27	20:46 (4)	20:09				
6	05:03	20:25 (4)	05:47	20:18 (3)	06:42	07:35	18:26 (5)	07:34	08:26		
	21:57	42	21:07 (4)	21:15	27	20:45 (4)	20:06				
7	05:04	20:26 (4)	05:49	20:18 (3)	06:43	07:37		07:36	08:28		
	21:57	41	21:07 (4)	21:13	25	20:43 (4)	20:04				
8	05:05	20:26 (4)	05:51	20:17 (3)	06:45	07:39		07:38	08:29		
	21:56	42	21:08 (4)	21:11	24	20:41 (3)	20:01				
9	05:06	20:26 (4)	05:52	20:17 (3)	06:47	07:41		07:40	08:30		
	21:55	42	21:08 (4)	21:09	22	20:39 (3)	19:59				
10	05:07	20:26 (4)	05:54	20:16 (3)	06:49	07:42		07:42	08:31		
	21:55	42	21:08 (4)	21:07	21	20:37 (3)	19:56				
11	05:08	20:26 (4)	05:56	20:17 (3)	06:50	07:44		07:44	08:33		
	21:54	42	21:08 (4)	21:05	18	20:35 (3)	19:54				
12	05:09	20:26 (4)	05:57	20:17 (3)	06:52	07:46		07:45	08:34		
	21:53	43	21:09 (4)	21:03	17	20:34 (3)	19:51				
13	05:11	20:26 (4)	05:59	20:16 (3)	06:54	07:48		07:47	08:35		
	21:52	43	21:09 (4)	21:01	15	20:31 (3)	19:49				
14	05:12	20:25 (4)	06:01	20:17 (3)	06:56	07:50		07:49	08:36		
	21:51	44	21:09 (4)	20:59	12	20:29 (3)	19:47				
15	05:13	20:25 (4)	06:03	20:18 (3)	06:58	07:52		07:51	08:37		
	21:50	44	21:09 (4)	20:57	10	20:28 (3)	19:44				
16	05:14	20:26 (4)	06:05	20:18 (3)	06:59	07:54		07:53	08:38		
	21:49	44	21:10 (4)	20:55	7	20:25 (3)	19:42				
17	05:16	20:26 (4)	06:06	20:19 (3)	07:01	18:30 (5)	07:55				
	21:47	44	21:10 (4)	20:53	4	20:23 (3)	19:39				
18	05:17	20:26 (4)	06:08	20:20 (3)	07:03	18:26 (5)	07:57				
	21:46	44	21:10 (4)	20:50	2	20:22 (3)	19:37				
19	05:18	20:26 (4)	06:10		07:05	18:24 (5)	07:59				
	21:45	43	21:09 (4)	20:48		19:34	19				
20	05:20	20:26 (4)	06:12		07:06	18:22 (5)	08:01				
	21:44	44	21:10 (4)	20:46		19:32	23				
21	05:21	20:26 (4)	06:13		07:08	18:20 (5)	08:03				
	21:42	43	21:09 (4)	20:44		19:29	25				
22	05:23	20:26 (4)	06:15		07:10	18:19 (5)	08:05				
	21:41	41	21:07 (4)	20:42		19:27	26				
23	05:24	20:27 (4)	06:17		07:12	18:18 (5)	08:07				
	21:39	40	21:07 (4)	20:39		19:24	28				
24	05:26	20:27 (4)	06:19		07:13	18:17 (5)	08:09				
	21:38	38	21:05 (4)	20:37		19:22	29				
25	05:27	20:27 (4)	06:20		07:15	18:16 (5)	07:11				
	21:36	37	21:04 (4)	20:35		19:19	30				
26	05:29	20:27 (4)	06:22		07:17	18:15 (5)	07:13				
	21:35	35	21:02 (4)	20:32		19:17	31				
27	05:30	20:28 (4)	06:24		07:19	18:15 (5)	07:14				
	21:33	33	21:01 (4)	20:30		19:14	30				
28	05:32	20:28 (4)	06:26		07:21	18:15 (5)	07:16				
	21:32	31	20:59 (4)	20:28		19:12	29				
29	05:34	20:29 (4)	06:28		07:22	18:15 (5)	07:18				
	21:30	29	20:58 (4)	20:25		19:09	26				
30	05:35	20:29 (4)	06:29		07:24	18:15 (5)	07:20				
	21:28	27	20:56 (4)	20:23		19:07	23				
31	05:37	20:26 (3)	06:31								
	21:26	29	20:55 (4)	20:21							
Potential sun hours	512		460		382		328		259		233
Total, worst case	1229		346		342		67				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.63		0.64		0.67		0.67				
Total reduction	0.20		0.22		0.22		0.20				
Total, real	252		76		74		13				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: IJ - H244
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01			19:00 (5)	05:52		05:03		20:42 (3)
	16:15	17:06	18:02						20:00	32		19:32 (5)	20:55		21:45	16	20:58 (3)
2	08:44	08:12	07:14						06:59			18:59 (5)	05:50		05:02		20:43 (3)
	16:16	17:08	18:04						20:02	32		19:31 (5)	20:57		21:46	16	20:59 (3)
3	08:43	08:10	07:12						06:56			18:59 (5)	05:48		05:01		20:44 (3)
	16:17	17:10	18:06						20:04	32		19:31 (5)	20:59		21:48	14	20:58 (3)
4	08:43	08:08	07:09						06:54			19:00 (5)	05:46		05:00		20:45 (3)
	16:18	17:12	18:07						20:06	31		19:31 (5)	21:01		21:49	12	20:57 (3)
5	08:43	08:07	07:07						06:51			18:59 (5)	05:44		04:59		20:47 (3)
	16:20	17:14	18:09						20:07	30		19:29 (5)	21:03		21:50	10	20:57 (3)
6	08:42	08:05	07:04						06:49			19:00 (5)	05:42		04:59		20:48 (3)
	16:21	17:16	18:11						20:09	29		19:29 (5)	21:04		21:51	7	20:55 (3)
7	08:42	08:03	07:02						06:47			19:00 (5)	05:40		04:58		20:50 (3)
	16:22	17:18	18:13						20:11	27		19:27 (5)	21:06		21:52	3	20:53 (3)
8	08:41	08:01	07:00						06:44			19:01 (5)	05:38		04:57		
	16:24	17:20	18:15						20:13	25		19:26 (5)	21:08		21:53		
9	08:41	07:59	06:57						06:42			19:03 (5)	05:36		04:57		
	16:25	17:22	18:17						20:15	21		19:24 (5)	21:10		21:54		
10	08:40	07:57	06:55						06:39			19:04 (5)	05:34		04:56		
	16:27	17:24	18:19						20:17	17		19:21 (5)	21:11		21:55		
11	08:40	07:55	06:52						06:37			19:07 (5)	05:33		04:56		
	16:28	17:26	18:21						20:19	12		19:19 (5)	21:13	2	20:42 (3)		21:55
12	08:39	07:53	06:50						06:35				05:31		20:39 (3)		04:55
	16:30	17:28	18:23						20:20				21:15	4	20:43 (3)		21:56
13	08:38	07:51	06:48						06:32				05:29		20:37 (3)		04:55
	16:31	17:30	18:25						20:22				21:17	7	20:44 (3)		21:57
14	08:37	07:49	06:45						06:30				05:27		20:37 (3)		04:55
	16:33	17:32	18:27						20:24				21:18	10	20:47 (3)		21:57
15	08:36	07:47	06:43						06:28				05:26		20:37 (3)		04:55
	16:34	17:34	18:28						20:26				21:20	11	20:48 (3)		21:58
16	08:35	07:45	06:40						06:25				05:24		20:37 (3)		04:54
	16:36	17:36	18:30						20:28				21:22	13	20:50 (3)		21:59
17	08:34	07:43	06:38						06:23				05:22		20:36 (3)		04:54
	16:38	17:38	18:32						20:30				21:23	15	20:51 (3)		21:59
18	08:33	07:41	06:35						06:21				05:21		20:36 (3)		04:54
	16:40	17:40	18:34						20:31				21:25	17	20:53 (3)		22:00
19	08:32	07:39	06:33						06:18				05:19		20:37 (3)		04:54
	16:41	17:42	18:36						20:33				21:27	17	20:54 (3)		22:00
20	08:31	07:36	06:31						06:16				05:18		20:36 (3)		04:54
	16:43	17:44	18:38						20:35				21:28	19	20:55 (3)		22:00
21	08:30	07:34	06:28						06:14				05:16		20:37 (3)		04:54
	16:45	17:46	18:40						20:37				21:30	20	20:57 (3)		22:00
22	08:28	07:32	06:26					18:14 (5)	06:12				05:15		20:37 (3)		04:55
	16:47	17:48	18:42	1				18:15 (5)	20:39				21:31	22	20:59 (3)		22:01
23	08:27	07:30	06:23					18:11 (5)	06:09				05:13		20:37 (3)		04:55
	16:49	17:50	18:43	6				18:17 (5)	20:41				21:33	22	20:59 (3)		22:01
24	08:26	07:28	06:21					18:08 (5)	06:07				05:12		20:37 (3)		04:55
	16:51	17:52	18:45	10				18:18 (5)	20:42				21:34	24	21:01 (3)		22:01
25	08:24	07:25	06:18					18:06 (5)	06:05				05:11		20:38 (3)		04:56
	16:52	17:54	18:47	15				18:21 (5)	20:44				21:36	23	21:01 (3)		22:01
26	08:23	07:23	06:16					18:05 (5)	06:03				05:09		20:38 (3)		04:56
	16:54	17:56	18:49	18				18:23 (5)	20:46				21:37	23	21:01 (3)		22:01
27	08:22	07:21	06:13					18:03 (5)	06:01				05:08		20:39 (3)		04:56
	16:56	17:58	18:51	21				18:24 (5)	20:48				21:39	22	21:01 (3)		22:01
28	08:20	07:18	06:11					18:02 (5)	05:58				05:07		20:39 (3)		04:57
	16:58	18:00	18:53	24				18:26 (5)	20:50				21:40	22	21:01 (3)		22:01
29	08:18		07:09					19:01 (5)	05:56				05:06		20:40 (3)		04:58
	17:00		19:54	27				19:28 (5)	20:52				21:41	20	21:00 (3)		22:01
30	08:17		07:06					19:01 (5)	05:54				05:05		20:41 (3)		04:58
	17:02		19:56	29				19:30 (5)	20:53				21:43	19	21:00 (3)		22:00
31	08:15		07:04					19:00 (5)					05:04		20:41 (3)		
	17:04		19:58	31				19:31 (5)					21:44	18	20:59 (3)		
Potential sun hours	250	273	367					420					494		510		
Total, worst case				182				288				350			132		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.67				0.67				0.63			0.62		
Total reduction				0.18				0.24				0.24			0.20		
Total, real				33				69				84			26		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IJ - H244

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59		05:39	20:49 (3)	06:33	19:06 (5)	07:26	07:24	08:19		
	22:00		21:25	4 20:53 (3)	20:18	12 19:18 (5)	19:05	16:54	16:10		
2	05:00		05:40		06:35		19:03 (5)	07:28	07:26	08:21	
	22:00		21:23	2 20:52 (3)	20:16	17 19:20 (5)	19:02	16:52	16:09		
3	05:00		05:42		06:36		19:01 (5)	07:30	07:28	08:22	
	21:59		21:21		20:13	21 19:22 (5)	19:00	16:50	16:08		
4	05:01		05:44		06:38		18:58 (5)	07:31	07:30	08:24	
	21:59		21:19		20:11	25 19:23 (5)	18:57	16:48	16:08		
5	05:02		05:45		06:40		18:57 (5)	07:33	07:32	08:25	
	21:58		21:17		20:09	27 19:24 (5)	18:55	16:46	16:07		
6	05:03	20:55 (3)	05:47		06:42		18:56 (5)	07:35	07:34	08:26	
	21:57	6 21:01 (3)	21:15		20:06	29 19:25 (5)	18:52	16:44	16:07		
7	05:04		05:49		06:43		18:54 (5)	07:37	07:36	08:28	
	21:57	8 21:02 (3)	21:13		20:04	30 19:24 (5)	18:50	16:43	16:06		
8	05:05		05:51		06:45		18:54 (5)	07:39	07:38	08:29	
	21:56	11 21:04 (3)	21:11		20:01	31 19:25 (5)	18:48	16:41	16:06		
9	05:06		05:52		06:47		18:53 (5)	07:41	07:40	08:30	
	21:55	13 21:05 (3)	21:09		19:59	32 19:25 (5)	18:45	16:39	16:05		
10	05:07		05:54		06:49		18:52 (5)	07:42	07:42	08:31	
	21:55	15 21:06 (3)	21:07		19:56	32 19:24 (5)	18:43	16:37	16:05		
11	05:08		05:56		06:50		18:52 (5)	07:44	07:44	08:33	
	21:54	16 21:07 (3)	21:05		19:54	32 19:24 (5)	18:40	16:36	16:05		
12	05:09		05:58		06:52		18:52 (5)	07:46	07:45	08:34	
	21:53	17 21:07 (3)	21:03		19:51	32 19:24 (5)	18:38	16:34	16:05		
13	05:11		05:59		06:54		18:52 (5)	07:48	07:47	08:35	
	21:52	19 21:08 (3)	21:01		19:49	30 19:22 (5)	18:36	16:32	16:05		
14	05:12		06:01		06:56		18:51 (5)	07:50	07:49	08:36	
	21:51	19 21:08 (3)	20:59		19:47	27 19:18 (5)	18:33	16:31	16:05		
15	05:13		06:03		06:58		18:52 (5)	07:52	07:51	08:37	
	21:50	21 21:09 (3)	20:57		19:44	24 19:16 (5)	18:31	16:29	16:05		
16	05:14		06:05		06:59		18:52 (5)	07:54	07:53	08:38	
	21:48	21 21:10 (3)	20:55		19:42	22 19:14 (5)	18:29	16:27	16:05		
17	05:16		06:06		07:01		18:52 (5)	07:55	07:55	08:38	
	21:47	22 21:10 (3)	20:53		19:39	19 19:11 (5)	18:26	16:26	16:05		
18	05:17		06:08		07:03		18:53 (5)	07:57	07:57	08:39	
	21:46	24 21:11 (3)	20:50		19:37	15 19:08 (5)	18:24	16:25	16:05		
19	05:18		06:10		07:05		18:55 (5)	07:59	07:59	08:40	
	21:45	24 21:11 (3)	20:48		19:34	11 19:06 (5)	18:22	16:23	16:05		
20	05:20		06:12		07:06		18:57 (5)	08:01	08:00	08:41	
	21:44	23 21:10 (3)	20:46		19:32	7 19:04 (5)	18:20	16:22	16:06		
21	05:21		06:13		07:08		18:59 (5)	08:03	08:02	08:41	
	21:42	22 21:09 (3)	20:44		19:29	2 19:01 (5)	18:17	16:20	16:06		
22	05:23		06:15		07:10		08:05	08:04	08:42		
	21:41	21 21:07 (3)	20:42		19:27		18:15	16:19	16:07		
23	05:24		06:17		07:12		08:07	08:06	08:42		
	21:39	20 21:07 (3)	20:39		19:24		18:13	16:18	16:07		
24	05:26		06:19		07:13		08:09	08:08	08:43		
	21:38	18 21:05 (3)	20:37		19:22		18:11	16:17	16:08		
25	05:27		06:20		07:15		07:11	08:09	08:43		
	21:36	17 21:04 (3)	20:35		19:19		17:09	16:16	16:08		
26	05:29		06:22		07:17		07:13	08:11	08:43		
	21:35	15 21:02 (3)	20:32		19:17		17:06	16:15	16:09		
27	05:30		06:24		07:19		07:14	08:13	08:44		
	21:33	13 21:01 (3)	20:30		19:14		17:04	16:13	16:10		
28	05:32		06:26		07:21		07:16	08:14	08:44		
	21:32	12 20:59 (3)	20:28		19:12		17:02	16:13	16:11		
29	05:34		06:28		07:22		07:18	08:16	08:44		
	21:30	10 20:58 (3)	20:25		19:09		17:00	16:12	16:11		
30	05:35		06:29		07:24		07:20	08:17	08:44		
	21:28	8 20:56 (3)	20:23		19:07		16:58	16:11	16:12		
31	05:37		06:31				07:22		08:44		
	21:26	6 20:55 (3)	20:21				16:56		16:13		
Potential sun hours	512		460		382		328	259	233		
Total, worst case		421		6	477						
Sun reduction		0.32		0.34	0.32						
Oper. time red.		1.00		1.00	1.00						
Wind dir. red.		0.63		0.63	0.67						
Total reduction		0.20		0.21	0.22						
Total, real		86		1	103						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: IK - H245

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		19:05 (5)	05:52			05:03		20:44 (3)
	16:15	17:06	18:02						20:00	28	19:33 (5)	20:55			21:45	21	21:05 (3)
2	08:44	08:12	07:14						06:59		19:03 (5)	05:50			05:02		20:45 (3)
	16:16	17:08	18:04						20:02	32	19:35 (5)	20:57			21:46	20	21:05 (3)
3	08:43	08:10	07:12						06:56		19:03 (5)	05:48			05:01		20:45 (3)
	16:17	17:10	18:06						20:04	33	19:36 (5)	20:59			21:48	20	21:05 (3)
4	08:43	08:08	07:09						06:54		19:03 (5)	05:46			05:00		20:45 (3)
	16:18	17:12	18:07						20:06	33	19:36 (5)	21:01			21:49	19	21:04 (3)
5	08:43	08:07	07:07						06:51		19:03 (5)	05:44			04:59		20:47 (3)
	16:20	17:14	18:09						20:07	32	19:35 (5)	21:03			21:50	18	21:05 (3)
6	08:42	08:05	07:04						06:49		19:03 (5)	05:42			04:59		20:47 (3)
	16:21	17:16	18:11						20:09	32	19:35 (5)	21:04			21:51	17	21:04 (3)
7	08:42	08:03	07:02						06:47		19:03 (5)	05:40			04:58		20:47 (3)
	16:22	17:18	18:13						20:11	31	19:34 (5)	21:06			21:52	16	21:03 (3)
8	08:41	08:01	07:00						06:44		19:03 (5)	05:38			04:57		20:49 (3)
	16:24	17:20	18:15						20:13	30	19:33 (5)	21:08			21:53	14	21:03 (3)
9	08:41	07:59	06:57						06:42		19:04 (5)	05:36			04:57		20:50 (3)
	16:25	17:22	18:17						20:15	28	19:32 (5)	21:10			21:54	13	21:03 (3)
10	08:40	07:57	06:55						06:39		19:04 (5)	05:34			04:56		20:50 (3)
	16:27	17:24	18:19						20:17	26	19:30 (5)	21:11			21:55	12	21:02 (3)
11	08:40	07:55	06:52						06:37		19:06 (5)	05:33			04:56		20:51 (3)
	16:28	17:26	18:21						20:19	23	19:29 (5)	21:13			21:55	11	21:02 (3)
12	08:39	07:53	06:50						06:35		19:07 (5)	05:31			04:55		20:52 (3)
	16:30	17:28	18:23						20:20	21	19:28 (5)	21:15			21:56	10	21:02 (3)
13	08:38	07:51	06:48						06:32		19:09 (5)	05:29		20:43 (3)	04:55		20:52 (3)
	16:31	17:30	18:25						20:22	16	19:25 (5)	21:17	1	20:44 (3)	21:57	9	21:01 (3)
14	08:37	07:49	06:45						06:30		19:12 (5)	05:27		20:43 (3)	04:55		20:53 (3)
	16:33	17:32	18:27						20:24	9	19:21 (5)	21:18	4	20:47 (3)	21:57	7	21:00 (3)
15	08:36	07:47	06:43						06:28			05:26		20:42 (3)	04:55		20:54 (3)
	16:34	17:34	18:28						20:26			21:20	6	20:48 (3)	21:58	6	21:00 (3)
16	08:35	07:45	06:40						06:25			05:24		20:42 (3)	04:54		20:56 (3)
	16:36	17:36	18:30						20:28			21:22	8	20:50 (3)	21:59	3	20:59 (3)
17	08:34	07:43	06:38						06:23			05:22		20:41 (3)	04:54		20:57 (3)
	16:38	17:38	18:32						20:30			21:23	10	20:51 (3)	21:59	1	20:58 (3)
18	08:33	07:41	06:35						06:21			05:21		20:41 (3)	04:54		
	16:40	17:40	18:34						20:31			21:25	12	20:53 (3)	22:00		
19	08:32	07:39	06:33						06:18			05:19		20:41 (3)	04:54		
	16:41	17:42	18:36						20:33			21:27	13	20:54 (3)	22:00		
20	08:31	07:36	06:31						06:16			05:18		20:40 (3)	04:54		
	16:43	17:44	18:38						20:35			21:28	15	20:55 (3)	22:00		
21	08:30	07:34	06:28						06:14			05:16		20:41 (3)	04:54		
	16:45	17:46	18:40						20:37			21:30	16	20:57 (3)	22:00		
22	08:28	07:32	06:26						06:12			05:15		20:41 (3)	04:55		
	16:47	17:48	18:42						20:39			21:31	18	20:59 (3)	22:01		
23	08:27	07:30	06:23						06:09			05:13		20:40 (3)	04:55		
	16:49	17:50	18:43						20:41			21:33	19	20:59 (3)	22:01		
24	08:26	07:28	06:21						06:07			05:12		20:41 (3)	04:55		
	16:51	17:52	18:45						20:42			21:34	20	21:01 (3)	22:01		
25	08:24	07:25	06:18						06:05			05:11		20:41 (3)	04:56		
	16:52	17:54	18:47	5					18:16 (5)			21:36	21	21:02 (3)	22:01		
26	08:23	07:23	06:16						18:21 (5)			05:09		20:41 (3)	04:56		20:58 (3)
	16:54	17:56	18:49	10					18:23 (5)			21:37	23	21:04 (3)	22:01	3	21:01 (3)
27	08:22	07:21	06:13						18:10 (5)			05:08		20:42 (3)	04:56		20:57 (3)
	16:56	17:58	18:51	14					18:24 (5)			21:39	23	21:05 (3)	22:01	5	21:02 (3)
28	08:20	07:18	06:11						18:09 (5)			05:07		20:42 (3)	04:57		20:57 (3)
	16:58	18:00	18:53	17					18:26 (5)			21:40	24	21:06 (3)	22:01	6	21:03 (3)
29	08:18		07:09						19:07 (5)			05:06		20:42 (3)	04:58		20:57 (3)
	17:00		19:54	21					19:28 (5)			21:41	24	21:06 (3)	22:01	8	21:05 (3)
30	08:17		07:06						19:06 (5)			05:05		20:43 (3)	04:58		20:56 (3)
	17:02		19:56	24					19:30 (5)			21:43	23	21:06 (3)	22:00	9	21:05 (3)
31	08:15		07:04						19:05 (5)			05:04		20:43 (3)			
	17:04		19:58	26					19:31 (5)			21:44	22	21:05 (3)			
Potential sun hours	250	273	367						420			494			510		
Total, worst case				117					374						248		
Sun reduction				0.27					0.35			0.38			0.32		
Oper. time red.				1.00					1.00			1.00			1.00		
Wind dir. red.				0.67					0.67			0.63			0.63		
Total reduction				0.18					0.24			0.24			0.20		
Total, real				21					89			72			50		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IK - H245

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:55 (3)	05:39	06:33	19:05 (5)	07:26	07:24	08:19			
	22:00	11	21:06 (3)	21:25	20:18	23	19:28 (5)	19:05	16:54	16:10	
2	05:00	20:55 (3)	05:40	06:35	19:03 (5)	07:28	07:26	08:21			
	22:00	12	21:07 (3)	21:23	20:16	26	19:29 (5)	19:02	16:52	16:09	
3	05:00	20:54 (3)	05:42	06:36	19:02 (5)	07:30	07:28	08:22			
	21:59	13	21:07 (3)	21:21	20:13	28	19:30 (5)	19:00	16:50	16:08	
4	05:01	20:54 (3)	05:44	06:38	19:00 (5)	07:31	07:30	08:24			
	21:59	14	21:08 (3)	21:19	20:11	30	19:30 (5)	18:57	16:48	16:08	
5	05:02	20:54 (3)	05:45	06:40	19:00 (5)	07:33	07:32	08:25			
	21:58	15	21:09 (3)	21:17	20:09	31	19:31 (5)	18:55	16:46	16:07	
6	05:03	20:54 (3)	05:47	06:42	18:59 (5)	07:35	07:34	08:26			
	21:57	16	21:10 (3)	21:15	20:06	32	19:31 (5)	18:52	16:44	16:07	
7	05:04	20:53 (3)	05:49	06:43	18:58 (5)	07:37	07:36	08:28			
	21:57	18	21:11 (3)	21:13	20:04	32	19:30 (5)	18:50	16:43	16:06	
8	05:05	20:53 (3)	05:51	06:45	18:58 (5)	07:39	07:38	08:29			
	21:56	18	21:11 (3)	21:11	20:01	32	19:30 (5)	18:48	16:41	16:06	
9	05:06	20:53 (3)	05:52	06:47	18:58 (5)	07:41	07:40	08:30			
	21:55	19	21:12 (3)	21:09	19:59	32	19:30 (5)	18:45	16:39	16:05	
10	05:07	20:52 (3)	05:54	06:49	18:57 (5)	07:42	07:42	08:31			
	21:55	21	21:13 (3)	21:07	19:56	31	19:28 (5)	18:43	16:37	16:05	
11	05:08	20:52 (3)	05:56	06:50	18:57 (5)	07:44	07:44	08:33			
	21:54	21	21:13 (3)	21:05	19:54	29	19:26 (5)	18:40	16:36	16:05	
12	05:09	20:52 (3)	05:58	06:52	18:57 (5)	07:46	07:45	08:34			
	21:53	21	21:13 (3)	21:03	19:51	27	19:24 (5)	18:38	16:34	16:05	
13	05:11	20:51 (3)	05:59	06:54	18:58 (5)	07:48	07:47	08:35			
	21:52	23	21:14 (3)	21:01	19:49	24	19:22 (5)	18:36	16:32	16:05	
14	05:12	20:51 (3)	06:01	06:56	18:57 (5)	07:50	07:49	08:36			
	21:51	23	21:14 (3)	20:59	19:47	21	19:18 (5)	18:33	16:31	16:05	
15	05:13	20:51 (3)	06:03	06:58	18:58 (5)	07:52	07:51	08:37			
	21:50	23	21:14 (3)	20:57	19:44	18	19:16 (5)	18:31	16:29	16:05	
16	05:14	20:51 (3)	06:05	06:59	19:00 (5)	07:54	07:53	08:38			
	21:48	24	21:15 (3)	20:55	19:42	14	19:14 (5)	18:29	16:27	16:05	
17	05:16	20:51 (3)	06:06	07:01	19:00 (5)	07:55	07:55	08:38			
	21:47	23	21:14 (3)	20:53	19:39	11	19:11 (5)	18:26	16:26	16:05	
18	05:17	20:51 (3)	06:08	07:03	19:02 (5)	07:57	07:57	08:39			
	21:46	21	21:12 (3)	20:50	19:37	6	19:08 (5)	18:24	16:25	16:05	
19	05:18	20:50 (3)	06:10	07:05		07:59	07:59	08:40			
	21:45	21	21:11 (3)	20:48	19:34		18:22	16:23	16:05		
20	05:20	20:51 (3)	06:12	07:06		08:01	08:00	08:41			
	21:44	19	21:10 (3)	20:46	19:32		18:20	16:22	16:06		
21	05:21	20:51 (3)	06:13	07:08		08:03	08:02	08:41			
	21:42	18	21:09 (3)	20:44	19:29		18:17	16:20	16:06		
22	05:23	20:50 (3)	06:15	07:10		08:05	08:04	08:42			
	21:41	17	21:07 (3)	20:42	19:27		18:15	16:19	16:07		
23	05:24	20:51 (3)	06:17	07:12		08:07	08:06	08:42			
	21:39	16	21:07 (3)	20:39	19:24		18:13	16:18	16:07		
24	05:26	20:51 (3)	06:19	07:13		08:09	08:08	08:43			
	21:38	14	21:05 (3)	20:37	19:22		18:11	16:17	16:08		
25	05:27	20:52 (3)	06:20	07:15		07:11	08:09	08:43			
	21:36	12	21:04 (3)	20:35	19:19		17:09	16:16	16:08		
26	05:29	20:52 (3)	06:22	07:17		07:13	08:11	08:43			
	21:35	10	21:02 (3)	20:32	19:17		17:06	16:15	16:09		
27	05:30	20:52 (3)	06:24	07:19		07:14	08:13	08:44			
	21:33	9	21:01 (3)	20:30	19:14		17:04	16:13	16:10		
28	05:32	20:52 (3)	06:26	07:21		07:16	08:14	08:44			
	21:32	7	20:59 (3)	20:28	19:12		17:02	16:13	16:11		
29	05:34	20:54 (3)	06:28	19:13 (5)	07:22		07:18	08:16	08:44		
	21:30	4	20:58 (3)	20:25	19:22 (5)		17:00	16:12	16:11		
30	05:35	20:54 (3)	06:29	19:09 (5)	07:24		07:20	08:17	08:44		
	21:28	2	20:56 (3)	20:23	19:26 (5)		16:58	16:11	16:12		
31	05:37			06:31	19:06 (5)		07:22		08:44		
	21:26		20:21	21	19:27 (5)		16:56		16:13		
Potential sun hours	512		460		382		328		259		233
Total, worst case		485		47		447					
Sun reduction		0.32		0.34		0.32					
Oper. time red.		1.00		1.00		1.00					
Wind dir. red.		0.63		0.67		0.67					
Total reduction		0.20		0.23		0.22					
Total, real		98		11		96					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IL - H246

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IM - H247

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:36 21:28	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:44	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case **Shadow receptor:** IN - H248

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16			07:01	05:52	05:03	04:59	05:39	06:33		07:26		07:53 (1)	07:24	08:19
	16:15	17:06	18:02			20:00	20:56	21:45	22:00	21:25	20:18		19:05	20	08:13 (1)	16:54	16:10
2	08:44	08:12	07:14			06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26	08:21
	16:16	17:08	18:04			20:02	20:57	21:47	22:00	21:23	20:16		19:02	18	08:12 (1)	16:52	16:09
3	08:44	08:10	07:12			06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06			20:04	20:59	21:48	21:59	21:21	20:14		19:00	16	08:12 (1)	16:50	16:09
4	08:43	08:09	07:09			06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08			20:06	21:01	21:49	21:59	21:19	20:11		18:57	14	08:12 (1)	16:48	16:08
5	08:43	08:07	07:07			06:52	05:44	04:59	05:02	05:46	06:40		07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10			20:08	21:03	21:50	21:58	21:18	20:09		18:55	11	08:11 (1)	16:46	16:07
6	08:43	08:05	07:05		07:29 (1)	06:49	05:42	04:59	05:03	05:47	06:42		07:35		08:02 (1)	07:34	08:27
	16:21	17:16	18:12	3	07:32 (1)	20:10	21:05	21:51	21:58	21:16	20:06		18:53	8	08:10 (1)	16:45	16:07
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	05:49	06:44		07:37		08:04 (1)	07:36	08:28
	16:22	17:18	18:13	7	07:34 (1)	20:11	21:06	21:52	21:57	21:14	20:04		18:50	5	08:09 (1)	16:43	16:06
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	05:51	06:45		07:39		08:06 (1)	07:38	08:29
	16:24	17:20	18:15	10	07:34 (1)	20:13	21:08	21:53	21:56	21:12	20:02		18:48	1	08:07 (1)	16:41	16:06
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52	06:47		07:41			07:40	08:31
	16:25	17:22	18:17	12	07:34 (1)	20:15	21:10	21:54	21:56	21:10	19:59		18:45			16:39	16:06
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49		07:43			07:42	08:32
	16:27	17:24	18:19	15	07:34 (1)	20:17	21:12	21:55	21:55	21:08	19:57		18:43			16:37	16:05
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56	06:51		07:45			07:44	08:33
	16:28	17:26	18:21	17	07:34 (1)	20:19	21:13	21:56	21:54	21:06	19:54		18:41			16:36	16:05
12	08:39	07:53	06:50		07:14 (1)	06:35	05:31	04:56	05:09	05:58	06:52		07:46			07:46	08:34
	16:30	17:28	18:23	19	07:33 (1)	20:21	21:15	21:56	21:53	21:04	19:52		18:38			16:34	16:05
13	08:38	07:51	06:48		07:12 (1)	06:33	05:29	04:55	05:11	05:59	06:54		07:48			07:48	08:35
	16:31	17:30	18:25	21	07:33 (1)	20:22	21:17	21:57	21:52	21:02	19:49		18:36			16:32	16:05
14	08:37	07:49	06:45		07:12 (1)	06:30	05:27	04:55	05:12	06:01	06:56		07:50			07:50	08:36
	16:33	17:32	18:27	19	07:31 (1)	20:24	21:19	21:58	21:51	20:59	19:47		18:34			16:31	16:05
15	08:37	07:47	06:43		07:13 (1)	06:28	05:26	04:55	05:13	06:03	06:58		07:52			07:51	08:37
	16:35	17:34	18:29	18	07:31 (1)	20:26	21:20	21:58	21:50	20:57	19:44		18:31			16:29	16:05
16	08:36	07:45	06:41		07:14 (1)	06:25	05:24	04:55	05:15	06:05	07:00		07:54			07:53	08:38
	16:36	17:36	18:31	14	07:28 (1)	20:28	21:22	21:59	21:49	20:55	19:42		18:29			16:28	16:05
17	08:35	07:43	06:38		07:16 (1)	06:23	05:22	04:54	05:16	06:06	07:01		07:56			07:55	08:39
	16:38	17:38	18:32	10	07:26 (1)	20:30	21:24	21:59	21:48	20:53	19:39		18:27			16:26	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03		07:58			07:57	08:39	
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37		18:24			16:25	16:05	
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05		07:59			07:59	08:40	
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34		18:22			16:23	16:05	
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01			08:01	08:41	
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20			16:22	16:06	
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03			08:02	08:41	
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18			16:21	16:06	
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05			08:04	08:42	
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15			16:19	16:07	
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07			08:06	08:43	
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13			16:18	16:07	
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09			08:08	08:43	
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22		18:11			16:17	16:08	
25	08:25	07:26	06:19		06:05	05:11	04:56	05:28	06:21	07:15		07:11			08:10	08:43	
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20		17:09			16:16	16:08	
26	08:23	07:23	06:16		06:03	05:10	04:56	05:29	06:22	07:17		07:59 (1)			08:11	08:44	
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	8	08:07 (1)			16:15	16:09	
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:56 (1)			08:13	08:44	
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	13	08:09 (1)			16:14	16:10	
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:54 (1)			08:15	08:44	
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	17	08:11 (1)			16:13	16:11	
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:53 (1)			08:16	08:44	
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	19	08:12 (1)			16:12	16:12	
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		07:52 (1)			08:18	08:44	
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	21	08:13 (1)			16:11	16:13	
31	08:16		07:04			05:04		05:37	06:31			07:23				08:44	
	17:04		19:58			21:44		21:27	20:21			16:56				16:14	
Potential sun hours	250	273	367			420	494	510	512	460	382		328		259	233	
Total, worst case				165							78		93				
Sun reduction				0.27							0.32		0.29				
Oper. time red.				1.00							1.00		1.00				
Wind dir. red.				0.65							0.65		0.65				
Total reduction				0.18							0.21		0.19				
Total, real				29							16		18				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: IO - H249

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26	07:55 (1)	07:24	08:19	
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	20	08:15 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28	07:54 (1)	07:26	08:21	
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	21	08:15 (1)	16:52	16:09
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30	07:56 (1)	07:28	08:22	
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	19	08:15 (1)	16:50	16:09
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32	07:58 (1)	07:30	08:24	
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	17	08:15 (1)	16:48	16:08
5	08:43	08:07	07:07	07:31 (1)	06:52	05:44	04:59	05:02	05:46	06:40		07:33	08:00 (1)	07:32	08:25	
	16:20	17:14	18:10	4	07:35 (1)	21:03	21:50	21:58	21:18	20:09		18:55	14	08:14 (1)	16:46	16:07
6	08:43	08:05	07:05	07:29 (1)	06:49	05:42	04:59	05:03	05:47	06:42		07:35	08:02 (1)	07:34	08:27	
	16:21	17:16	18:12	7	07:36 (1)	21:05	21:51	21:58	21:16	20:06		18:53	12	08:14 (1)	16:45	16:07
7	08:42	08:03	07:02	07:27 (1)	06:47	05:40	04:58	05:04	05:49	06:44		07:37	08:04 (1)	07:36	08:28	
	16:22	17:18	18:13	10	07:37 (1)	21:06	21:52	21:57	21:14	20:04		18:50	9	08:13 (1)	16:43	16:06
8	08:42	08:01	07:00	07:24 (1)	06:44	05:38	04:57	05:05	05:51	06:45		07:39	08:06 (1)	07:38	08:29	
	16:24	17:20	18:15	13	07:37 (1)	21:08	21:53	21:56	21:12	20:02		18:48	6	08:12 (1)	16:41	16:06
9	08:41	07:59	06:58	07:22 (1)	06:42	05:36	04:57	05:06	05:52	06:47		07:41	08:07 (1)	07:40	08:31	
	16:25	17:22	18:17	16	07:38 (1)	21:15	21:10	21:54	21:56	21:10		18:45	2	08:09 (1)	16:39	16:06
10	08:41	07:57	06:55	07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49		07:43		07:42	08:32	
	16:27	17:24	18:19	18	07:37 (1)	21:17	21:12	21:55	21:58	19:57		18:43		16:37	16:05	
11	08:40	07:55	06:53	07:17 (1)	06:37	05:33	04:56	05:08	05:56	06:51		07:45		07:44	08:33	
	16:28	17:26	18:21	20	07:37 (1)	21:19	21:13	21:56	21:54	21:06		18:41		16:36	16:05	
12	08:39	07:53	06:50	07:15 (1)	06:35	05:31	04:56	05:09	05:58	06:52		07:46		07:46	08:34	
	16:30	17:28	18:23	21	07:36 (1)	21:21	21:15	21:56	21:53	21:04		18:38		16:34	16:05	
13	08:38	07:51	06:48	07:16 (1)	06:33	05:29	04:55	05:11	05:59	06:54		07:48		07:48	08:35	
	16:31	17:30	18:25	19	07:35 (1)	21:22	21:17	21:57	21:52	21:02		18:36		16:32	16:05	
14	08:37	07:49	06:45	07:16 (1)	06:30	05:27	04:55	05:12	06:01	06:56		07:50		07:50	08:36	
	16:33	17:32	18:27	17	07:33 (1)	21:24	21:19	21:58	21:51	20:59		18:34		16:31	16:05	
15	08:37	07:47	06:43	07:18 (1)	06:28	05:26	04:55	05:13	06:03	06:58		07:52		07:51	08:37	
	16:35	17:34	18:29	14	07:32 (1)	21:26	21:20	21:58	21:50	20:57		18:31		16:29	16:05	
16	08:36	07:45	06:41	07:19 (1)	06:25	05:24	04:55	05:14	06:05	07:00		07:54		07:53	08:38	
	16:36	17:36	18:31	10	07:29 (1)	21:28	21:22	21:59	21:49	20:55		18:29		16:28	16:05	
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01			07:56		07:55	08:39	
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39			18:27		16:26	16:05	
18	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03			07:58		07:57	08:39	
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37			18:24		16:25	16:05	
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05			07:59		07:59	08:40	
	16:42	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34			18:22		16:23	16:05	
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07			08:01		08:01	08:41	
	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32			18:20		16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08			08:03		08:02	08:41	
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29			18:18		16:21	16:06	
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10			08:05		08:04	08:42	
	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27			18:15		16:19	16:07	
23	08:27	07:30	06:23	06:10	05:13	04:55	05:24	06:17	07:12			08:07		08:06	08:43	
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24			18:13		16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14			08:09		08:08	08:43	
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22			18:11		16:17	16:08	
25	08:25	07:26	06:19	06:05	05:11	04:56	05:28	06:21	07:15			07:11		08:10	08:43	
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20			17:09		16:16	16:08	
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17			07:13		08:11	08:44	
	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17			17:07		16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19			07:15		08:13	08:44	
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15			7	08:09 (1)	17:05	16:10	
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21			07:59 (1)		08:15	08:44	
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12			13	08:12 (1)	17:02	16:11	
29	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23			07:57 (1)		08:16	08:44	
	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10			17	08:14 (1)	17:00	16:12	
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24			07:56 (1)		08:18	08:44	
	17:02		19:57	20:54	21:43	22:01	21:28	20:23	19:07			19	08:15 (1)	16:58	16:13	
31	08:16		07:04		05:04		05:37	06:31				07:23			08:44	
	17:04		19:58		21:44		21:27	20:21				16:56			16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case			169								56	120				
Sun reduction			0.27								0.32	0.29				
Oper. time red.			1.00								1.00	1.00				
Wind dir. red.			0.65								0.65	0.65				
Total reduction			0.18								0.21	0.19				
Total, real			30								12	23				

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IP - H250

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IQ - H251

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	7 07:48 (1)	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04	10 07:49 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	07:12	07:36 (1)	06:57	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06	13 07:49 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
4	08:44	08:09	07:09	07:34 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08	15 07:49 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	08:07	07:07	07:31 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
	16:20	17:14	18:10	18 07:49 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05	07:05	07:29 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12	20 07:49 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03	07:02	07:28 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13	20 07:48 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01	07:00	07:28 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15	19 07:47 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:06
9	08:41	07:59	06:58	07:30 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:31
	16:25	17:22	18:17	16 07:46 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06
10	08:41	07:57	06:55	07:30 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24	18:19	14 07:44 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55	06:53	07:33 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:33
	16:28	17:26	18:21	8 07:41 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
12	08:39	07:53	06:50		06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:34
	16:30	17:28	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
13	08:38	07:51	06:48		06:33	05:29	04:55	05:11	05:59	06:54	07:48	08:35
	16:31	17:30	18:25		20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:05
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:38
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:07
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12	08:07	08:43
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:08
25	08:25	07:26	06:19		06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:43
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	18:09	16:08
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:44
	16:54	17:56	18:49		20:46	21:38	22:01	21:35	20:33	19:17	18:07	16:09
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:44
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	18:05	16:10
28	08:20	07:19	06:11	07:43 (1)	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:44
	16:58	18:00	18:53	4 07:47 (1)	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:11
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	18:03	16:13
31	08:16		07:04			05:04		05:37	06:31		07:23	08:44
	17:04		19:58			21:44		21:27	20:21		16:56	16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328	259
Total, worst case		4		160							169	233
Sun reduction		0.23		0.27							0.29	
Oper. time red.		1.00		1.00							1.00	
Wind dir. red.		0.65		0.65							0.65	
Total reduction		0.15		0.18							0.19	
Total, real		1		28							32	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IR - H252

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
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15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:33 (1) 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	08:32 (1) 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	08:31 (1) 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:30 (1) 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	08:29 (1) 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:29 (1) 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:31 (1) 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:33 (1) 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:35 (1) 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:37 (1) 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:39 (1) 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:40 (1) 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:43 (1) 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:03 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:44 (1) 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:46 (1) 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:48 (1) 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	06:31 20:21	07:23 16:56	07:23 16:56	08:49 (1) 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		200								201		
Sun reduction		0.23								0.29		
Oper. time red.		1.00								1.00		
Wind dir. red.		0.64								0.64		
Total reduction		0.15								0.19		
Total, real		30								38		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IS - H253

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
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15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
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31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IT - H254

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
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13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:07 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:09 16:17	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	07:17 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	07:19 16:12	08:44 16:12
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		216								213		
Sun reduction		0.23								0.29		
Oper. time red.		1.00								1.00		
Wind dir. red.		0.63								0.63		
Total reduction		0.15								0.19		
Total, real		32								40		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IU - H255

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
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Oper. time red.												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IV - H256

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IW - H257

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IX - H258

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: IY - H259

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JA - H261

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JB - H262

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JC - H263

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JD - H264

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JE - H265

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JF - H266

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JG - H267

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
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	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JH - H268

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JI - H269

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JJ - H270

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JK - H271

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JL - H272

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JM - H273

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JN - H274

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JO - H275

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JP - H276

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JQ - H277

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JR - H278

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JS - H279

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JT - H280

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JU - H281

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JV - H282

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JW - H283

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JX - H284

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JY - H285

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: JZ - H286

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
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Table layout: For each day in each month the following matrix apply

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	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KA - H287

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KB - H288

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KC - H289

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KD - H290

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KE - H291

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KF - H292
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December								
1	08:44	08:14	07:16	07:01	05:52	06:18 (5)	05:03	05:33 (4)	04:59	05:32 (4)	05:39	06:29 (5)	06:33	07:26	07:24	08:19				
2	16:15	17:06	18:02	20:00	20:55	33	06:51 (5)	21:45	7	05:40 (4)	22:00	13	05:45 (4)	21:25	24	06:53 (5)	20:18	19:05	16:54	16:10
3	08:44	08:12	07:14	06:59	05:50	06:16 (5)	05:02	05:33 (4)	05:00	05:33 (4)	05:40	06:29 (5)	06:35	07:28	07:26	08:21				
4	16:16	17:08	18:04	20:02	20:57	35	06:51 (5)	21:47	8	05:41 (4)	22:00	13	05:46 (4)	21:23	26	06:55 (5)	20:16	19:02	16:52	16:09
5	08:44	08:10	07:12	06:56	05:48	06:14 (5)	05:01	05:32 (4)	05:00	05:32 (4)	05:40	06:27 (5)	06:36	07:30	07:28	08:22				
6	16:17	17:10	18:06	20:04	20:59	36	06:50 (5)	21:48	9	05:41 (4)	21:59	12	05:45 (4)	21:21	28	06:55 (5)	20:14	19:00	16:50	16:09
7	08:43	08:08	07:09	06:54	05:46	06:14 (5)	05:00	05:31 (4)	05:01	05:34 (4)	05:44	06:26 (5)	06:38	07:32	07:30	08:24				
8	16:18	17:12	18:08	20:06	21:01	35	06:49 (5)	21:49	10	05:41 (4)	21:59	12	05:46 (4)	21:19	30	06:56 (5)	20:11	18:57	16:48	16:08
9	08:43	08:07	07:07	06:52	05:44	06:14 (5)	04:59	05:31 (4)	05:02	05:35 (4)	05:46	06:26 (5)	06:40	07:33	07:32	08:25				
10	16:20	17:14	18:10	20:08	21:03	35	06:49 (5)	21:50	10	05:41 (4)	21:58	11	05:46 (4)	21:17	31	06:57 (5)	20:09	18:55	16:46	16:07
11	08:43	08:05	07:05	06:49	05:42	06:15 (5)	04:59	05:30 (4)	05:03	05:36 (4)	05:47	06:25 (5)	06:42	07:35	07:34	08:26				
12	16:21	17:16	18:11	20:09	21:04	34	06:49 (5)	21:51	11	05:41 (4)	21:58	11	05:47 (4)	21:16	33	06:58 (5)	20:06	18:53	16:45	16:07
13	08:42	08:03	07:02	06:47	05:40	06:15 (5)	04:58	05:30 (4)	05:04	05:37 (4)	05:49	06:24 (5)	06:44	07:37	07:36	08:28				
14	16:22	17:18	18:13	20:11	21:06	33	06:48 (5)	21:52	11	05:41 (4)	21:57	10	05:47 (4)	21:14	34	06:58 (5)	20:04	18:50	16:43	16:06
15	08:42	08:01	07:00	06:44	05:38	06:16 (5)	04:57	05:29 (4)	05:05	05:38 (4)	05:51	06:23 (5)	06:45	07:39	07:38	08:29				
16	16:24	17:20	18:15	20:13	21:08	31	06:47 (5)	21:53	12	05:41 (4)	21:56	10	05:48 (4)	21:12	35	06:58 (5)	20:01	18:48	16:41	16:06
17	08:41	07:59	06:57	06:42	05:36	06:16 (5)	04:57	05:29 (4)	05:06	05:39 (4)	05:52	06:23 (5)	06:47	07:41	07:40	08:30				
18	16:25	17:22	18:17	20:15	21:10	30	06:46 (5)	21:54	12	05:41 (4)	21:55	9	05:48 (4)	21:10	36	06:59 (5)	19:59	18:45	16:39	16:06
19	08:40	07:57	06:55	06:40	05:35	06:18 (5)	04:56	05:28 (4)	05:07	05:40 (4)	05:54	06:24 (5)	06:49	07:43	07:42	08:32				
20	16:27	17:24	18:19	20:17	21:12	27	06:45 (5)	21:55	12	05:40 (4)	21:55	9	05:49 (4)	21:08	36	07:00 (5)	19:56	18:43	16:37	16:05
21	08:40	07:55	06:53	06:37	05:33	06:19 (5)	04:56	05:28 (4)	05:08	05:41 (4)	05:56	06:25 (5)	06:51	07:44	07:44	08:33				
22	16:28	17:26	18:21	20:19	21:13	25	06:44 (5)	21:55	13	05:41 (4)	21:54	8	05:49 (4)	21:06	34	06:59 (5)	19:54	18:41	16:36	16:05
23	08:39	07:53	06:50	06:35	05:31	06:20 (5)	04:56	05:28 (4)	05:09	05:42 (4)	05:58	06:27 (5)	06:52	07:46	07:46	08:34				
24	16:30	17:28	18:23	20:20	21:15	22	06:42 (5)	21:56	13	05:41 (4)	21:53	7	05:49 (4)	21:03	32	06:59 (5)	19:52	18:38	16:34	16:05
25	08:38	07:51	06:48	06:32	05:29	06:22 (5)	04:55	05:27 (4)	05:11	05:43 (4)	05:59	06:29 (5)	06:54	07:48	07:47	08:35				
26	16:31	17:30	18:25	20:22	21:17	19	06:41 (5)	21:57	13	05:40 (4)	21:52	6	05:49 (4)	21:01	31	07:00 (5)	19:49	18:36	16:32	16:05
27	08:37	07:49	06:45	06:30	05:27	06:23 (5)	04:55	05:27 (4)	05:12	05:44 (4)	06:01	06:30 (5)	06:56	07:50	07:49	08:36				
28	16:33	17:32	18:27	20:24	21:18	16	06:39 (5)	21:58	13	05:40 (4)	21:51	5	05:49 (4)	20:59	29	06:59 (5)	19:47	18:34	16:31	16:05
29	08:36	07:47	06:43	06:28	05:26	06:25 (5)	04:55	05:27 (4)	05:13	05:45 (4)	06:03	06:32 (5)	06:58	07:52	07:51	08:37				
30	16:35	17:34	18:29	20:26	21:20	10	06:35 (5)	21:58	14	05:41 (4)	21:50	4	05:49 (4)	20:57	27	06:59 (5)	19:44	18:31	16:29	16:05
31	08:35	07:45	06:40	06:25	05:24	06:25 (5)	04:55	05:27 (4)	05:14	05:47 (4)	06:05	06:33 (5)	06:59	07:54	07:53	08:38				
32	16:36	17:36	18:30	20:28	21:22	06:35 (5)	21:59	05:41 (4)	21:49	05:50 (4)	20:55	25	06:58 (5)	19:42	18:29	16:28	16:05			
33	08:34	07:43	06:38	06:23	05:22	06:25 (5)	04:54	05:27 (4)	05:16	05:48 (4)	06:06	06:35 (5)	07:01	07:56	07:55	08:38				
34	16:38	17:38	18:32	20:30	21:23	06:38 (5)	21:59	05:41 (4)	21:47	2	05:50 (4)	20:53	23	06:58 (5)	19:39	18:27	16:26	16:05		
35	08:33	07:41	06:36	06:21	05:21	06:45 (5)	05:21	05:27 (4)	05:17	06:08	06:37 (5)	07:03	07:57	07:57	08:39	08:40				
36	16:40	17:40	18:34	20:32	21:25	06:46 (5)	21:25	05:41 (4)	21:46	20:51	21	06:58 (5)	19:37	18:24	16:25	16:05				
37	08:32	07:39	06:33	06:18	05:19	06:43 (5)	05:19	05:27 (4)	05:19	06:10	06:38 (5)	07:05	07:59	07:59	08:40	08:41				
38	16:42	17:42	18:36	20:33	21:27	06:48 (5)	21:27	05:41 (4)	21:45	20:48	18	06:56 (5)	19:34	18:22	16:23	16:05				
39	08:31	07:37	06:31	06:16	05:18	06:41 (5)	05:18	05:27 (4)	05:20	06:12	06:40 (5)	07:06	08:01	08:00	08:41	08:41				
40	16:43	17:44	18:38	20:35	21:28	8	06:49 (5)	21:28	22:00	14	05:41 (4)	21:44	20:46	16	06:56 (5)	19:32	18:20	16:22	16:06	
41	08:30	07:34	06:28	06:14	05:16	06:39 (5)	05:16	05:27 (4)	05:21	06:13	06:42 (5)	07:08	08:03	08:02	08:41	08:41				
42	16:45	17:46	18:40	20:37	21:30	11	06:50 (5)	21:30	22:01	14	05:41 (4)	21:42	20:44	13	06:55 (5)	19:29	18:18	16:21	16:06	
43	08:29	07:32	06:26	06:12	05:15	06:36 (5)	05:15	05:28 (4)	05:23	06:15	06:43 (5)	07:10	08:05	08:04	08:42	08:42				
44	16:47	17:48	18:42	20:39	21:31	14	06:50 (5)	21:31	22:01	14	05:42 (4)	21:41	20:42	10	06:53 (5)	19:27	18:15	16:19	16:07	
45	08:27	07:30	06:23	06:09	05:13	06:34 (5)	05:13	05:28 (4)	05:24	06:17	06:45 (5)	07:12	08:07	08:06	08:42	08:42				
46	16:49	17:50	18:43	20:41	21:33	16	06:50 (5)	21:33	22:01	14	05:42 (4)	21:39	20:39	7	06:52 (5)	19:24	18:13	16:18	16:07	
47	08:26	07:28	06:21	06:07	05:12	06:32 (5)	05:12	05:28 (4)	05:26	06:19	06:47 (5)	07:14	08:09	08:08	08:43	08:43				
48	16:51	17:52	18:45	20:43	21:34	19	06:51 (5)	21:34	22:01	14	05:42 (4)	21:38	20:37	4	06:51 (5)	19:22	18:11	16:17	16:08	
49	08:25	07:25	06:18	06:05	05:11	06:30 (5)	05:11	05:29 (4)	05:27	06:21	06:45 (5)	07:15	08:11	08:09	08:43	08:43				
50	16:53	17:54	18:47	20:44	21:36	21	06:51 (5)	21:36	22:01	14	05:43 (4)	21:36	20:35	19:19	17:09	16:16	16:08	16:08		
51	08:23	07:23	06:16	06:03	05:09	06:28 (5)	05:09	05:29 (4)	05:29	06:22	06:52 (5)	19:27	17:17	17:13	08:11	08:43	08:43			
52	16:54	17:56	18:49	20:46	21:37	23	06:51 (5)	21:37	22:01	14	05:43 (4)	21:35	20:32	19:17	17:07	16:15	16:09	16:09		
53	08:22	07:21	06:14	06:01	05:08	06:26 (5)	05:08	05:38 (4)	04:57	06:24	06:53 (5)	19:26	18:16	16:21	16:10	16:10				
54	16:56	17:58	18:51	20:48	21:39	2	05:40 (4)	22:01	14	05:44 (4)	21:33	20:30	19:15	17:05	16:14	16:14	08:44	08:44		
55	08:20	07:19	06:11	05:59	05:07	06:24 (5)	05:07	05:37 (4)	04:57	06:25	06:55 (5)	19:27	18:17	16:21	16:10	16:10				
56	16:58	18:00	18:53	20:50	21:40	4	05:41 (4)	22:01	14	05:44 (4)	21:32	4	06:43 (5)	20:28	19:12	17:02	16:13	16:11	16:11	
57	08:19	07:09	05:56	05:43	04:51	06:22 (5)	04:51	05:36 (4)	04:58	06:27	06:57 (5)	19:28	18:18	16:23	16:12	16:12				
58	17:00	17:55	18:50	20:52	21:41	5	05:41 (4)	22:01	13	05:44 (4)	21:30	12	06:48 (5)	20:25	19:10	17:00	16:12	16:12	16:12	
59	08:17	07:06	05:54	05:41	04:49	06:20 (5)	04:49	05:35 (4)	04:58	06:29	06:59 (5)	19:30	18:20	16:25	16:14	16:14				
60	17:02	17:56	18:51	20:54	21:43	6	05:41 (4)	22:00	13	05:44 (4)	21:28	17	06:50 (5)	20:23	16:58	16:11	16:11	16:13	16:13	
61	08:15	07:04	05:52	05:39	04:47	06:19 (5)	04:47	05:30 (4)	04:51	06:31	06:61 (5)	19:31								

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KG - H293

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	18:02	07:01	20:00	9	07:25 (5)	05:52	20:55	05:03		
2	08:44	16:16	08:12	17:08	18:04	07:14	18:04	18:04	06:59	20:02	12	07:35 (5)	05:50	20:57	05:01		
3	08:44	16:17	08:10	17:10	18:06	07:12	18:06	18:06	06:56	20:04	15	07:35 (5)	05:48	20:59	05:01		
4	08:43	16:18	08:09	17:12	18:08	07:09	18:08	18:08	06:54	20:06	17	07:35 (5)	05:46	21:01	05:00		
5	08:43	16:20	08:07	17:14	18:10	07:07	18:10	18:10	06:52	20:08	19	07:34 (5)	05:44	21:03	04:59		
6	08:43	16:21	08:05	17:16	18:11	07:05	18:11	18:11	06:49	20:09	21	07:34 (5)	05:42	21:04	04:59		
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	18:13	06:47	20:11	22	07:33 (5)	05:40	21:06	04:58		
8	08:42	16:24	08:01	17:20	18:15	07:00	18:15	18:15	06:44	20:13	24	07:32 (5)	05:38	21:08	04:57	05:29 (3)	
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	18:17	06:42	20:15	25	07:31 (5)	05:36	21:10	04:57	05:29 (3)	
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	18:19	06:40	20:17	23	07:29 (5)	05:35	21:12	04:56	05:30 (3)	
11	08:40	16:28	07:55	17:26	18:21	06:53	18:21	18:21	06:37	20:19	21	07:28 (5)	05:33	21:13	04:56	05:28 (3)	
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	18:23	06:35	20:21	17	07:26 (5)	05:31	21:15	04:56	05:31 (3)	
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	18:25	06:32	20:22	13	07:24 (5)	05:29	21:17	04:55	05:27 (3)	
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	18:27	06:30	20:24	3	07:24 (5)	05:27	21:17	04:55	05:31 (3)	
15	08:36	16:35	07:47	17:34	18:29	06:43	18:29	18:29	06:28	20:26		07:18 (5)	05:26	21:18	04:55	05:27 (3)	
16	08:35	16:36	07:45	17:36	18:30	06:41	18:30	18:30	06:26	20:28			05:24	21:20	04:55	05:32 (3)	
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	18:32	06:25	20:30			05:22	21:22	04:55	05:27 (3)	
18	08:33	16:40	07:41	17:40	18:34	06:36	18:34	18:34	06:23	20:32			05:21	21:23	04:54	05:32 (3)	
19	08:32	16:42	07:39	17:42	18:36	06:33	18:36	18:36	06:21	20:34			05:20	21:24	04:54	05:27 (3)	
20	08:31	16:43	07:37	17:44	18:38	06:31	18:38	18:38	06:19	20:36			05:19	21:25	04:54	05:33 (3)	
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	18:40	06:17	20:38			05:18	21:26	04:54	05:27 (3)	
22	08:29	16:47	07:32	17:48	18:42	06:26	18:42	18:42	06:16	20:40			05:17	21:27	04:54	05:33 (3)	
23	08:27	16:49	07:30	17:50	18:44	06:23	18:44	18:44	06:14	20:42			05:16	21:28	04:54	05:27 (3)	
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45	18:45	06:12	20:44			05:15	21:29	04:54	05:33 (3)	
25	08:25	16:53	07:25	17:54	18:47	06:18	18:47	18:47	06:10	20:46			05:14	21:30	04:54	05:27 (3)	
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	18:49	06:09	20:48			05:13	21:31	04:54	05:33 (3)	
27	08:22	16:56	07:21	17:58	18:51	06:14	18:51	18:51	06:07	20:50			05:12	21:32	04:54	05:27 (3)	
28	08:20	16:58	07:19	18:00	18:53	06:11	18:53	18:53	06:06	20:52			05:11	21:33	04:54	05:33 (3)	
29	08:19	17:00			19:55	07:09		19:55	06:05	20:54			05:10	21:34	04:54	05:27 (3)	
30	08:17	17:02			19:56	07:06		19:56	06:04	20:56			05:09	21:35	04:54	05:33 (3)	
31	08:15	17:04			19:58	07:04		19:58	06:03	20:58			05:08	21:36	04:54	05:27 (3)	
Potential sun hours	250		273		367			420				494		510			
Total, worst case					11			241						103			
Sun reduction					0.27			0.35						0.32			
Oper. time red.					1.00			1.00						1.00			
Wind dir. red.					0.68			0.68						0.66			
Total reduction					0.18			0.24						0.21			
Total, real					2			57						22			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KG - H293

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 3	05:32 (3) 05:35 (3) 21:25	06:33 20:18 21	07:06 (5) 07:27 (5) 19:05	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 2	05:33 (3) 05:35 (3) 21:23	06:35 20:16 23	07:05 (5) 07:28 (5) 19:02	07:26 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 2	05:33 (3) 05:35 (3) 21:21	06:37 20:14 25	07:04 (5) 07:29 (5) 19:00	07:28 16:50 16:09	08:22 16:09 16:09
4	05:01 21:59 1	05:34 (3) 05:35 (3) 21:19	06:38 20:11 24	07:05 (5) 07:29 (5) 18:57	07:30 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 6	05:46 21:17 05:47	06:40 20:09 22	07:07 (5) 07:29 (5) 18:55	07:32 16:46 16:07	08:25 16:07 16:07
6	05:03 21:58 7	05:47 21:16 05:49	06:42 20:06 21	07:09 (5) 07:30 (5) 18:53	07:35 16:45 16:07	08:26 16:07 16:07
7	05:04 21:57 8	05:49 21:14 05:51	06:44 20:04 19	07:10 (5) 07:29 (5) 18:50	07:36 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 9	05:51 21:12 05:52	06:45 20:01 17	07:12 (5) 07:29 (5) 18:48	07:38 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 10	05:52 21:10 05:54	06:47 19:59 15	07:14 (5) 07:29 (5) 18:45	07:40 16:39 16:06	08:30 16:06 16:06
10	05:07 21:55 11	05:54 21:08 05:56	06:49 19:57 12	07:16 (5) 07:28 (5) 18:43	07:42 16:37 16:05	08:32 16:05 16:05
11	05:08 21:54 12	05:56 21:06 05:58	06:51 19:54 10	07:17 (5) 07:27 (5) 18:41	07:44 16:36 16:05	08:33 16:05 16:05
12	05:09 21:53 13	05:58 21:03 05:59	06:52 19:52 7	07:19 (5) 07:26 (5) 18:38	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 14	05:59 21:01 06:01	06:54 19:49 4	07:21 (5) 07:25 (5) 18:36	07:47 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 15	06:01 20:59 06:03	06:56 19:47 1	07:22 (5) 07:23 (5) 18:34	07:49 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 16	06:03 20:57 06:05	06:58 19:44 06:59	07:52 18:31 16:29	07:51 16:29 16:05	08:37 16:05 16:05
16	05:15 21:49 17	06:05 20:55 06:06	06:59 19:42 07:01	07:54 18:29 16:28	07:53 16:28 16:05	08:38 16:05 16:05
17	05:16 21:47 18	06:06 20:53 06:08	07:01 19:39 07:03	07:56 18:27 16:26	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 19	06:08 20:51 06:10	07:03 19:37 07:05	07:57 18:24 16:25	07:57 16:25 16:05	08:39 16:05 16:05
19	05:19 21:45 20	06:10 20:48 06:12	07:05 19:34 07:07	07:59 18:22 16:23	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44 21	06:12 20:46 06:14	07:07 19:32 07:08	08:01 18:20 16:22	08:01 16:22 16:06	08:41 16:06 16:06
21	05:21 21:42 22	06:14 20:44 06:15	07:08 19:29 07:10	08:03 18:18 16:21	08:02 16:21 16:06	08:41 16:06 16:06
22	05:23 21:41 23	06:15 20:42 06:17	07:10 19:27 07:12	08:05 18:15 16:19	08:04 16:19 16:07	08:42 16:07 16:07
23	05:24 21:39 24	06:17 20:39 06:19	07:12 19:24 07:14	08:07 18:13 16:18	08:06 16:18 16:07	08:42 16:07 16:07
24	05:26 21:38 25	06:19 20:37 06:21	07:14 19:22 07:15	08:09 18:11 16:17	08:08 16:17 16:08	08:43 16:08 16:08
25	05:28 21:36 26	06:21 20:35 06:22	07:15 19:19 07:17	07:11 17:09 16:16	08:09 16:16 16:08	08:43 16:08 16:08
26	05:29 21:35 27	06:22 20:32 06:24	07:17 19:17 07:19	07:13 17:07 16:15	08:11 16:15 16:09	08:43 16:09 16:09
27	05:31 21:33 28	06:24 20:30 06:26	07:19 19:15 07:21	07:15 17:05 16:14	08:13 16:14 16:10	08:44 16:10 16:10
28	05:32 21:32 29	06:28 20:28 06:28	07:21 19:12 07:23	07:17 17:02 16:13	08:14 16:13 16:11	08:44 16:11 16:11
29	05:34 21:30 30	06:28 20:25 06:29	07:23 19:10 07:20	07:19 17:00 16:12	08:16 16:12 16:12	08:44 16:12 16:12
30	05:35 21:28 31	06:29 20:23 06:31	07:24 19:07 07:24	07:20 16:58 16:11	08:18 16:11 16:13	08:44 16:13 16:13
31	05:37 21:27 Potential sun hours	06:31 20:21 460	07:25 (5) 07:26 (5) 382	07:22 16:56 328	08:13 16:14 259	08:44 16:14 233
Total, worst case	8	35	221			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.68	0.68			
Total reduction	0.21	0.23	0.22			
Total, real	2	8	48			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KH - H294

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		07:25 (5)	05:52			05:03		05:34 (3)
	16:15	17:06	18:02						20:00	15	07:40 (5)	20:55			21:45	12	05:46 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50			05:02		05:33 (3)
	16:16	17:08	18:04						20:02	17	07:40 (5)	20:57			21:47	13	05:46 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48			05:01		05:32 (3)
	16:17	17:10	18:06						20:04	19	07:39 (5)	20:59			21:48	13	05:45 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46			05:00		05:31 (3)
	16:18	17:12	18:08						20:06	20	07:38 (5)	21:01			21:49	14	05:45 (3)
5	08:43	08:07	07:07						06:52		07:15 (5)	05:44			04:59		05:31 (3)
	16:20	17:14	18:10						20:08	22	07:37 (5)	21:03			21:50	15	05:46 (3)
6	08:43	08:05	07:05						06:49		07:14 (5)	05:42			04:59		05:30 (3)
	16:21	17:16	18:11						20:09	22	07:36 (5)	21:04			21:51	16	05:46 (3)
7	08:42	08:03	07:02						06:47		07:16 (5)	05:40			04:58		05:30 (3)
	16:22	17:18	18:13						20:11	19	07:35 (5)	21:06			21:52	16	05:46 (3)
8	08:42	08:01	07:00						06:44		07:16 (5)	05:38			04:57		05:29 (3)
	16:24	17:20	18:15						20:13	16	07:32 (5)	21:08			21:53	17	05:46 (3)
9	08:41	07:59	06:57						06:42		07:19 (5)	05:36			04:57		05:29 (3)
	16:25	17:22	18:17						20:15	10	07:29 (5)	21:10			21:54	17	05:46 (3)
10	08:40	07:57	06:55						06:40			05:35			04:56		05:28 (3)
	16:27	17:24	18:19						20:17			21:12			21:55	18	05:46 (3)
11	08:40	07:55	06:53						06:37			05:33			04:56		05:28 (3)
	16:28	17:26	18:21						20:19			21:13			21:55	18	05:46 (3)
12	08:39	07:53	06:50						06:35			05:31			04:56		05:28 (3)
	16:30	17:28	18:23						20:21			21:15			21:56	18	05:46 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:27 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	19	05:46 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:27 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	19	05:46 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:27 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	19	05:46 (3)
16	08:35	07:45	06:41						06:25			05:24			04:55		05:27 (3)
	16:36	17:36	18:30						20:28			21:22			21:59	19	05:46 (3)
17	08:34	07:43	06:38						06:23			05:22			04:54		05:27 (3)
	16:38	17:38	18:32						20:30			21:23			21:59	20	05:47 (3)
18	08:33	07:41	06:36						06:21			05:21			04:54		05:27 (3)
	16:40	17:40	18:34						20:32			21:25			22:00	20	05:47 (3)
19	08:32	07:39	06:33						06:19			05:19			04:54		05:27 (3)
	16:42	17:42	18:36						20:33			21:27			22:00	20	05:47 (3)
20	08:31	07:37	06:31						06:16			05:18			04:55		05:27 (3)
	16:43	17:44	18:38						20:35			21:28			22:00	20	05:47 (3)
21	08:30	07:34	06:28						06:14			05:16			04:55		05:27 (3)
	16:45	17:46	18:40						20:37			21:30			22:01	20	05:47 (3)
22	08:29	07:32	06:26						06:12			05:15			04:55		05:28 (3)
	16:47	17:48	18:42						20:39			21:31			22:01	20	05:48 (3)
23	08:27	07:30	06:23						06:09			05:13			04:55		05:28 (3)
	16:49	17:50	18:44						20:41			21:33			22:01	20	05:48 (3)
24	08:26	07:28	06:21						06:07			05:12		05:41 (3)	04:55		05:28 (3)
	16:51	17:52	18:45						20:43		2	21:34		05:43 (3)	22:01	20	05:48 (3)
25	08:25	07:25	06:18						06:05			05:11		05:40 (3)	04:56		05:29 (3)
	16:53	17:54	18:47						20:44			21:36		05:43 (3)	22:01	20	05:49 (3)
26	08:23	07:23	06:16						06:03			05:10		05:39 (3)	04:56		05:29 (3)
	16:54	17:56	18:49						20:46			21:37		05:44 (3)	22:01	20	05:49 (3)
27	08:22	07:21	06:14					06:37 (5)	06:01			05:08		05:38 (3)	04:57		05:30 (3)
	16:56	17:58	18:51	1	06:38 (5)	20:48			21:39		6	05:44 (3)		05:44 (3)	22:01	19	05:49 (3)
28	08:20	07:19	06:11		06:35 (5)	05:59			05:07			05:37 (3)		05:37 (3)	04:57		05:30 (3)
	16:58	18:00	18:53	5	06:40 (5)	20:50			21:40		7	05:44 (3)		05:44 (3)	22:01	19	05:49 (3)
29	08:19		07:09		07:32 (5)	05:56			05:06			05:36 (3)		05:36 (3)	04:58		05:31 (3)
	17:00		19:55	8	07:40 (5)	20:52			21:41		9	05:45 (3)		05:45 (3)	22:01	19	05:50 (3)
30	08:17		07:06		07:30 (5)	05:54			05:05			05:35 (3)		05:35 (3)	04:58		05:31 (3)
	17:02		19:56	10	07:40 (5)	20:54			21:43		10	05:45 (3)		05:45 (3)	22:00	19	05:50 (3)
31	08:15		07:04		07:27 (5)				05:04			05:34 (3)		05:34 (3)			
	17:04		19:58	13	07:40 (5)				21:44		11	05:45 (3)		05:45 (3)			
Potential sun hours	250	273	367			420			494			510					
Total, worst case				37		160					53				539		
Sun reduction				0.27		0.35					0.38				0.32		
Oper. time red.				1.00		1.00					1.00				1.00		
Wind dir. red.				0.68		0.68					0.66				0.66		
Total reduction				0.18		0.24					0.25				0.21		
Total, real				7		38					13				113		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KH - H294

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 18	05:32 (3) 05:50 (3) 21:25	05:39 21:25 20:18	06:33 20:18	07:26 19:05 16:54	08:19 16:10
2	05:00 22:00 18	05:33 (3) 05:51 (3) 21:23	05:40 21:23 20:16	06:35 20:16	07:28 19:02 16:52	08:21 16:09
3	05:00 21:59 17	05:33 (3) 05:50 (3) 21:21	05:42 21:21 20:14	06:37 20:14	07:30 19:00 16:50	08:22 16:09
4	05:01 21:59 17	05:34 (3) 05:51 (3) 21:19	05:44 21:19 20:11	06:38 20:11	07:32 18:57 16:48	08:24 16:08
5	05:02 21:58 16	05:35 (3) 05:51 (3) 21:17	05:46 21:17 20:09	06:40 20:09	07:33 18:55 16:46	08:25 16:07
6	05:03 21:58 16	05:36 (3) 05:52 (3) 21:16	05:47 21:16 20:06	06:42 20:06	07:35 18:53 16:45	08:26 16:07
7	05:04 21:57 15	05:37 (3) 05:52 (3) 21:14	05:49 21:14 20:04	06:44 20:04	07:37 18:50 16:43	08:28 16:06
8	05:05 21:56 14	05:38 (3) 05:53 (3) 21:12	05:51 21:12 20:01	06:45 20:01	07:39 18:48 16:41	08:29 16:06
9	05:06 21:55 14	05:39 (3) 05:53 (3) 21:10	05:52 21:10 19:59	06:47 19:59	07:41 18:45 16:39	08:30 16:06
10	05:07 21:55 13	05:40 (3) 05:53 (3) 21:08	05:54 21:08 19:57	06:49 19:57	07:43 18:43 16:37	08:32 16:05
11	05:08 21:54 12	05:41 (3) 05:53 (3) 21:06	05:56 21:06 19:54	06:51 19:54	07:44 18:41 16:36	08:33 16:05
12	05:10 21:53 11	05:42 (3) 05:53 (3) 21:03	05:58 21:03 19:52	06:52 19:52	07:46 18:38 16:34	08:34 16:05
13	05:11 21:52 10	05:43 (3) 05:53 (3) 21:01	05:59 21:01 19:49	06:54 19:49	07:48 18:36 16:32	08:35 16:05
14	05:12 21:51 9	05:44 (3) 05:53 (3) 20:59	06:01 20:59 19:47	06:56 19:47	07:50 18:34 16:31	08:36 16:05
15	05:13 21:50 8	05:45 (3) 05:53 (3) 20:57	06:03 20:57 19:44	06:58 19:44	07:52 18:31 16:29	08:37 16:05
16	05:15 21:49 7	05:47 (3) 05:54 (3) 20:55	06:05 20:55 19:42	06:59 19:42	07:54 18:29 16:28	08:38 16:05
17	05:16 21:47 5	05:48 (3) 05:53 (3) 20:53	06:06 20:53 19:39	07:01 19:39	07:56 18:27 16:26	08:39 16:05
18	05:17 21:46 4	05:49 (3) 05:53 (3) 20:51	06:08 20:51 19:37	07:03 19:37	07:57 18:24 16:25	08:39 16:05
19	05:19 21:45 3	05:50 (3) 05:53 (3) 20:48	06:10 20:48 19:34	07:05 19:34	07:59 18:22 16:23	08:40 16:05
20	05:20 21:44 1	05:52 (3) 05:53 (3) 20:46	06:12 20:46 19:32	07:07 19:32	08:01 18:20 16:22	08:41 16:06
21	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	228		197			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	49		43			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KI - H295

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		07:25 (5)	05:52			05:03		05:34 (3)
	16:15	17:06	18:02						20:00	14	07:39 (5)	20:55			21:45	16	05:50 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50			05:02		05:33 (3)
	16:16	17:08	18:04						20:02	16	07:39 (5)	20:57			21:47	17	05:50 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48			05:01		05:32 (3)
	16:17	17:10	18:06						20:04	17	07:37 (5)	20:59			21:48	17	05:49 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46			05:00		05:31 (3)
	16:18	17:12	18:08						20:06	19	07:37 (5)	21:01			21:49	18	05:49 (3)
5	08:43	08:07	07:07						06:52		07:15 (5)	05:44			04:59		05:31 (3)
	16:20	17:14	18:10						20:08	20	07:35 (5)	21:03			21:50	18	05:49 (3)
6	08:43	08:05	07:05						06:49		07:16 (5)	05:42			04:59		05:30 (3)
	16:21	17:16	18:11						20:09	18	07:34 (5)	21:04			21:51	19	05:49 (3)
7	08:42	08:03	07:02						06:47		07:18 (5)	05:40			04:58		05:30 (3)
	16:22	17:18	18:13						20:11	14	07:32 (5)	21:06			21:52	19	05:49 (3)
8	08:42	08:01	07:00						06:44		07:20 (5)	05:38			04:57		05:30 (3)
	16:24	17:20	18:15						20:13	8	07:28 (5)	21:08			21:53	18	05:48 (3)
9	08:41	07:59	06:57						06:42			05:36			04:57		05:31 (3)
	16:25	17:22	18:17						20:15			21:10			21:54	17	05:48 (3)
10	08:40	07:57	06:55						06:40			05:35			04:56		05:31 (3)
	16:27	17:24	18:19						20:17			21:12			21:55	17	05:48 (3)
11	08:40	07:55	06:53						06:37			05:33			04:56		05:32 (3)
	16:28	17:26	18:21						20:19			21:13			21:55	16	05:48 (3)
12	08:39	07:53	06:50						06:35			05:31			04:56		05:32 (3)
	16:30	17:28	18:23						20:21			21:15			21:56	16	05:48 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:32 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	15	05:47 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:33 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	14	05:47 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:34 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	13	05:47 (3)
16	08:35	07:45	06:41						06:25			05:24			04:55		05:34 (3)
	16:36	17:36	18:30						20:28			21:22			21:59	13	05:47 (3)
17	08:34	07:43	06:38						06:23			05:22			04:54		05:35 (3)
	16:38	17:38	18:32						20:30			21:23			21:59	12	05:47 (3)
18	08:33	07:41	06:36						06:21			05:21			04:54		05:35 (3)
	16:40	17:40	18:34						20:32			21:25			22:00	12	05:47 (3)
19	08:32	07:39	06:33						06:19			05:19		05:48 (3)	04:54		05:35 (3)
	16:42	17:42	18:36						20:33			21:27	1	05:49 (3)	22:00	12	05:47 (3)
20	08:31	07:37	06:31						06:16			05:18		05:46 (3)	04:55		05:36 (3)
	16:43	17:44	18:38						20:35			21:28	3	05:49 (3)	22:00	11	05:47 (3)
21	08:30	07:34	06:28						06:14			05:16		05:45 (3)	04:55		05:37 (3)
	16:45	17:46	18:40						20:37			21:30	4	05:49 (3)	22:01	11	05:48 (3)
22	08:29	07:32	06:26						06:12			05:15		05:44 (3)	04:55		05:37 (3)
	16:47	17:48	18:42						20:39			21:31	6	05:50 (3)	22:01	11	05:48 (3)
23	08:27	07:30	06:23						06:09			05:13		05:43 (3)	04:55		05:36 (3)
	16:49	17:50	18:44						20:41			21:33	7	05:50 (3)	22:01	12	05:48 (3)
24	08:26	07:28	06:21						06:07			05:12		05:41 (3)	04:55		05:36 (3)
	16:51	17:52	18:45						20:43			21:34	8	05:49 (3)	22:01	12	05:48 (3)
25	08:25	07:25	06:18						06:05			05:11		05:40 (3)	04:56		05:37 (3)
	16:53	17:54	18:47						20:44			21:36	10	05:50 (3)	22:01	12	05:49 (3)
26	08:23	07:23	06:16						06:03			05:10		05:39 (3)	04:56		05:36 (3)
	16:54	17:56	18:49						20:46			21:37	11	05:50 (3)	22:01	13	05:49 (3)
27	08:22	07:21	06:14					06:37 (5)	06:01			05:08		05:38 (3)	04:57		05:37 (3)
	16:56	17:58	18:51	1	06:38 (5)	20:48			21:39	12	05:50 (3)	22:01	13	05:50 (3)			05:50 (3)
28	08:20	07:19	06:11		06:35 (5)	05:59			05:07		05:37 (3)	04:57		05:37 (3)	04:57		05:36 (3)
	16:58	18:00	18:53	4	06:39 (5)	20:50			21:40	13	05:50 (3)	22:01	14	05:50 (3)			05:50 (3)
29	08:19		07:09		07:32 (5)	05:56			05:06		05:36 (3)	04:58		05:37 (3)			05:37 (3)
	17:00		19:55	7	07:39 (5)	20:52			21:41	14	05:50 (3)	22:01	14	05:51 (3)			05:51 (3)
30	08:17		07:06		07:30 (5)	05:54			05:05		05:35 (3)	04:58		05:36 (3)			05:36 (3)
	17:02		19:56	9	07:39 (5)	20:54			21:43	15	05:50 (3)	22:00	15	05:51 (3)			05:51 (3)
31	08:15		07:04		07:27 (5)				05:04		05:34 (3)						
	17:04		19:58	12	07:39 (5)				21:44	15	05:49 (3)						
Potential sun hours	250	273	367			420			494			510					
Total, worst case				33		126			119			437					
Sun reduction				0.27		0.35			0.38			0.32					
Oper. time red.				1.00		1.00			1.00			1.00					
Wind dir. red.				0.68		0.68			0.66			0.66					
Total reduction				0.18		0.24			0.25			0.21					
Total, real				6		30			30			92					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KI - H295

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 16	05:36 (3) 05:52 (3) 21:25	05:39 21:25 20:18	06:33 20:18	07:26 19:05 16:10	08:19 16:10
2	05:00 22:00 17	05:36 (3) 05:53 (3) 21:23	05:40 21:23 20:16	06:35 20:16	07:28 19:02 16:52	08:21 16:09
3	05:00 21:59 17	05:35 (3) 05:52 (3) 21:21	05:42 21:21 20:14	06:37 20:14	07:30 19:00 16:50	08:22 16:09
4	05:01 21:59 18	05:35 (3) 05:53 (3) 21:19	05:44 21:19 20:11	06:38 20:11	07:32 18:57 16:48	08:24 16:08
5	05:02 21:58 19	05:35 (3) 05:54 (3) 21:17	05:46 21:17 20:09	06:40 20:09	07:33 18:55 16:46	08:25 16:07
6	05:03 21:58 19	05:36 (3) 05:55 (3) 21:16	05:47 21:16 20:06	06:42 20:06	07:35 18:53 16:45	08:26 16:07
7	05:04 21:57 18	05:37 (3) 05:55 (3) 21:14	05:49 21:14 20:04	06:44 20:04	07:37 18:50 16:43	08:28 16:06
8	05:05 21:56 18	05:38 (3) 05:56 (3) 21:12	05:51 21:12 20:01	06:45 20:01	07:39 18:48 16:41	08:29 16:06
9	05:06 21:55 17	05:39 (3) 05:56 (3) 21:10	05:52 21:10 19:59	06:47 19:59	07:41 18:45 16:39	08:30 16:06
10	05:07 21:55 17	05:40 (3) 05:57 (3) 21:08	05:54 21:08 19:57	06:49 19:57	07:43 18:43 16:37	08:32 16:05
11	05:08 21:54 16	05:41 (3) 05:57 (3) 21:06	05:56 21:06 19:54	06:51 19:54	07:44 18:41 16:36	08:33 16:05
12	05:10 21:53 16	05:42 (3) 05:58 (3) 21:04	05:58 21:04 19:52	06:52 19:52	07:46 18:38 16:34	08:34 16:05
13	05:11 21:52 15	05:43 (3) 05:58 (3) 21:01	05:59 21:01 19:49	06:54 19:49	07:48 18:36 16:32	08:35 16:05
14	05:12 21:51 14	05:44 (3) 05:58 (3) 20:59	06:01 20:59 19:47	06:56 19:47	07:50 18:34 16:31	08:36 16:05
15	05:13 21:50 13	05:45 (3) 05:58 (3) 20:57	06:03 20:57 19:44	06:58 19:44	07:52 18:31 16:29	08:37 16:05
16	05:15 21:49 12	05:47 (3) 05:59 (3) 20:55	06:05 20:55 19:42	06:59 19:42	07:54 18:29 16:28	08:38 16:05
17	05:16 21:47 11	05:48 (3) 05:59 (3) 20:53	06:06 20:53 19:39	07:01 19:39	07:56 18:27 16:26	08:39 16:05
18	05:17 21:46 10	05:49 (3) 05:59 (3) 20:51	06:08 20:51 19:37	07:03 19:37	07:57 18:24 16:25	08:39 16:05
19	05:19 21:45 9	05:51 (3) 06:00 (3) 20:48	07:05 20:48 19:34	07:05 19:34	07:59 18:22 16:23	08:40 16:05
20	05:20 21:44 8	05:52 (3) 06:00 (3) 20:46	07:07 20:46 19:32	07:07 19:32	08:01 18:20 16:22	08:41 16:06
21	05:21 21:42 7	05:53 (3) 06:00 (3) 20:44	07:08 20:44 19:29	07:08 19:29	08:03 18:18 16:21	08:41 16:06
22	05:23 21:41 5	05:55 (3) 06:00 (3) 20:42	07:10 20:42 19:27	07:10 19:27	08:05 18:15 16:19	08:42 16:07
23	05:24 21:39 4	05:56 (3) 06:00 (3) 20:39	07:12 20:39 19:24	07:12 19:24	08:07 18:13 16:18	08:42 16:07
24	05:26 21:38 2	05:57 (3) 05:59 (3) 20:37	07:14 20:37 19:22	07:14 19:22	08:09 18:11 16:17	08:43 16:08
25	05:28 21:36 1	06:21 20:35 19:19	07:15 19:19	07:15 19:19	07:11 17:09 16:16	08:43 16:08
26	05:29 21:35 1	06:22 20:33 19:17	07:17 19:17	07:17 19:17	07:13 17:07 16:15	08:43 16:09
27	05:31 21:33 1	06:24 20:30 19:15	07:19 19:15	07:19 19:15	07:15 17:05 16:14	08:44 16:10
28	05:32 21:32 1	06:26 20:28 19:12	07:21 19:12	07:21 19:12	07:17 17:02 16:13	08:44 16:11
29	05:34 21:30 1	06:28 20:25 19:10	07:23 19:10	07:23 19:10	07:19 17:00 16:12	08:44 16:12
30	05:35 21:28 1	06:29 20:23 19:07	07:24 19:07	07:24 19:07	07:20 16:58 16:11	08:44 16:13
31	05:37 21:27 1	06:31 20:21	07:25 19:05	07:25 19:05	07:22 16:56 16:14	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	318		162			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	67		35			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KJ - H296

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:07 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KK - H297

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:09 (1)	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	14	06:23 (1)	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:41	06:11 (1)	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	13	06:24 (1)	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	06:57	05:48	05:01	05:01	05:42	06:12 (1)	06:37	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	11	06:23 (1)	20:14	19:00	16:50	16:09		
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:14 (1)	06:38	07:32	07:30	08:24			
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	9	06:23 (1)	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	06:52	05:44	06:10 (1)	04:59	05:02	06:16 (1)	06:40	07:33	07:32	08:25			
	16:20	17:14	18:10	20:08	21:03	1	06:11 (1)	21:50	21:58	7	06:23 (1)	20:09	18:55	16:47	16:07	
6	08:43	08:05	07:05	06:49	05:42	06:09 (1)	04:59	05:03	05:47	06:17 (1)	06:42	07:35	07:34	08:27		
	16:21	17:16	18:12	20:09	21:05	3	06:12 (1)	21:51	21:58	5	06:22 (1)	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40	06:07 (1)	04:58	05:04	05:49	06:19 (1)	06:44	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	6	06:13 (1)	21:52	21:57	2	06:21 (1)	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38	06:05 (1)	04:57	05:05	05:51	06:45	07:39	07:38	08:29			
	16:24	17:20	18:15	20:13	21:08	8	06:13 (1)	21:53	21:56	20:01	18:48	16:41	16:06			
9	08:41	07:59	06:58	06:42	05:36	06:03 (1)	04:57	05:06	05:52	06:47	07:41	07:40	08:30			
	16:25	17:22	18:17	20:15	21:10	10	06:13 (1)	21:54	21:56	21:10	19:59	18:45	16:39	16:06		
10	08:41	07:57	06:55	06:40	05:35	06:02 (1)	04:56	05:07	05:54	06:49	07:43	07:42	08:32			
	16:27	17:24	18:19	20:17	21:12	12	06:14 (1)	21:55	21:55	21:08	19:57	18:43	16:37	16:05		
11	08:40	07:55	06:53	06:37	05:33	06:00 (1)	04:56	05:08	05:56	06:51	07:44	07:44	08:33			
	16:28	17:26	18:21	20:19	21:13	13	06:13 (1)	21:56	21:54	21:06	19:54	18:41	16:36	16:05		
12	08:39	07:53	06:50	06:35	05:31	05:58 (1)	04:56	05:10	05:58	06:52	07:46	07:46	08:34			
	16:30	17:28	18:23	20:21	21:15	15	06:13 (1)	21:56	21:53	21:04	19:52	18:38	16:34	16:05		
13	08:38	07:51	06:48	06:33	05:29	05:57 (1)	04:55	05:11	05:59	06:54	07:48	07:48	08:35			
	16:31	17:30	18:25	20:22	21:17	16	06:13 (1)	21:57	21:52	21:01	19:49	18:36	16:32	16:05		
14	08:37	07:49	06:45	06:30	05:27	05:55 (1)	04:55	05:12	06:01	06:56	07:50	07:49	08:36			
	16:33	17:32	18:27	20:24	21:19	18	06:13 (1)	21:58	21:51	20:59	19:47	18:34	16:31	16:05		
15	08:37	07:47	06:43	06:28	05:26	05:54 (1)	04:55	05:13	06:03	06:58	07:52	07:51	08:37			
	16:35	17:34	18:29	20:26	21:20	19	06:13 (1)	21:58	21:50	20:57	19:44	18:31	16:29	16:05		
16	08:36	07:45	06:41	06:25	05:24	05:52 (1)	04:55	05:15	06:05	07:00	07:54	07:53	08:38			
	16:36	17:36	18:31	20:28	21:22	20	06:12 (1)	21:59	21:49	20:55	19:42	18:29	16:28	16:05		
17	08:35	07:43	06:38	06:23	05:22	05:53 (1)	04:54	05:16	06:06	07:01	07:56	07:55	08:39			
	16:38	17:38	18:32	20:30	21:24	19	06:12 (1)	21:59	21:48	20:53	19:39	18:27	16:26	16:05		
18	08:33	07:41	06:36	06:21	05:21	05:53 (1)	04:54	05:17	06:08	07:03	07:58	07:57	08:39			
	16:40	17:40	18:34	20:32	21:25	17	06:10 (1)	22:00	21:46	20:51	19:37	18:24	16:25	16:05		
19	08:32	07:39	06:33	06:19	05:19	05:54 (1)	04:54	05:19	06:10	07:05	07:59	07:59	08:40			
	16:42	17:42	18:36	20:34	21:27	16	06:10 (1)	22:00	21:45	20:49	19:34	18:22	16:23	16:05		
20	08:31	07:37	06:31	06:16	05:18	05:55 (1)	04:55	05:20	06:12	07:07	08:01	08:01	08:41			
	16:43	17:44	18:38	20:35	21:28	13	06:08 (1)	22:00	21:44	20:46	19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16	05:56 (1)	04:55	05:22	06:10 (1)	06:14	07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	21:30	11	06:07 (1)	22:01	21:42	4	06:14 (1)	20:44	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	05:58 (1)	04:55	05:23	06:08 (1)	06:15	07:10	08:05	08:04	08:42		
	16:47	17:48	18:42	20:39	21:31	8	06:06 (1)	22:01	21:41	9	06:17 (1)	20:42	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13	04:55	05:24	06:06 (1)	06:17	07:12	08:07	08:06	08:42			
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	21:40	12	06:18 (1)	20:39	19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:04 (1)	06:19	07:14	08:09	08:08	08:43			
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	15	06:19 (1)	20:37	19:22	18:11	16:17	16:08		
25	08:25	07:26	06:19	06:05	05:11	04:56	05:28	06:04 (1)	06:21	07:15	07:11	08:09	08:43			
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	17	06:21 (1)	20:35	19:20	17:09	16:16	16:08		
26	08:23	07:23	06:16	06:03	05:10	04:56	05:29	06:03 (1)	06:22	07:17	07:13	08:11	08:44			
	16:55	17:56	18:49	20:46	21:37	22:01	21:35	18	06:21 (1)	20:33	19:17	17:07	16:15	16:09		
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:03 (1)	06:24	07:19	07:15	08:13	08:44			
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	19	06:22 (1)	20:30	19:15	17:05	16:14	16:10		
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:03 (1)	06:26	07:21	07:17	08:15	08:44			
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	19	06:22 (1)	20:28	19:12	17:02	16:13	16:11		
29	08:19		07:09	05:56	05:06	04:58	05:34	06:05 (1)	06:28	07:23	07:19	08:16	08:44			
	17:00		19:55	20:52	21:42	22:01	21:30	18	06:23 (1)	20:26	19:10	17:00	16:12	16:12		
30	08:17		07:06	05:54	05:05	04:58	05:36	06:06 (1)	06:30	07:24	07:21	08:18	08:44			
	17:02		19:57	20:54	21:43	22:00	21:28	17	06:23 (1)	20:23	19:07	16:58	16:11	16:13		
31	08:15		07:04	05:54	05:04		05:37	06:08 (1)	06:31		07:22		08:44			
	17:04		19:58		21:44		21:27	16	06:24 (1)	20:21		16:56		16:14		
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233			
Total, worst case					225			164		61						
Sun reduction					0.38			0.32		0.34						
Oper. time red.					1.00			1.00		1.00						
Wind dir. red.					0.67			0.67		0.67						
Total reduction					0.25			0.22		0.23						
Total, real					57			35		14						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KL - H298

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:09 (1)	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20	06:29 (1)	20:18	19:05	16:10			
2	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:41	06:11 (1)	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	06:17 (1)	21:47	22:00	21:23	19	06:30 (1)	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48	06:14 (1)	05:01	05:42	06:12 (1)	06:37	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	06:18 (1)	21:48	21:59	21:21	17	06:29 (1)	20:14	19:00	16:50	16:09	
4	08:43	08:09	07:09	06:54	05:46	06:12 (1)	05:00	05:41	06:14 (1)	06:38	07:32	07:30	08:24			
	16:18	17:12	18:08	20:06	21:01	06:18 (1)	21:49	21:59	21:19	16	06:30 (1)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44	06:10 (1)	04:59	05:42	06:16 (1)	06:40	07:33	07:32	08:25			
	16:20	17:14	18:10	20:08	21:03	06:19 (1)	21:50	21:58	21:18	14	06:30 (1)	20:09	18:55	16:47	16:07	
6	08:43	08:05	07:05	06:49	05:42	06:09 (1)	04:59	05:43	06:17 (1)	06:42	07:35	07:34	08:27			
	16:21	17:16	18:12	20:09	21:05	06:20 (1)	21:51	21:58	21:16	12	06:29 (1)	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40	06:07 (1)	04:58	05:44	06:19 (1)	06:44	07:37	07:36	08:28			
	16:22	17:18	18:13	20:11	21:06	06:20 (1)	21:52	21:57	21:14	10	06:29 (1)	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38	06:05 (1)	04:57	05:45	06:20 (1)	06:45	07:39	07:38	08:29			
	16:24	17:20	18:15	20:13	21:08	06:19 (1)	21:53	21:56	21:12	8	06:28 (1)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	05:36	06:03 (1)	04:57	05:46	06:22 (1)	06:47	07:41	07:40	08:30			
	16:25	17:22	18:17	20:15	21:10	06:19 (1)	21:54	21:56	21:10	6	06:28 (1)	19:59	18:45	16:39	16:06	
10	08:41	07:57	06:55	06:40	05:35	06:02 (1)	04:56	05:47	06:24 (1)	06:49	07:43	07:42	08:32			
	16:27	17:24	18:19	20:17	21:12	06:20 (1)	21:55	21:55	21:08	3	06:27 (1)	19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33	06:00 (1)	04:56	05:48	06:27 (1)	06:51	07:44	07:44	08:33			
	16:28	17:26	18:21	20:19	21:13	06:19 (1)	21:56	21:54	21:06		19:54	18:41	16:36	16:05		
12	08:39	07:53	06:50	06:35	05:31	05:58 (1)	04:56	05:10	05:58		06:52	07:46	07:46	08:34		
	16:30	17:28	18:23	20:21	21:15	06:18 (1)	21:56	21:53	21:04		19:52	18:38	16:34	16:05		
13	08:38	07:51	06:48	06:33	05:29	05:58 (1)	04:55	05:11	05:59		06:54	07:48	07:48	08:35		
	16:31	17:30	18:25	20:22	21:17	06:18 (1)	21:57	21:52	21:01		19:49	18:36	16:32	16:05		
14	08:37	07:49	06:45	06:30	05:27	05:58 (1)	04:55	05:12	06:01		06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:19	06:17 (1)	21:58	21:51	20:59		19:47	18:34	16:31	16:05		
15	08:37	07:47	06:43	06:28	05:26	05:59 (1)	04:55	05:13	06:03		06:58	07:52	07:51	08:37		
	16:35	17:34	18:29	20:26	21:20	06:17 (1)	21:58	21:50	20:57		19:44	18:31	16:29	16:05		
16	08:36	07:45	06:41	06:25	05:24	05:59 (1)	04:55	05:15	06:05		07:00	07:54	07:53	08:38		
	16:36	17:36	18:31	20:28	21:22	06:16 (1)	21:59	21:49	20:55		19:42	18:29	16:28	16:05		
17	08:35	07:43	06:38	06:23	05:22	06:01 (1)	04:54	05:16	06:06		07:01	07:56	07:55	08:39		
	16:38	17:38	18:32	20:30	21:24	06:15 (1)	21:59	21:48	20:53		19:39	18:27	16:26	16:05		
18	08:33	07:41	06:36	06:21	05:21	06:02 (1)	04:54	05:17	06:08		07:03	07:58	07:57	08:39		
	16:40	17:40	18:34	20:32	21:25	06:13 (1)	22:00	21:46	20:51		19:37	18:24	16:25	16:05		
19	08:32	07:39	06:33	06:19	05:19	06:04 (1)	04:54	05:19	06:10		07:05	07:59	07:59	08:40		
	16:42	17:42	18:36	20:34	21:27	06:12 (1)	22:00	21:45	20:49		19:34	18:22	16:23	16:05		
20	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12		07:07	08:01	08:01	08:41		
	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46		19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16		04:55	05:22	06:14		07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	21:30		22:01	21:42	20:44		19:29	18:18	16:21	16:06		
22	08:29	07:32	06:26	06:12	05:15		04:55	05:23	06:15		07:10	08:05	08:04	08:42		
	16:47	17:48	18:42	20:39	21:31		22:01	21:41	20:42		19:27	18:15	16:19	16:07		
23	08:27	07:30	06:23	06:10	05:13		04:55	05:24	06:17		07:12	08:07	08:06	08:42		
	16:49	17:50	18:44	20:41	21:33		22:01	21:40	20:39		19:24	18:13	16:18	16:07		
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26			07:14	08:09	08:08	08:43		
	16:51	17:52	18:45	20:43	21:35		22:01	21:38	3	06:19 (1)	20:37	19:22	18:11	16:17	16:08	
25	08:25	07:26	06:19	06:05	05:11		04:56	05:28			06:14 (1)	06:21	07:15	07:11	08:09	08:43
	16:53	17:54	18:47	20:45	21:36		22:01	21:37	9	06:23 (1)	20:35	19:20	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:10		04:56	05:29			06:11 (1)	06:22	07:17	07:13	08:11	08:44
	16:55	17:56	18:49	20:46	21:37		22:01	21:35	13	06:24 (1)	20:33	19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08		04:57	05:31			06:11 (1)	06:24	07:19	07:15	08:13	08:44
	16:56	17:58	18:51	20:48	21:39		22:01	21:33	15	06:26 (1)	20:30	19:15	17:05	16:14	16:10	
28	08:20	07:19	06:11	05:59	05:07		04:57	05:32			06:09 (1)	06:26	07:21	07:17	08:15	08:44
	16:58	18:00	18:53	20:50	21:40		22:01	21:32	18	06:27 (1)	20:28	19:12	17:02	16:13	16:11	
29	08:19		07:09	05:56	05:06		04:58	05:34			06:09 (1)	06:28	07:23	07:19	08:16	08:44
	17:00		19:55	20:52	21:42		22:01	21:30	19	06:28 (1)	20:26	19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05		04:58	05:36			06:08 (1)	06:29	07:24	07:21	08:18	08:44
	17:02		19:57	20:54	21:43		22:00	21:28	20	06:28 (1)	20:23	19:07	16:58	16:11	16:13	
31	08:15		07:04		05:04			05:37			06:08 (1)	06:31	07:22		08:44	
	17:04		19:58		21:44			21:27	21	06:29 (1)	20:21		16:56		16:14	
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233			
Total, worst case					238			118		125						
Sun reduction					0.38			0.32		0.34						
Oper. time red.					1.00			1.00		1.00						
Wind dir. red.					0.67			0.67		0.67						
Total reduction					0.26			0.22		0.23						
Total, real					61		26	29								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KM - H299

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	06:26 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:56	19 06:45 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	06:27 (1)	05:02	05:00	05:40	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	17 06:44 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	06:57	05:48	06:28 (1)	05:01	05:00	05:42	06:37	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	14 06:42 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09		
4	08:43	08:09	07:09	06:54	05:46	06:30 (1)	05:00	05:01	05:44	06:38	07:32	07:30	08:24		
	16:18	17:12	18:08	20:06	21:01	10 06:40 (1)	21:49	21:59	21:19	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	06:52	05:44		04:59	05:02	05:46	06:40	07:33	07:32	08:25		
	16:20	17:14	18:10	20:08	21:03		21:50	21:58	21:18	20:09	18:55	16:47	16:07		
6	08:43	08:05	07:05	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:27		
	16:21	17:16	18:12	20:09	21:05		21:51	21:58	21:16	20:06	18:53	16:45	16:07		
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:44	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:14	20:04	18:50	16:43	16:06		
8	08:42	08:01	07:00	06:44	05:38		04:57	05:05	05:51	6 06:41 (1)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:12	6 06:47 (1)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	05:36		04:57	05:06	05:52	06:38 (1)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10		21:54	21:56	21:10	12 06:50 (1)	19:59	18:45	16:39	16:06	
10	08:41	07:57	06:55	06:40	05:35		04:56	05:07	05:54	06:37 (1)	06:49	07:43	07:42	08:32	
	16:27	17:24	18:19	20:17	21:12		21:55	21:55	21:08	15 06:52 (1)	19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33		04:56	05:08	05:56	06:35 (1)	06:51	07:44	07:44	08:33	
	16:28	17:26	18:21	20:19	21:13		21:56	21:54	21:06	18 06:53 (1)	19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	06:34 (1)	06:52	07:46	07:46	08:34	
	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	20 06:54 (1)	19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	06:34 (1)	06:54	07:48	07:48	08:35	
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	21 06:55 (1)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:32 (1)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	23 06:55 (1)	19:47	18:34	16:31	16:05	
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:32 (1)	06:58	07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	23 06:55 (1)	19:44	18:31	16:29	16:05	
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	06:34 (1)	07:00	07:54	07:53	08:38	
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	22 06:56 (1)	19:42	18:29	16:28	16:05	
17	08:35	07:43	06:38	06:23	05:22		04:54	05:16	06:06	06:35 (1)	07:01	07:56	07:55	08:39	
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	20 06:55 (1)	19:39	18:27	16:26	16:05	
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08	06:37 (1)	07:03	07:58	07:57	08:39	
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51	18 06:55 (1)	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:19	05:19	06:43 (1)	05:19	06:10		06:39 (1)	07:05	07:59	07:59	08:40	
	16:42	17:42	18:36	20:34	3 06:46 (1)	21:27	22:00	21:45	20:49	16 06:55 (1)	19:34	18:22	16:23	16:05	
20	08:31	07:37	06:31	06:16	06:41 (1)	05:18	04:55	05:20	06:12	06:40 (1)	07:07	08:01	08:01	08:41	
	16:43	17:44	18:38	20:35	6 06:47 (1)	21:28	22:00	21:44	20:46	14 06:54 (1)	19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	06:39 (1)	05:16	04:55	05:21	06:14	06:42 (1)	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	9 06:48 (1)	21:30	22:01	21:42	20:44	12 06:54 (1)	19:29	18:18	16:21	16:06	
22	08:29	07:32	06:26	06:12	06:36 (1)	05:15	04:55	05:23	06:15	06:44 (1)	07:10	08:05	08:04	08:42	
	16:47	17:48	18:42	20:39	12 06:48 (1)	21:32	22:01	21:41	20:42	9 06:53 (1)	19:27	18:15	16:19	16:07	
23	08:27	07:30	06:23	06:10	06:34 (1)	05:13	04:55	05:24	06:17	06:45 (1)	07:12	08:07	08:06	08:42	
	16:49	17:50	18:44	20:41	14 06:48 (1)	21:33	22:01	21:40	20:39	6 06:51 (1)	19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	06:32 (1)	05:12	04:55	05:26	06:19	06:47 (1)	07:14	08:09	08:08	08:43	
	16:51	17:52	18:45	20:43	17 06:49 (1)	21:35	22:01	21:38	20:37	3 06:50 (1)	19:22	18:11	16:17	16:08	
25	08:25	07:26	06:19	06:05	06:30 (1)	05:11	04:56	05:28	06:21		07:15	07:11	08:09	08:43	
	16:53	17:54	18:47	20:45	19 06:49 (1)	21:36	22:01	21:37	20:35		19:20	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	06:28 (1)	05:10	04:56	05:29	06:22		07:17	07:13	08:11	08:44	
	16:55	17:56	18:49	20:46	20 06:48 (1)	21:37	22:01	21:35	20:33		19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	06:26 (1)	05:08	04:57	05:31	06:24		07:19	07:15	08:13	08:44	
	16:56	17:58	18:51	20:48	22 06:48 (1)	21:39	22:01	21:33	20:30		19:15	17:05	16:14	16:10	
28	08:20	07:19	06:11	05:59	06:24 (1)	05:07	04:57	05:32	06:26		07:21	07:17	08:15	08:44	
	16:58	18:00	18:53	20:50	24 06:48 (1)	21:40	22:01	21:32	20:28		19:12	17:02	16:13	16:11	
29	08:19		07:09	05:56	06:25 (1)	05:06	04:58	05:34	06:28		07:23	07:19	08:16	08:44	
	17:00		19:55	20:52	22 06:47 (1)	21:42	22:01	21:30	20:26		19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	06:25 (1)	05:05	04:58	05:36	06:29		07:24	07:21	08:18	08:44	
	17:02		19:57	20:54	21 06:46 (1)	21:43	22:01	21:28	20:23		19:07	16:58	16:11	16:13	
31	08:15		07:04		05:04			05:37	06:31			07:22		08:44	
	17:04		19:58		21:44			21:27	20:21			16:56		16:14	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259		233
Total, worst case				189	60				258						
Sun reduction				0.35	0.38				0.34						
Oper. time red.				1.00	1.00				1.00						
Wind dir. red.				0.68	0.68				0.68						
Total reduction				0.24	0.26				0.23						
Total, real				45	15				60						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KN - H300

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:57	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:09
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32	08:25
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27
	16:21	17:16	18:12	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	04:56	05:10	05:58	06:52	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29	04:55	05:11	05:59	06:46 (1)	07:48	07:48	08:35
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:01	06:56 (1)	19:49	18:36	16:32
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:43 (1)	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	06:57 (1)	19:47	18:34	16:31
15	08:37	07:47	06:43	06:28	06:52 (1)	05:26	04:55	05:13	06:42 (1)	07:52	07:51	08:37
	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	06:59 (1)	19:44	18:31	16:29
16	08:36	07:45	06:41	06:25	06:50 (1)	05:24	04:55	05:15	06:41 (1)	07:00	07:54	08:38
	16:36	17:36	18:31	20:28	21:22	21:59	21:49	20:55	07:00 (1)	19:42	18:29	16:28
17	08:35	07:43	06:38	06:23	06:47 (1)	05:22	04:54	05:16	06:39 (1)	07:01	07:56	08:39
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	07:01 (1)	19:39	18:27	16:26
18	08:33	07:41	06:36	06:21	06:45 (1)	05:21	04:54	05:17	06:39 (1)	07:03	07:58	08:39
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	07:01 (1)	19:37	18:24	16:25
19	08:32	07:39	06:33	06:19	06:43 (1)	05:19	04:54	05:19	06:39 (1)	07:05	07:59	08:40
	16:42	17:42	18:36	20:34	21:27	22:00	21:45	20:49	07:02 (1)	19:34	18:22	16:23
20	08:31	07:37	06:31	06:16	06:41 (1)	05:18	04:55	05:20	06:40 (1)	07:07	08:01	08:41
	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46	07:01 (1)	19:32	18:20	16:22
21	08:30	07:34	06:28	06:14	06:39 (1)	05:16	04:55	05:21	06:42 (1)	07:08	08:03	08:41
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	07:02 (1)	19:29	18:18	16:21
22	08:29	07:32	06:26	06:12	06:36 (1)	05:15	04:55	05:23	06:44 (1)	07:10	08:05	08:42
	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	07:02 (1)	19:27	18:15	16:19
23	08:27	07:30	06:23	06:10	06:34 (1)	05:13	04:55	05:24	06:45 (1)	07:12	08:07	08:42
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:39	07:01 (1)	19:24	18:13	16:18
24	08:26	07:28	06:21	06:07	06:32 (1)	05:12	04:55	05:26	06:47 (1)	07:14	08:09	08:43
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	07:00 (1)	19:22	18:11	16:17
25	08:25	07:26	06:19	06:05	06:32 (1)	05:11	04:56	05:28	06:49 (1)	07:15	07:11	08:09
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	07:00 (1)	19:20	17:09	16:16
26	08:23	07:23	06:16	06:03	06:33 (1)	05:10	04:56	05:29	06:50 (1)	07:17	07:13	08:11
	16:55	17:56	18:49	20:46	21:37	22:01	21:35	20:33	06:58 (1)	19:17	17:07	16:15
27	08:22	07:21	06:14	06:01	06:34 (1)	05:08	04:57	05:31	06:52 (1)	07:19	07:15	08:13
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	06:57 (1)	19:15	17:05	16:14
28	08:20	07:19	06:11	05:59	06:35 (1)	05:07	04:57	05:32	06:54 (1)	07:21	07:17	08:15
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	06:56 (1)	19:12	17:02	16:11
29	08:19		07:09	05:56	06:36 (1)	05:06	04:58	05:34	07:23	07:19	08:16	08:44
	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	06:38 (1)	05:05	04:58	05:36	07:24	07:21	08:18	08:44
	17:02		19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	16:13
31	08:15		07:04		05:04		05:37	06:31		07:22		08:44
	17:04		19:58		21:44		21:27	20:21		16:56		16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				242				241				
Sun reduction				0.35				0.34				
Oper. time red.				1.00				1.00				
Wind dir. red.				0.68				0.68				
Total reduction				0.24				0.23				
Total, real				58				56				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case **Shadow receptor:** KO - H301

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:00 (1)	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	5 07:05 (1)	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:02 (1)	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	1 07:03 (1)	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48	05:01	05:00	05:42	06:37		07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14		19:00	16:50	16:09	
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38		07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11		18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:46	06:40		07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09		18:55	16:46	16:07	
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42		07:35	07:34	08:27	
	16:21	17:16	18:12	20:09	21:05	21:51	21:58	21:16	20:06		18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44		07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04		18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45		07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01		18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47		07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59		18:45	16:39	16:06	
10	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49		07:43	07:42	08:32	
	16:27	17:24	18:19	20:17	1 07:05 (1)	21:12	21:55	21:08	19:57		18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	07:01 (1)	05:33	04:56	05:08	06:51		07:44	07:44	08:33	
	16:28	17:26	18:21	20:19	5 07:06 (1)	21:13	21:56	21:54	19:54		18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	06:59 (1)	05:31	04:56	05:10	06:52		07:46	07:46	08:34	
	16:30	17:28	18:23	20:21	8 07:07 (1)	21:15	21:56	21:53	19:52		18:38	16:34	16:05	
13	08:38	07:51	06:48	06:33	06:57 (1)	05:29	04:55	05:11	06:54		07:48	07:48	08:35	
	16:31	17:30	18:25	20:22	11 07:08 (1)	21:17	21:57	21:52	19:49		18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	06:54 (1)	05:27	04:55	05:12	06:56		07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	14 07:08 (1)	21:19	21:58	21:51	19:47		18:34	16:31	16:05	
15	08:37	07:47	06:43	06:28	06:52 (1)	05:26	04:55	05:13	06:58		07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	17 07:09 (1)	21:20	21:58	21:50	19:44		18:31	16:29	16:05	
16	08:36	07:45	06:41	06:25	06:50 (1)	05:24	04:55	05:15	06:59		07:54	07:53	08:38	
	16:36	17:36	18:31	20:28	19 07:09 (1)	21:22	21:59	21:49	19:42		18:29	16:28	16:05	
17	08:35	07:43	06:38	06:23	06:47 (1)	05:22	04:54	05:16	06:59	06:55 (1)	07:01	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21 07:08 (1)	21:24	21:59	21:48	10 07:05 (1)	19:39	18:27	16:26	16:05	
18	08:33	07:41	06:36	06:21	06:45 (1)	05:21	04:54	05:17	06:58	06:52 (1)	07:03	07:58	07:57	08:39
	16:40	17:40	18:34	20:32	23 07:08 (1)	21:25	22:00	21:46	16 07:08 (1)	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:19	06:43 (1)	05:19	04:54	05:19	06:10	06:51 (1)	07:05	07:59	07:59	08:40
	16:42	17:42	18:36	20:34	25 07:08 (1)	21:27	22:00	21:45	18 07:09 (1)	19:34	18:22	16:23	16:05	
20	08:31	07:37	06:31	06:16	06:43 (1)	05:18	04:54	05:20	06:12	06:49 (1)	07:07	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	24 07:07 (1)	21:28	22:00	21:44	21 07:10 (1)	19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	06:43 (1)	05:16	04:55	05:21	06:14	06:48 (1)	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	24 07:07 (1)	21:30	22:01	21:42	23 07:11 (1)	19:29	18:18	16:21	16:06	
22	08:29	07:32	06:26	06:12	06:43 (1)	05:15	04:55	05:23	06:15	06:48 (1)	07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	22 07:05 (1)	21:32	22:01	21:41	24 07:12 (1)	19:27	18:15	16:19	16:07	
23	08:27	07:30	06:23	06:10	06:44 (1)	05:13	04:55	05:24	06:17	06:46 (1)	07:12	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	20 07:04 (1)	21:33	22:01	21:40	25 07:11 (1)	19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	06:45 (1)	05:12	04:55	05:26	06:19	06:47 (1)	07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	18 07:03 (1)	21:35	22:01	21:38	25 07:12 (1)	19:22	18:11	16:17	16:08	
25	08:25	07:26	06:19	06:05	06:46 (1)	05:11	04:56	05:28	06:21	06:49 (1)	07:15	07:11	08:09	08:43
	16:53	17:54	18:47	20:45	15 07:01 (1)	21:36	22:01	21:37	23 07:12 (1)	19:20	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	06:49 (1)	05:10	04:56	05:29	06:22	06:50 (1)	07:17	07:13	08:11	08:44
	16:54	17:56	18:49	20:46	9 06:58 (1)	21:37	22:01	21:35	21 07:11 (1)	19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01		05:08	04:57	05:31	06:24	06:52 (1)	07:19	07:15	08:13	08:44
	16:56	17:58	18:51	20:48		21:39	22:01	21:33	19 07:11 (1)	19:15	17:05	16:14	16:10	
28	08:20	07:19	06:11	05:59		05:07	04:57	05:32	06:26	06:54 (1)	07:21	07:17	08:15	08:44
	16:58	18:00	18:53	20:50		21:40	22:01	21:32	16 07:10 (1)	19:12	17:02	16:13	16:11	
29	08:19		07:09	05:56		05:06	04:58	05:34	06:28	06:55 (1)	07:23	07:19	08:16	08:44
	17:00		19:55	20:52		21:42	22:01	21:30	14 07:09 (1)	19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54		05:05	04:58	05:36	06:29	06:57 (1)	07:24	07:21	08:18	08:44
	17:02		19:57	20:54		21:43	22:01	21:28	11 07:08 (1)	19:07	16:58	16:11	16:13	
31	08:15		07:04			05:04		05:37	06:31	06:59 (1)	07:22	07:22	08:14	08:44
	17:04		19:58			21:44		21:27	8 07:07 (1)		16:56		16:14	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case				276					274	6				
Sun reduction				0.35					0.34	0.32				
Oper. time red.				1.00					1.00	1.00				
Wind dir. red.				0.68					0.68	0.68				
Total reduction				0.24					0.23	0.22				
Total, real				66					63	1				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case **Shadow receptor:** KP - H302

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:01 (1)	07:26	07:24	08:19	
2	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	25	07:26 (1)	19:05	16:54	16:10
3	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:02 (1)	07:28	07:26	08:21	
4	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	25	07:27 (1)	19:02	16:52	16:09
5	08:44	08:10	07:12	06:57	05:48	05:01	05:00	05:42	06:37	07:04 (1)	07:30	07:28	08:22	
6	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	23	07:27 (1)	19:00	16:50	16:09
7	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:05 (1)	07:32	07:30	08:24	
8	16:18	17:12	18:08	20:06	20:56	21:49	21:59	21:19	20:11	21	07:26 (1)	18:57	16:48	16:08
9	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:07 (1)	07:33	07:32	08:25	
10	16:20	17:14	18:10	20:08	20:58	21:50	21:58	21:18	20:09	18	07:25 (1)	18:55	16:46	16:07
11	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:09 (1)	07:35	07:34	08:27	
12	16:21	17:16	18:12	20:09	20:59	21:51	21:58	21:16	20:06	16	07:25 (1)	18:53	16:45	16:07
13	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:10 (1)	07:37	07:36	08:28	
14	16:22	17:18	18:13	20:11	20:56	21:52	21:57	21:14	20:04	13	07:23 (1)	18:50	16:43	16:06
15	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:12 (1)	07:39	07:38	08:29	
16	16:24	17:20	18:15	20:13	20:58	21:53	21:56	21:12	20:01	10	07:22 (1)	18:48	16:41	16:06
17	08:41	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:14 (1)	07:41	07:40	08:30	
18	16:25	17:22	18:17	20:15	20:59	21:54	21:56	21:10	19:59	6	07:20 (1)	18:45	16:39	16:06
19	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:16 (1)	07:43	07:42	08:32	
20	16:27	17:24	18:19	20:17	20:59	21:55	21:55	21:08	19:57	3	07:19 (1)	18:43	16:37	16:05
21	08:40	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:51	07:19 (1)	07:44	07:44	08:33	
22	16:28	17:26	18:21	20:19	20:59	21:56	21:54	21:06	19:54	07:19 (1)	18:43	16:37	16:05	
23	08:39	07:53	06:50	06:35	05:31	04:56	05:09	05:58	06:52	07:19 (1)	07:44	07:44	08:33	
24	16:30	17:28	18:23	20:21	20:59	21:56	21:53	21:04	19:52	07:19 (1)	18:43	16:37	16:05	
25	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:19 (1)	07:44	07:44	08:33	
26	16:31	17:30	18:25	20:22	20:59	21:57	21:52	21:01	19:49	07:19 (1)	18:43	16:37	16:05	
27	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:19 (1)	07:44	07:44	08:33	
28	16:33	17:32	18:27	20:24	20:59	21:58	21:51	20:59	19:47	07:19 (1)	18:43	16:37	16:05	
29	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:19 (1)	07:44	07:44	08:33	
30	16:35	17:34	18:29	20:26	20:59	21:58	21:50	20:57	19:44	07:19 (1)	18:43	16:37	16:05	
31	08:36	07:45	06:41	06:25	05:24	04:55	05:15	06:05	06:59	07:19 (1)	07:44	07:44	08:33	
32	16:36	17:36	18:31	20:28	20:59	21:59	21:49	20:55	19:42	07:19 (1)	18:43	16:37	16:05	
33	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:19 (1)	18:43	16:37	16:05	
34	16:38	17:38	18:32	20:30	20:59	21:59	21:48	20:53	19:39	07:19 (1)	18:43	16:37	16:05	
35	08:33	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:19 (1)	18:43	16:37	16:05	
36	16:40	17:40	18:34	20:32	20:59	21:59	21:47	20:51	19:37	07:19 (1)	18:43	16:37	16:05	
37	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:19 (1)	18:43	16:37	16:05	
38	16:42	17:42	18:36	20:34	20:59	21:59	21:45	20:49	19:34	07:19 (1)	18:43	16:37	16:05	
39	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	07:19 (1)	18:43	16:37	16:05	
40	16:43	17:44	18:38	20:35	20:59	21:59	21:44	20:46	19:32	07:19 (1)	18:43	16:37	16:05	
41	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	07:19 (1)	18:43	16:37	16:05	
42	16:45	17:46	18:40	20:37	20:59	21:59	21:42	20:44	19:29	07:19 (1)	18:43	16:37	16:05	
43	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	07:19 (1)	18:43	16:37	16:05	
44	16:47	17:48	18:42	20:39	20:59	21:59	21:41	20:42	19:27	07:19 (1)	18:43	16:37	16:05	
45	08:27	07:30	06:23	06:10	05:13	04:55	05:24	06:17	07:12	07:19 (1)	18:43	16:37	16:05	
46	16:49	17:50	18:44	20:41	20:59	21:59	21:40	20:39	19:24	07:19 (1)	18:43	16:37	16:05	
47	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	07:19 (1)	18:43	16:37	16:05	
48	16:51	17:52	18:45	20:43	20:59	21:59	21:38	20:37	19:22	07:19 (1)	18:43	16:37	16:05	
49	08:25	07:26	06:19	06:05	05:11	04:56	05:28	06:21	07:15	07:13 (1)	18:43	16:37	16:05	
50	16:53	17:54	18:47	20:45	20:59	21:59	21:37	20:35	19:20	6	07:19 (1)	18:43	16:37	16:05
51	08:23	07:23	06:16	06:03	05:10	04:56	05:29	06:22	07:17	07:09 (1)	18:43	16:37	16:05	
52	16:54	17:56	18:49	20:46	20:59	21:59	21:35	20:33	19:17	13	07:22 (1)	18:43	16:37	16:05
53	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19 (1)	07:07 (1)	18:43	16:37	16:05	
54	16:56	17:58	18:51	20:48	20:59	21:59	21:33	20:30	19:15	17	07:24 (1)	18:43	16:37	16:05
55	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:06 (1)	18:43	16:37	16:05	
56	16:58	18:00	18:53	20:50	20:59	21:59	21:32	20:28	19:12	19	07:25 (1)	18:43	16:37	16:05
57	08:19	07:09	05:56	05:44	05:06	04:58	05:34	06:28	07:23	07:04 (1)	18:43	16:37	16:05	
58	17:00	19:55	20:52	20:54	20:59	21:59	21:30	20:26	19:10	22	07:26 (1)	18:43	16:37	16:05
59	08:17	07:06	05:54	05:44	05:05	04:58	05:36	06:29	07:24	07:03 (1)	18:43	16:37	16:05	
60	17:02	19:57	20:54	20:54	20:59	21:59	21:28	20:23	19:07	23	07:26 (1)	18:43	16:37	16:05
61	08:15	07:04	05:54	05:44	05:04	04:58	05:37	06:31	07:22	07:02 (1)	18:43	16:37	16:05	
62	17:04	19:58	20:54	20:54	20:59	21:59	21:27	20:21	19:07	25	07:27 (1)	18:43	16:37	16:05
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case				283					125	160				
Sun reduction				0.35					0.34	0.32				
Oper. time red.				1.00					1.00	1.00				
Wind dir. red.				0.67					0.67	0.67				
Total reduction				0.24					0.23	0.22				
Total, real				67					29	35				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KQ - H303

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26		07:55 (1)	07:24	08:19
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	25	08:20 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	25	08:19 (1)	16:52	16:09
3	08:44	08:10	07:12		06:56	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	23	08:19 (1)	16:50	16:09
4	08:43	08:09	07:09		07:34 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08	3	07:37 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	20	08:18 (1)	16:48	16:08
5	08:43	08:07	07:07		07:31 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10	7	07:38 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	18	08:18 (1)	16:46	16:07
6	08:43	08:05	07:05		07:29 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35		08:02 (1)	07:34	08:27
	16:21	17:16	18:12	10	07:39 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	15	08:17 (1)	16:45	16:07
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37		08:04 (1)	07:36	08:28
	16:22	17:18	18:13	14	07:41 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	12	08:16 (1)	16:43	16:06
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39		08:06 (1)	07:38	08:29
	16:24	17:20	18:15	17	07:41 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	9	08:15 (1)	16:41	16:06
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41		08:07 (1)	07:40	08:30
	16:25	17:22	18:17	19	07:41 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	5	08:12 (1)	16:39	16:06
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43			07:42	08:32
	16:27	17:24	18:19	22	07:41 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43			16:37	16:05
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:44			07:44	08:33
	16:28	17:26	18:21	24	07:41 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41			16:36	16:05
12	08:39	07:53	06:50		07:15 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46			07:46	08:34
	16:30	17:28	18:23	25	07:40 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38			16:34	16:05
13	08:38	07:51	06:48		07:16 (1)	06:32	05:29	04:55	05:11	05:59	06:54	07:48			07:48	08:35
	16:31	17:30	18:25	24	07:40 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36			16:32	16:05
14	08:37	07:49	06:45		07:16 (1)	06:30	05:27	04:55	05:12	06:01	06:56	07:50			07:50	08:36
	16:33	17:32	18:27	22	07:38 (1)	20:24	21:19	21:58	21:51	20:59	19:47	18:34			16:31	16:05
15	08:37	07:47	06:43		07:17 (1)	06:28	05:26	04:55	05:13	06:03	06:58	07:52			07:51	08:37
	16:35	17:34	18:29	21	07:38 (1)	20:26	21:20	21:58	21:50	20:57	19:44	18:31			16:29	16:05
16	08:36	07:45	06:41		07:17 (1)	06:25	05:24	04:55	05:14	06:05	06:59	07:54			07:53	08:38
	16:36	17:36	18:31	19	07:36 (1)	20:28	21:22	21:59	21:49	20:55	19:42	18:29			16:28	16:05
17	08:35	07:43	06:38		07:19 (1)	06:23	05:22	04:54	05:16	06:06	07:01	07:56			07:55	08:39
	16:38	17:38	18:32	15	07:34 (1)	20:30	21:24	21:59	21:48	20:53	19:39	18:27			16:26	16:05
18	08:34	07:41	06:36		07:21 (1)	06:21	05:21	04:54	05:17	06:08	07:03	07:58			07:57	08:39
	16:40	17:40	18:34	10	07:31 (1)	20:32	21:25	22:00	21:46	20:51	19:37	18:24			16:25	16:05
19	08:32	07:39	06:33			06:19	05:19	04:54	05:19	06:10	07:05	07:59			07:59	08:40
	16:42	17:42	18:36			20:34	21:27	22:00	21:45	20:49	19:34	18:22			16:23	16:05
20	08:31	07:37	06:31			06:16	05:18	04:54	05:20	06:12	07:07	08:01			08:01	08:41
	16:43	17:44	18:38			20:35	21:28	22:01	21:44	20:46	19:32	18:20			16:22	16:06
21	08:30	07:34	06:28			06:14	05:16	04:55	05:21	06:14	07:08	08:03			08:02	08:41
	16:45	17:46	18:40			20:37	21:30	22:01	21:42	20:44	19:29	18:18			16:21	16:06
22	08:29	07:32	06:26			06:12	05:15	04:55	05:23	06:15	07:10	08:05			08:04	08:42
	16:47	17:48	18:42			20:39	21:32	22:01	21:41	20:42	19:27	18:15			16:19	16:07
23	08:27	07:30	06:23			06:09	05:13	04:55	05:24	06:17	07:12	08:07			08:06	08:42
	16:49	17:50	18:44			20:41	21:33	22:01	21:40	20:40	19:24	18:13			16:18	16:07
24	08:26	07:28	06:21			06:07	05:12	04:55	05:26	06:19	07:14	08:09			08:08	08:43
	16:51	17:52	18:45			20:43	21:35	22:01	21:38	20:37	19:22	18:11			16:17	16:08
25	08:25	07:26	06:19			06:05	05:11	04:56	05:27	06:21	07:15		08:06 (1)		08:10	08:43
	16:53	17:54	18:47			20:45	21:36	22:01	21:37	20:35	19:20	7	08:13 (1)		16:16	16:08
26	08:23	07:23	06:16			06:03	05:09	04:56	05:29	06:22	07:17		08:01 (1)		08:11	08:44
	16:54	17:56	18:49			20:46	21:37	22:01	21:35	20:33	19:17	14	08:15 (1)		16:15	16:09
27	08:22	07:21	06:14			06:01	05:08	04:57	05:31	06:24	07:19		07:59 (1)		08:13	08:44
	16:56	17:58	18:51			20:48	21:39	22:01	21:33	20:30	19:15	18	08:17 (1)		16:14	16:10
28	08:20	07:19	06:11			05:59	05:07	04:57	05:32	06:26	07:21		07:58 (1)		08:15	08:44
	16:58	18:00	18:53			20:50	21:40	22:01	21:32	20:28	19:12	20	08:18 (1)		16:13	16:11
29	08:19		07:09			05:56	05:06	04:58	05:34	06:28	07:23		07:57 (1)		08:16	08:44
	17:00		19:55			20:52	21:42	22:01	21:30	20:26	19:10	22	08:19 (1)		16:12	16:12
30	08:17		07:06			05:54	05:05	04:58	05:35	06:29	07:24		07:56 (1)		08:18	08:44
	17:02		19:57			20:54	21:43	22:01	21:28	20:23	19:07	24	08:20 (1)		16:11	16:13
31	08:16		07:04				05:04		05:37	06:31			07:22			08:44
	17:04		19:58				21:44		21:27	20:21			16:56			16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case				252							105		152			
Sun reduction				0.27							0.32		0.29			
Oper. time red.				1.00							1.00		1.00			
Wind dir. red.				0.65							0.65		0.65			
Total reduction				0.18							0.21		0.19			
Total, real				44							22		29			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: KR - H304

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 07:55 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	08:13 (1) 18 08:31 (1)	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 07:57 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:11 (1) 20 08:31 (1)	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 07:57 (1)	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	08:09 (1) 23 08:32 (1)	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	07:34 (1) 07:57 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:08 (1) 25 08:33 (1)	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:31 (1) 07:57 (1)	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	08:08 (1) 25 08:33 (1)	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:31 (1) 07:57 (1)	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:07 (1) 26 08:33 (1)	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:31 (1) 07:57 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:07 (1) 26 08:33 (1)	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:30 (1) 07:56 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	08:07 (1) 26 08:33 (1)	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:31 (1) 07:56 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:07 (1) 25 08:32 (1)	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:31 (1) 07:55 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:09 (1) 22 08:31 (1)	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:32 (1) 07:54 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:11 (1) 19 08:30 (1)	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:33 (1) 07:52 (1)	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:13 (1) 16 08:29 (1)	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:34 (1) 07:50 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:15 (1) 13 08:28 (1)	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	07:36 (1) 07:47 (1)	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:17 (1) 9 08:26 (1)	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29		06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:19 (1) 5 08:24 (1)	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31		06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29		07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32		06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27		07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34		06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24		07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22		07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20		08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18		08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44		06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13		08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11		08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09		08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	07:48 (1)	06:03	05:09	04:56	05:29	06:22	07:17	07:13		08:11	08:44
27	08:22 16:56	07:21 17:58	06:14 18:51	07:46 (1)	06:01	05:08	04:57	05:31	06:24	07:19	07:15		08:13	08:44
28	08:20 16:58	07:19 18:00	06:11 18:53	07:43 (1)	05:59	05:07	04:57	05:32	06:26	07:21	07:17		08:15	08:44
29	08:19 17:00		07:09 19:55		05:50 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 7 08:26 (1)		08:16	08:44
30	08:17 17:02		07:06 19:57		05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	08:15 (1) 14 08:29 (1)		08:18	08:44
31	08:15 17:04		07:04 19:58			05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		16:11	16:13
Potential sun hours	250	273	367		420	494	510	512	460	382		259		233
Total, worst case											298			
Sun reduction		0.23			0.27					0.32	0.29			
Oper. time red.		1.00			1.00					1.00	1.00			
Wind dir. red.		0.65			0.65					0.65	0.65			
Total reduction		0.15			0.18					0.21	0.19			
Total, real		3			52					4	57			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case **Shadow receptor:** KS - H305

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (1)	08:19
2	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	07:58 (1)	16:10
3	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26		08:21
4	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09
5	08:44	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28		08:22
6	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50		16:09
7	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24
8	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48		16:08
9	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32		08:25
10	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46		16:07
11	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:27
12	16:21	17:16	18:12	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45		16:07
13	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36		08:28
14	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43		16:06
15	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38		08:29
16	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41		16:06
17	08:41	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:30
18	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39		16:05
19	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42		08:32
20	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37		16:05
21	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44		08:33
22	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36		16:05
23	08:39	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46		08:34
24	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34		16:05
25	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48		08:35
26	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32		16:05
27	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:49 (1)	08:36
28	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31	08:55 (1)	16:05
29	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:45 (1)	08:37
30	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	08:59 (1)	16:05
31	08:36	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:43 (1)	08:38
32	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	09:01 (1)	16:05
33	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:41 (1)	08:39
34	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	09:02 (1)	16:05
35	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57	08:40 (1)	08:39
36	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	09:03 (1)	16:05
37	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59	08:39 (1)	08:40
38	16:41	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23	09:04 (1)	16:05
39	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01	08:38 (1)	08:41
40	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	09:04 (1)	16:06
41	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:03	08:37 (1)	08:41
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	09:05 (1)	16:06
43	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:05	08:37 (1)	08:42
44	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	09:05 (1)	16:07
45	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:07	08:37 (1)	08:42
46	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	09:05 (1)	16:07
47	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:09	08:37 (1)	08:43
48	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	09:04 (1)	16:08
49	08:25	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:11	07:39 (1)	08:43
50	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09	16:16	08:04 (1)	16:08
51	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:13	07:41 (1)	08:44
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:15	08:04 (1)	16:09
53	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:15	07:43 (1)	08:44
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:05	16:14	08:03 (1)	16:10
55	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:17	07:45 (1)	08:44
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:13	08:02 (1)	16:11
57	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:19	07:47 (1)	08:44
58	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:01	16:12	08:01 (1)	16:12
59	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:21	07:50 (1)	08:44
60	17:02		19:57	20:54	21:43	22:01	21:28	20:23	19:07	18:01	16:11	08:01 (1)	16:13
61	08:15		07:04		05:04		05:37	06:31		07:22	07:22	07:52 (1)	08:44
62	17:04		19:58		21:44		21:27	20:21		16:56	16:56	07:59 (1)	16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259		233
Total, worst case		357								361	4		
Sun reduction		0.23								0.29	0.27		
Oper. time red.		1.00								1.00	1.00		
Wind dir. red.		0.63								0.63	0.63		
Total reduction		0.15								0.19	0.17		
Total, real		53								67	1		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case **Shadow receptor:** KT - H306

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (1)
2	16:15	17:06	18:02	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54
3	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:22 (1)
4	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	08:21 (1)
5	08:44	08:10	08:38 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:58 (1)
6	16:17	17:10	3	08:41 (1)	18:06	20:04	20:59	21:48	21:21	20:14	19:00	16:50
7	08:43	08:09	08:36 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:00 (1)
8	16:18	17:12	8	08:44 (1)	18:08	20:06	21:01	21:49	21:19	20:11	18:57	16:48
9	08:43	08:07	08:34 (1)	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:02 (1)
10	16:20	17:14	12	08:46 (1)	18:10	20:08	21:03	21:50	21:18	20:09	18:55	16:46
11	08:43	08:05	08:32 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:04 (1)
12	16:21	17:16	16	08:48 (1)	18:11	20:09	21:05	21:51	21:16	20:06	18:53	16:45
13	08:42	08:03	08:30 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:06 (1)
14	16:22	17:18	19	08:49 (1)	18:13	20:11	21:06	21:52	21:14	20:04	18:50	16:43
15	08:42	08:01	08:28 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:09 (1)
16	16:24	17:20	22	08:50 (1)	18:15	20:13	21:08	21:53	21:12	20:01	18:48	16:41
17	08:41	07:59	08:26 (1)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:11 (1)
18	16:25	17:22	25	08:51 (1)	18:17	20:15	21:10	21:54	21:10	19:59	18:45	16:39
19	08:41	07:57	08:24 (1)	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:10 (1)
20	16:27	17:24	28	08:52 (1)	18:19	20:17	21:12	21:55	21:08	19:57	18:43	16:37
21	08:40	07:55	08:22 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:11 (1)
22	16:28	17:26	31	08:53 (1)	18:21	20:19	21:13	21:56	21:06	19:54	18:41	16:36
23	08:39	07:53	08:20 (1)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:12 (1)
24	16:30	17:28	34	08:54 (1)	18:23	20:21	21:15	21:56	21:04	19:52	18:38	16:34
25	08:38	07:51	08:19 (1)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:13 (1)
26	16:31	17:30	35	08:54 (1)	18:25	20:22	21:17	21:57	21:01	19:49	18:36	16:32
27	08:37	07:49	08:18 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:14 (1)
28	16:33	17:32	36	08:54 (1)	18:27	20:24	21:19	21:58	21:01	19:47	18:34	16:31
29	08:37	07:47	08:18 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:15 (1)
30	16:35	17:34	36	08:54 (1)	18:29	20:26	21:20	21:58	21:00	19:44	18:31	16:29
31	08:36	07:45	08:18 (1)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:16 (1)
32	16:36	17:36	36	08:54 (1)	18:30	20:28	21:22	21:59	21:49	19:42	18:29	16:28
33	08:35	07:43	08:19 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:17 (1)
34	16:38	17:38	35	08:54 (1)	18:32	20:30	21:24	21:59	21:48	19:39	18:27	16:26
35	08:33	07:41	08:19 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:18 (1)
36	16:40	17:40	35	08:54 (1)	18:34	20:32	21:25	22:00	21:46	19:37	18:24	16:25
37	08:32	07:39	08:18 (1)	06:33	06:18	05:19	04:54	05:19	06:10	07:05	07:59	08:19 (1)
38	16:41	17:42	35	08:53 (1)	18:36	20:33	21:27	22:00	21:45	19:34	18:22	16:23
39	08:31	07:37	08:19 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:20 (1)
40	16:43	17:44	34	08:53 (1)	18:38	20:35	21:28	22:01	21:44	19:32	18:20	16:22
41	08:30	07:34	08:20 (1)	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:21 (1)
42	16:45	17:46	33	08:53 (1)	18:40	20:37	21:30	22:01	21:42	19:29	18:18	16:21
43	08:29	07:32	08:20 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:22 (1)
44	16:47	17:48	31	08:51 (1)	18:42	20:39	21:32	22:01	21:41	19:27	18:15	16:19
45	08:27	07:30	08:21 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:23 (1)
46	16:49	17:50	29	08:50 (1)	18:44	20:41	21:33	22:01	21:40	19:24	18:13	16:18
47	08:26	07:28	08:22 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:24 (1)
48	16:51	17:52	27	08:49 (1)	18:45	20:43	21:35	22:01	21:38	19:22	18:11	16:17
49	08:25	07:26	08:23 (1)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:25 (1)
50	16:53	17:54	24	08:47 (1)	18:47	20:45	21:36	22:01	21:37	19:19	17:09	16:16
51	08:23	07:23	08:25 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:26 (1)
52	16:54	17:56	20	08:45 (1)	18:49	20:46	21:37	22:01	21:35	19:17	17:07	16:15
53	08:22	07:21	08:28 (1)	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:27 (1)
54	16:56	17:58	15	08:43 (1)	18:51	20:48	21:39	22:01	21:33	19:15	17:05	16:14
55	08:20	07:19	08:32 (1)	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:28 (1)
56	16:58	18:00	5	08:37 (1)	18:53	20:50	21:40	22:01	21:32	19:12	17:02	16:13
57	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:29 (1)
58	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12
59	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:31 (1)
60	17:02			19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11
61	08:15			07:04	05:04	05:04	05:04	05:37	06:31	07:22	08:18	08:32 (1)
62	17:04			19:58	21:44	21:44	21:44	21:27	20:21	16:56	08:22 (1)	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		664								546	129	
Sun reduction		0.23								0.29	0.27	
Oper. time red.		1.00								1.00	1.00	
Wind dir. red.		0.62								0.62	0.62	
Total reduction		0.15								0.18	0.17	
Total, real		96								100	21	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KU - H307

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	08:42 (1)	07:16	08:31 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26
	16:15	17:06	18:02 (1)	18:02	09:02 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05
2	08:44	08:12	08:40 (1)	07:14	08:33 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28
	16:16	17:08	18:04 (1)	18:04	09:01 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02
3	08:44	08:10	08:38 (1)	07:12	08:35 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30
	16:17	17:10	09:03 (1)	18:06	08:57 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00
4	08:43	08:09	08:36 (1)	07:09	08:39 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32
	16:18	17:12	09:05 (1)	18:08	08:54 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57
5	08:43	08:07	08:34 (1)	07:07		06:52	05:44	04:59	05:02	05:45	06:40	07:33
	16:20	17:14	09:06 (1)	18:10		20:08	21:03	21:50	21:58	21:18	20:09	18:55
6	08:43	08:05	08:32 (1)	07:05		06:49	05:42	04:59	05:03	05:47	06:42	07:35
	16:21	17:16	09:07 (1)	18:11		20:09	21:05	21:51	21:58	21:16	20:06	18:53
7	08:42	08:03	08:30 (1)	07:02		06:47	05:40	04:58	05:04	05:49	06:44	07:37
	16:22	17:18	09:08 (1)	18:13		20:11	21:06	21:52	21:57	21:14	20:04	18:50
8	08:42	08:01	08:28 (1)	07:00		06:44	05:38	04:57	05:05	05:51	06:45	07:39
	16:24	17:20	09:09 (1)	18:15		20:13	21:08	21:53	21:56	21:12	20:01	18:48
9	08:41	07:59	08:27 (1)	06:57		06:42	05:36	04:57	05:06	05:52	06:47	07:41
	16:25	17:22	09:10 (1)	18:17		20:15	21:10	21:54	21:56	21:10	19:59	18:45
10	08:41	07:57	08:27 (1)	06:55		06:40	05:35	04:56	05:07	05:54	06:49	07:43
	16:27	17:24	09:11 (1)	18:19		20:17	21:12	21:55	21:55	21:08	19:57	18:43
11	08:40	07:55	08:26 (1)	06:53		06:37	05:33	04:56	05:08	05:56	06:51	07:44
	16:28	17:26	09:11 (1)	18:21		20:19	21:13	21:56	21:54	21:06	19:54	18:41
12	08:39	07:53	08:26 (1)	06:50		06:35	05:31	04:55	05:09	05:58	06:52	07:46
	16:30	17:28	09:12 (1)	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38
13	08:38	07:51	08:26 (1)	06:48		06:32	05:29	04:55	05:11	05:59	06:54	07:48
	16:31	17:30	09:12 (1)	18:25		20:22	21:17	21:57	21:52	21:01	19:49	18:36
14	08:37	07:49	08:25 (1)	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50
	16:33	17:32	09:12 (1)	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34
15	08:37	07:47	08:25 (1)	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52
	16:35	17:34	09:12 (1)	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31
16	08:36	07:45	08:25 (1)	06:41		06:25	05:24	04:54	05:14	06:05	06:59	07:54
	16:36	17:36	09:13 (1)	18:30		20:28	21:22	21:59	21:49	20:55	19:42	18:29
17	08:35	07:43	08:25 (1)	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56
	16:38	17:38	09:13 (1)	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27
18	08:33	07:41	08:25 (1)	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58
	16:40	17:40	09:13 (1)	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24
19	08:32	07:39	08:24 (1)	06:33		06:18	05:19	04:54	05:19	06:10	07:05	07:59
	16:41	17:42	09:12 (1)	18:36		20:33	21:27	22:00	21:45	20:48	19:34	18:22
20	08:31	07:37	08:25 (1)	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01
	16:43	17:44	09:12 (1)	18:38		20:35	21:28	22:00	21:44	20:46	19:32	18:20
21	08:30	07:34	08:25 (1)	06:28		06:14	05:16	04:55	05:21	06:13	07:08	08:03
	16:45	17:46	09:12 (1)	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18
22	08:29	07:32	08:25 (1)	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05
	16:47	17:48	09:10 (1)	18:42		20:39	21:31	22:01	21:41	20:42	19:27	18:15
23	08:27	07:30	08:26 (1)	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07
	16:49	17:50	09:10 (1)	18:44		20:41	21:33	22:01	21:40	20:39	19:24	18:13
24	08:26	07:28	08:27 (1)	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09
	16:51	17:52	09:10 (1)	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11
25	08:25	07:26	08:27 (1)	06:18		06:05	05:11	04:56	05:27	06:21	07:15	07:11
	16:53	17:54	09:08 (1)	18:47		20:45	21:36	22:01	21:37	20:35	19:19	17:09
26	08:23	07:23	08:28 (1)	06:16		06:03	05:09	04:56	05:29	06:22	07:17	07:13
	16:54	17:56	09:07 (1)	18:49		20:46	21:37	22:01	21:35	20:33	19:17	17:07
27	08:22	07:21	08:29 (1)	06:14		06:01	05:08	04:56	05:31	06:24	07:19	07:15
	16:56	17:58	09:06 (1)	18:51		20:48	21:39	22:01	21:33	20:30	19:15	17:05
28	08:20	07:19	08:29 (1)	06:11		05:59	05:07	04:57	05:32	06:26	07:21	07:17
	16:58	18:00	09:04 (1)	18:53		20:50	21:40	22:01	21:32	20:28	19:12	17:02
29	08:19	08:47 (3)		07:09		05:56	05:06	04:58	05:34	06:28	07:23	07:19
	17:00	08:50 (3)		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17:00
30	08:17	08:45 (1)		07:06		05:54	05:05	04:58	05:35	06:29	07:24	07:21
	17:02	08:52 (1)		19:57		20:54	21:43	22:01	21:28	20:23	19:07	16:58
31	08:15	08:44 (1)		07:04			05:04		05:37	06:31		07:22
	17:04	08:57 (1)		19:58			21:44		21:27	20:21		16:56
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	23	1126	96							917		344
Sun reduction	0.24	0.23	0.27							0.29		0.27
Oper. time red.	1.00	1.00	1.00							1.00		1.00
Wind dir. red.	0.61	0.62	0.62							0.62		0.61
Total reduction	0.15	0.14	0.17							0.18		0.16
Total, real	3	161	16							165		56

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KV - H308

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	09:39 (3)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19	11:01 (1)
2	16:15	11:50 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:10	29
3	08:44	09:40 (3)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21	11:00 (1)
4	16:16	11:51 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09	32
5	08:44	09:41 (3)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22	10:59 (1)
6	16:17	11:50 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:08	34
7	08:43	09:42 (3)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24	10:59 (1)
8	16:18	11:51 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08	35
9	08:43	09:43 (3)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25	10:59 (1)
10	16:20	11:50 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07	39
11	08:43	09:46 (3)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27	10:59 (1)
12	16:21	11:51 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:07	46
13	08:42	09:48 (3)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28	10:59 (1)
14	16:22	11:50 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06	50
15	08:42	11:14 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29	10:59 (1)
16	16:24	11:49 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06	53
17	08:41	11:16 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30	11:39 (1)
18	16:25	11:50 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:05	55
19	08:41	11:17 (1)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32	11:39 (1)
20	16:27	11:49 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05	58
21	08:40	11:18 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33	11:40 (1)
22	16:28	11:48 (1)	17:26	18:23	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05	59
23	08:39	11:20 (1)	07:53	08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	11:40 (1)
24	16:30	11:47 (1)	17:28	18:26 (2)	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:04	60
25	08:38	11:22 (1)	07:51	08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	11:41 (1)
26	16:31	11:46 (1)	17:30	18:27 (2)	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:03	62
27	08:37	11:24 (1)	07:49	08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	11:41 (1)
28	16:33	11:45 (1)	17:32	18:27 (2)	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:03	63
29	08:36	11:27 (1)	07:47	08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	11:41 (1)
30	16:35	11:43 (1)	17:34	18:28 (2)	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:02	65
31	08:36	11:31 (1)	07:45	08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	11:41 (1)
32	16:36	11:39 (1)	17:36	18:28 (2)	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:01	66
33	08:35	17:43	07:43	08:09 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	11:41 (1)
34	16:38	17:38	17:38	19	08:28 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	16:01
35	08:33	07:41	07:41	08:07 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	16:01
36	16:40	17:40	17:40	22	08:29 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	16:01
37	08:32	07:39	07:39	08:04 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	16:01
38	16:41	17:42	17:42	24	08:28 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	16:01
39	08:31	07:37	07:37	08:02 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	16:01
40	16:43	17:44	17:44	26	08:28 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	16:01
41	08:30	07:34	07:34	08:02 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	16:01
42	16:45	17:46	17:46	25	08:27 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	16:01
43	08:29	07:32	07:32	08:02 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	16:01
44	16:47	17:48	17:48	24	08:26 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	16:01
45	08:27	07:30	07:30	08:03 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	16:01
46	16:49	17:50	17:50	22	08:25 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	16:01
47	08:26	07:28	07:28	08:05 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	16:01
48	16:51	17:52	17:52	19	08:24 (2)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	16:01
49	08:25	07:25	07:25	08:05 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:09	16:01
50	16:52	17:54	17:54	16	08:21 (2)	18:47	20:45	21:36	22:01	21:37	20:35	19:19	16:01
51	08:23	07:23	07:23	08:08 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	16:01
52	16:54	17:56	17:56	11	08:19 (2)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	16:01
53	08:22	07:21	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	09:11	16:01
54	16:56	17:58	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	14	16:01
55	08:20	07:19	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	09:13	16:01
56	16:58	18:00	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	11	16:01
57	08:19	17:00	17:00	07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	09:15	16:01
58	17:00	17:00	17:00	19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	8	16:01
59	08:17	17:02	17:02	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	09:16	16:01
60	17:04	17:04	17:04	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	5	16:01
61	08:15	17:04	17:04	07:04	05:04	05:04	05:07	06:31	07:22	08:17	09:13	10:09	16:01
62	Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
63	Total, worst case	590	270									96	1780
64	Sun reduction	0.24	0.23									0.27	0.21
65	Oper. time red.	1.00	1.00									1.00	1.00
66	Wind dir. red.	0.60	0.64									0.60	0.60
67	Total reduction	0.15	0.15									0.16	0.12
68	Total, real	86	40									15	220

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Assumptions for shadow calculations

Shadow receptor: KW - H309

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	12:23 (1)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	16:15	31 12:54 (1)	17:06	08:47 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05
3	08:44	12:24 (1)	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28
4	16:16	31 12:55 (1)	17:08	08:49 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
5	08:44	12:24 (1)	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
6	16:17	30 12:54 (1)	17:10	08:50 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
7	08:43	12:26 (1)	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32
8	16:18	28 12:54 (1)	17:12	08:50 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
9	08:43	12:27 (1)	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33
10	16:20	26 12:53 (1)	17:14	08:51 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55
11	08:43	12:29 (1)	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35
12	16:21	24 12:53 (1)	17:16	08:52 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53
13	08:42	12:30 (1)	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37
14	16:22	22 12:52 (1)	17:18	08:52 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
15	08:42	12:32 (1)	08:01	08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
16	16:24	18 12:50 (1)	17:20	08:53 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48
17	08:41	12:35 (1)	07:59	08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
18	16:25	14 12:49 (1)	17:22	08:53 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45
19	08:40	12:39 (1)	07:57	08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43
20	16:27	7 12:46 (1)	17:24	08:53 (2)	18:19	20:17	21:12	21:55	21:58	21:08	19:57	18:43
21	08:40	07:55	08:23 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44
22	16:28	17:26	30 08:53 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36
23	08:39	07:53	08:23 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46
24	16:30	17:28	30 08:53 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34
25	08:38	07:51	08:24 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48
26	16:31	17:30	29 08:53 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32
27	08:37	07:49	08:23 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49
28	16:33	17:32	29 08:52 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31
29	08:36	07:47	08:24 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51
30	16:34	17:34	27 08:51 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29
31	08:36	07:45	08:25 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53
32	16:36	17:36	26 08:51 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28
33	08:35	07:43	08:26 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55
34	16:38	17:38	24 08:50 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26
35	08:33	07:41	08:27 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57
36	16:40	17:40	20 08:47 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25
37	08:32	07:39	08:29 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59
38	16:41	17:42	17 08:46 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23
39	08:31	07:37	08:32 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01
40	16:43	17:44	11 08:43 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22
41	08:30	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	09:06 (2)	08:02
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	4 09:10 (2)	16:20
43	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	09:01 (2)	08:04
44	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	13 09:14 (2)	16:19
45	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:59 (2)	08:06
46	16:49	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	18 09:17 (2)	16:18
47	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:57 (2)	08:08
48	16:51	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	21 09:18 (2)	16:17
49	08:25	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	07:55 (2)	08:09
50	16:52	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	24 08:19 (2)	16:16
51	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	07:54 (2)	08:11
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	26 08:20 (2)	16:15
53	08:22	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	07:53 (2)	08:13
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	28 08:21 (2)	16:14
55	08:20	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	07:53 (2)	08:14
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	28 08:21 (2)	16:13
57	08:19	07:17	07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	07:52 (2)	08:16
58	17:00	07:10	19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	30 08:22 (2)	16:12
59	08:17	07:02	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	07:53 (2)	08:18
60	17:04	07:04	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	30 08:23 (2)	16:11
61	08:15	07:04	19:58	20:54	21:44	22:00	21:27	20:21	16:56	31 08:23 (2)	16:10	16:11
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	233	423									178	932
Sun reduction	0.24	0.23									0.27	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.63	0.62									0.62	0.63
Total reduction	0.15	0.14									0.16	0.13
Total, real	35	61									29	121

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KX - H310

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KY - H311

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KZ - H312

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:25 (5)	07:16	17:16 (4)	07:01	05:52	20:00 (2)	05:03		
	16:15	17:06	9 16:34 (5)	18:02	18 17:34 (4)	20:00	20:55	26 20:26 (2)	21:45		
2	08:44	08:12	16:26 (5)	07:14	17:15 (4)	06:59	05:50	20:00 (2)	05:02		
	16:16	17:08	11 16:37 (5)	18:04	21 17:36 (4)	20:02	20:57	27 20:27 (2)	21:46		
3	08:43	08:10	16:25 (5)	07:11	17:15 (4)	06:56	05:48	20:00 (2)	05:01		
	16:17	17:10	14 16:39 (5)	18:06	23 17:38 (4)	20:04	20:59	29 20:29 (2)	21:48		
4	08:43	08:08	16:25 (5)	07:09	17:14 (4)	06:54	05:46	20:00 (2)	05:00		
	16:18	17:12	16 16:41 (5)	18:07	27 17:41 (4)	20:06	21:01	30 20:30 (2)	21:49		
5	08:43	08:07	16:25 (5)	07:07	17:13 (4)	06:51	05:44	20:00 (2)	04:59		
	16:19	17:14	18 16:43 (5)	18:09	29 17:42 (4)	20:07	21:03	30 20:30 (2)	21:50		
6	08:42	08:05	16:25 (5)	07:04	17:13 (4)	06:49	05:42	20:00 (2)	04:59		
	16:21	17:16	20 16:45 (5)	18:11	32 17:45 (4)	20:09	21:04	29 20:29 (2)	21:51		
7	08:42	08:03	16:26 (5)	07:02	17:13 (4)	06:47	05:40	20:01 (2)	04:58		
	16:22	17:18	21 16:47 (5)	18:13	33 17:46 (4)	20:11	21:06	28 20:29 (2)	21:52		
8	08:42	08:01	16:26 (5)	07:00	17:13 (4)	06:44	05:38	20:01 (2)	04:57		
	16:24	17:20	22 16:48 (5)	18:15	35 17:48 (4)	20:13	21:08	27 20:28 (2)	21:53		
9	08:41	07:59	16:27 (5)	06:57	17:12 (4)	06:42	05:36	20:02 (2)	04:57		
	16:25	17:22	21 16:48 (5)	18:17	37 17:49 (4)	20:15	21:10	25 20:27 (2)	21:54		
10	08:40	07:57	16:28 (5)	06:55	17:13 (4)	06:39	05:34	20:02 (2)	04:56		
	16:26	17:24	19 16:47 (5)	18:19	36 17:49 (4)	20:17	21:11	24 20:26 (2)	21:55		
11	08:40	07:55	16:29 (5)	06:52	17:14 (4)	06:37	05:33	20:04 (2)	04:56		
	16:28	17:26	17 16:46 (5)	18:21	34 17:48 (4)	20:19	21:13	22 20:26 (2)	21:55		
12	08:39	07:53	16:29 (5)	06:50	17:14 (4)	06:35	05:31	20:04 (2)	04:55		
	16:30	17:28	15 16:44 (5)	18:23	33 17:47 (4)	20:20	21:15	21 20:25 (2)	21:56		
13	08:38	07:51	16:32 (5)	06:48	17:15 (4)	06:32	05:29	20:05 (2)	04:55		
	16:31	17:30	10 16:42 (5)	18:25	31 17:46 (4)	20:22	21:17	18 20:23 (2)	21:57		
14	08:37	07:49	06:45	18:25	17:15 (4)	06:30	05:27	20:08 (2)	04:55		
	16:33	17:32	18:27	30 18:00 (3)	20:24	21:18	14 20:22 (2)	21:57			
15	08:36	07:47	06:43	18:28	17:17 (4)	06:28	05:26	20:09 (2)	04:54		
	16:34	17:34	18:28	30 18:02 (3)	20:26	21:20	10 20:19 (2)	21:58			
16	08:35	07:45	06:40	18:30	17:18 (4)	06:25	05:24	20:10 (2)	04:54		
	16:36	17:36	18:30	30 18:04 (3)	20:28	21:22	21:59				
17	08:34	07:43	06:38	18:32	17:21 (4)	06:23	05:22	20:11 (2)	04:54		
	16:38	17:38	18:32	27 18:06 (3)	20:30	21:23	21:59				
18	08:33	07:41	06:35	18:34	17:24 (4)	06:21	05:21	20:12 (2)	04:54		
	16:40	17:40	18:34	21 18:07 (3)	20:31	21:25	22:00				
19	08:32	07:39	06:33	18:36	17:55 (3)	06:18	05:19	20:13 (2)	04:54		
	16:41	17:42	18:36	15 18:10 (3)	20:33	21:27	22:00				
20	08:31	07:36	06:31	18:38	17:54 (3)	06:16	05:18	20:14 (2)	04:54		
	16:43	17:44	18:38	17 18:11 (3)	20:35	21:28	22:00				
21	08:30	07:34	06:28	18:40	17:55 (3)	06:14	05:16	20:15 (2)	04:54		
	16:45	17:46	18:40	18 18:13 (3)	20:37	21:30	22:01				
22	08:28	07:32	06:26	18:42	17:54 (3)	06:12	05:15	20:16 (2)	04:55		
	16:47	17:48	18:41	21 18:15 (3)	20:39	1 20:10 (2)	21:31	22:01			
23	08:27	07:30	06:23	18:43	17:55 (3)	06:09	05:13	20:17 (2)	04:55		
	16:49	17:50	18:43	20 18:15 (3)	20:41	5 20:12 (2)	21:33	22:01			
24	08:26	07:28	06:21	18:45	17:56 (3)	06:07	05:12	20:18 (2)	04:55		
	16:50	17:52	18:45	17 18:13 (3)	20:42	9 20:14 (2)	21:34	22:01			
25	08:24	07:25	17:22 (4)	06:18	17:58 (3)	06:05	05:11	20:19 (2)	04:55		
	16:52	17:54	4 17:26 (4)	06:17	13 18:11 (3)	20:44	11 20:15 (2)	21:36	22:01		
26	08:23	07:23	17:20 (4)	06:16	18:00 (3)	06:03	05:09	20:20 (2)	04:56		
	16:54	17:56	8 17:28 (4)	06:15	7 18:07 (3)	20:46	14 20:17 (2)	21:37	22:01		
27	08:22	07:21	17:19 (4)	06:13	06:01	20:02 (2)	05:08	20:21 (2)	04:56		
	16:56	17:58	12 17:31 (4)	06:11	20:48	17 20:19 (2)	21:39	22:01			
28	08:20	07:18	17:17 (4)	06:11	05:58	20:02 (2)	05:07	20:22 (2)	04:57		
	16:58	18:00	15 17:32 (4)	06:10	20:50	19 20:21 (2)	21:40	22:01			
29	08:18		07:08	19:54	05:56	20:01 (2)	05:06	20:23 (2)	04:57		
	17:00		19:54	20:52	21 20:22 (2)	21:41	22:01				
30	08:17	16:27 (5)	07:06	20:54	05:54	20:01 (2)	05:05	20:24 (2)	04:58		
	17:02	3 16:30 (5)	19:56	20:53	23 20:24 (2)	21:43	22:00				
31	08:15	16:26 (5)	07:04			05:04					
	17:04	6 16:32 (5)	19:58			21:44					
Potential sun hours	250		273	367		420		494		510	
Total, worst case	9		252	655		120		360			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	1		39	120		27		89			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: KZ - H312

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	21	20:14 (2) 20:35 (2)	06:33 20:18		07:26 19:05	17:53 (4) 18:25 (4)	07:24 16:54	15:57 (5) 16:17 (5)	08:19 16:10
2	04:59 22:00	05:40 21:23	23	20:14 (2) 20:37 (2)	06:35 20:16		07:28 19:02	17:52 (4) 18:26 (4)	07:26 16:52	15:56 (5) 16:18 (5)	08:21 16:09
3	05:00 21:59	05:42 21:21	25	20:12 (2) 20:37 (2)	06:36 20:13		07:30 19:00	17:51 (4) 18:26 (4)	07:28 16:50	15:56 (5) 16:18 (5)	08:22 16:08
4	05:01 21:59	05:44 21:19	26	20:12 (2) 20:38 (2)	06:38 20:11		07:31 18:57	17:50 (4) 18:27 (4)	07:30 16:48	15:55 (5) 16:17 (5)	08:24 16:08
5	05:02 21:58	05:45 21:17	27	20:11 (2) 20:38 (2)	06:40 20:09		07:33 18:55	17:50 (4) 18:26 (4)	07:32 16:46	15:55 (5) 16:15 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	29	20:10 (2) 20:39 (2)	06:42 20:06		07:35 18:52	17:50 (4) 18:24 (4)	07:34 16:44	15:55 (5) 16:12 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	30	20:10 (2) 20:40 (2)	06:43 20:04		07:37 18:50	17:48 (4) 18:21 (4)	07:36 16:43	15:55 (5) 16:10 (5)	08:28 16:06
8	05:05 21:56	05:50 21:11	30	20:09 (2) 20:39 (2)	06:45 20:01		07:39 18:48	17:48 (4) 18:18 (4)	07:38 16:41	15:55 (5) 16:08 (5)	08:29 16:06
9	05:06 21:55	05:52 21:10	30	20:09 (2) 20:39 (2)	06:47 19:59		07:41 18:45	17:48 (4) 18:16 (4)	07:40 16:39	15:55 (5) 16:06 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	29	20:08 (2) 20:37 (2)	06:49 19:56		07:42 18:43	17:48 (4) 18:14 (4)	07:42 16:37	15:57 (5) 16:05 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	26	20:09 (2) 20:35 (2)	06:50 19:54		07:44 18:40	17:49 (4) 18:11 (4)	07:44 16:35	15:58 (5) 16:03 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	25	20:09 (2) 20:34 (2)	06:52 19:51		07:46 18:38	17:49 (4) 18:09 (4)	07:45 16:34	15:59 (5) 16:01 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01	23	20:08 (2) 20:31 (2)	06:54 19:49		07:48 18:36	17:50 (4) 18:07 (4)	07:47 16:32		08:35 16:05
14	05:12 21:51	06:01 20:59	20	20:09 (2) 20:29 (2)	06:56 19:47		07:50 18:33	17:51 (4) 18:04 (4)	07:49 16:31		08:36 16:04
15	05:13 21:50	06:03 20:57	19	20:09 (2) 20:28 (2)	06:58 19:44		07:52 18:31	17:52 (4) 18:02 (4)	07:51 16:29		08:37 16:05
16	05:14 21:49	06:04 20:55	16	20:09 (2) 20:25 (2)	06:59 19:42		07:54 18:29	17:53 (4) 17:59 (4)	07:53 16:27		08:38 16:05
17	05:16 21:47	06:06 20:53	13	20:10 (2) 20:23 (2)	07:01 19:39	18:50 (3) 18:54 (3)	07:55 18:26	17:55 (4) 17:57 (4)	07:55 16:26		08:38 16:05
18	05:17 21:46	06:08 20:50	11	20:11 (2) 20:22 (2)	07:03 19:37	18:46 (3) 18:58 (3)	07:57 18:24		16:26 16:24		16:05 16:05
19	05:18 21:45	06:10 20:48	8	20:11 (2) 20:19 (2)	07:05 19:34	18:44 (3) 19:00 (3)	07:59 18:22		16:24 16:23		16:05 16:05
20	05:20 21:44	06:12 20:46	4	20:13 (2) 20:17 (2)	07:06 19:32	18:42 (3) 19:01 (3)	08:01 18:20		16:22 16:22		16:06 16:06
21	05:21 21:42	06:13 20:44			07:08 19:29	18:40 (3) 19:01 (3)	08:03 18:17		16:22 16:20		16:06 16:06
22	05:23 21:41	06:15 20:42			07:10 19:27	18:39 (3) 18:58 (3)	08:05 18:15		16:20 16:19		16:06 16:06
23	05:24 21:39	06:17 20:39			07:12 19:24	18:39 (3) 18:56 (3)	08:07 18:13		16:19 16:18		16:06 16:07
24	05:26 21:38	06:19 20:37			07:13 19:22	18:38 (3) 18:54 (3)	08:09 18:11		16:18 16:17		16:07 16:08
25	05:27 21:36	06:20 20:35			07:15 19:19	18:09 (4) 18:51 (3)	07:11 17:09		16:17 16:16		16:08 16:08
26	05:29 21:35	06:22 20:32			07:17 19:17	18:03 (4) 18:48 (3)	07:13 17:06		16:16 16:14		16:08 16:09
27	05:30 21:33	06:24 20:30			07:19 19:14	18:01 (4) 18:46 (3)	07:14 17:04		16:15 16:13		16:09 16:10
28	05:32 21:32	20:22 (2) 20:28 (2)			06:26 19:12	17:58 (4) 18:44 (3)	07:16 17:02	16:05 (5) 16:09 (5)	08:14 16:12		16:10 16:11
29	05:34 21:30	20:19 (2) 20:31 (2)			06:27 20:25	17:57 (4) 18:41 (3)	07:18 17:00	16:01 (5) 16:12 (5)	08:16 16:12		16:11 16:11
30	05:35 21:28	20:17 (2) 20:33 (2)			06:29 20:23	17:54 (4) 18:24 (4)	07:20 16:58	15:59 (5) 16:14 (5)	08:18 16:11		16:11 16:12
31	05:37 21:26	20:16 (2) 20:35 (2)			06:31 20:21		07:22 16:56	15:57 (5) 16:15 (5)			16:12 16:13
Potential sun hours	512	460		382		328		259		233	
Total, worst case	53	435		287		463		177			
Sun reduction	0.32	0.34		0.32		0.29		0.27			
Oper. time red.	1.00	1.00		1.00		1.00		1.00			
Wind dir. red.	0.65	0.65		0.68		0.68		0.66			
Total reduction	0.21	0.22		0.22		0.20		0.17			
Total, real	11	96		62		91		31			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LA - H313

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	19:08 (3)	05:52
	16:15	17:06	18:02	20:00	8	19:16 (3)
2	08:44	08:12	07:14	06:59	20:55	4
	16:16	17:08	18:04	20:02	20:57	7
3	08:43	08:10	16:36 (5)	07:11	06:56	20:22 (2)
	16:17	17:10	16:39 (5)	18:06	20:04	20:26 (2)
4	08:43	08:08	16:34 (5)	07:09	17:39 (4)	05:50
	16:18	17:12	16:41 (5)	18:07	17:41 (4)	20:06
5	08:43	08:07	16:34 (5)	07:07	17:35 (4)	06:51
	16:19	17:14	16:43 (5)	18:09	17:42 (4)	20:07
6	08:42	08:05	16:33 (5)	07:04	17:33 (4)	06:49
	16:21	17:16	16:45 (5)	18:11	17:45 (4)	20:09
7	08:42	08:03	16:32 (5)	07:02	17:31 (4)	06:47
	16:22	17:18	16:47 (5)	18:13	17:46 (4)	20:11
8	08:42	08:01	16:32 (5)	07:00	17:30 (4)	06:44
	16:24	17:20	16:50 (5)	18:15	17:48 (4)	20:13
9	08:41	07:59	16:32 (5)	06:57	17:28 (4)	06:42
	16:25	17:22	16:52 (5)	18:17	17:50 (4)	20:15
10	08:40	07:57	16:32 (5)	06:55	17:27 (4)	06:39
	16:26	17:24	16:54 (5)	18:19	17:52 (4)	20:17
11	08:40	07:55	16:32 (5)	06:52	17:27 (4)	06:37
	16:28	17:26	16:56 (5)	18:21	17:55 (4)	20:19
12	08:39	07:53	16:32 (5)	06:50	17:25 (4)	06:35
	16:30	17:28	16:56 (5)	18:23	17:56 (4)	20:20
13	08:38	07:51	16:32 (5)	06:48	17:25 (4)	06:32
	16:31	17:30	16:55 (5)	18:25	17:58 (4)	20:22
14	08:37	07:49	16:33 (5)	06:45	17:24 (4)	06:30
	16:33	17:32	16:55 (5)	18:27	18:00 (4)	20:24
15	08:36	07:47	16:34 (5)	06:43	17:24 (4)	06:28
	16:34	17:34	16:54 (5)	18:28	18:02 (4)	20:26
16	08:35	07:45	16:35 (5)	06:40	17:23 (4)	06:25
	16:36	17:36	16:53 (5)	18:30	18:02 (4)	20:28
17	08:34	07:43	16:37 (5)	06:38	17:24 (4)	06:23
	16:38	17:38	16:52 (5)	18:32	18:02 (4)	20:30
18	08:33	07:41	16:38 (5)	06:35	17:23 (4)	06:21
	16:40	17:40	16:49 (5)	18:34	18:01 (4)	20:31
19	08:32	07:39	06:33	17:24 (4)	06:18	05:19
	16:41	17:42	18:36	18:10 (3)	20:33	21:27
20	08:31	07:36	06:31	17:24 (4)	06:16	05:18
	16:43	17:44	18:38	18:11 (3)	20:35	21:28
21	08:30	07:34	06:28	17:25 (4)	06:14	05:16
	16:45	17:46	18:40	18:13 (3)	20:37	21:30
22	08:28	07:32	06:26	17:25 (4)	06:12	05:15
	16:47	17:48	18:41	18:15 (3)	20:39	21:31
23	08:27	07:30	06:23	17:26 (4)	06:09	05:13
	16:49	17:50	18:43	18:17 (3)	20:41	21:33
24	08:26	07:28	06:21	17:27 (4)	06:07	05:12
	16:50	17:52	18:45	18:18 (3)	20:42	21:34
25	08:24	07:25	06:18	17:28 (4)	06:05	05:11
	16:52	17:54	18:47	18:21 (3)	20:44	21:36
26	08:23	07:23	06:16	17:30 (4)	06:03	05:09
	16:54	17:56	18:49	18:22 (3)	20:46	21:37
27	08:22	07:21	06:13	17:33 (4)	06:01	05:08
	16:56	17:58	18:51	18:24 (3)	20:48	21:39
28	08:20	07:18	06:11	18:03 (3)	05:58	05:07
	16:58	18:00	18:53	18:24 (3)	20:50	21:40
29	08:18		07:08	19:03 (3)	05:56	05:06
	17:00		19:54	19:22 (3)	20:52	21:41
30	08:17		07:06	19:04 (3)	05:54	05:05
	17:02		19:56	19:21 (3)	20:53	21:43
31	08:15		07:04	19:05 (3)		05:04
	17:04		19:58	19:19 (3)		21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case		263	827	8	638	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.64	
Total reduction		0.15	0.18	0.24	0.24	
Total, real		40	151	2	156	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LA - H313

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:23 (2)	06:33		07:26	18:04 (4)	07:24	16:02 (5)	08:19	
	22:00	21:25	30	20:53 (2)	20:18	19:05	32	18:36 (4)	16:54	21	16:23 (5)
2	04:59	05:40	20:24 (2)	06:35		07:28	18:04 (4)	07:26	16:02 (5)	08:21	
	22:00	21:23	28	20:52 (2)	20:16	19:02	29	18:33 (4)	16:52	19	16:21 (5)
3	05:00	05:42	20:23 (2)	06:36		07:30	18:05 (4)	07:28	16:02 (5)	08:22	
	21:59	21:21	27	20:50 (2)	20:13	19:00	26	18:31 (4)	16:50	17	16:19 (5)
4	05:01	05:44	20:24 (2)	06:38		07:31	18:06 (4)	07:30	16:02 (5)	08:24	
	21:59	21:19	24	20:48 (2)	20:11	18:57	23	18:29 (4)	16:48	15	16:17 (5)
5	05:02	05:45	20:24 (2)	06:40		07:33	18:06 (4)	07:32	16:03 (5)	08:25	
	21:58	21:17	22	20:46 (2)	20:09	18:55	20	18:26 (4)	16:46	12	16:15 (5)
6	05:03	05:47	20:25 (2)	06:42		07:35	18:07 (4)	07:34	16:03 (5)	08:26	
	21:58	21:15	20	20:45 (2)	20:06	18:52	17	18:24 (4)	16:44	9	16:12 (5)
7	05:04	05:49	20:25 (2)	06:43		07:37	18:08 (4)	07:36	16:04 (5)	08:28	
	21:57	21:13	18	20:43 (2)	20:04	18:50	13	18:21 (4)	16:43	6	16:10 (5)
8	05:05	05:50	20:25 (2)	06:45		07:39	18:09 (4)	07:38	16:06 (5)	08:29	
	21:56	21:11	16	20:41 (2)	20:01	18:48	9	18:18 (4)	16:41	2	16:08 (5)
9	05:06	05:52	20:27 (2)	06:47		07:41	18:12 (4)	07:40			08:30
	21:55	21:09	12	20:39 (2)	19:59	18:45	4	18:16 (4)	16:39		16:05
10	05:07	05:54	20:27 (2)	06:49		07:42		07:42			08:31
	21:55	21:07	10	20:37 (2)	19:56	18:43		16:37			16:05
11	05:08	05:56	20:29 (2)	06:50		07:44		07:44			08:33
	21:54	21:05	6	20:35 (2)	19:54	19:01 (3)		16:35			16:05
12	05:09	05:57	20:31 (2)	06:52	6	19:07 (3)	18:40				08:34
	21:53	21:03	3	20:34 (2)	19:51	18:58 (3)	07:46	07:45			16:05
13	05:10	05:59		06:54	13	19:11 (3)	18:38	16:34			08:35
	21:52	21:01		19:49	16	18:56 (3)	07:48	07:47			16:05
14	05:12	20:34 (2)	06:01	06:56		19:12 (3)	18:36	16:32			08:36
	21:51	8	20:42 (2)	20:59	20	18:53 (3)	07:50	07:49			16:04
15	05:13	20:32 (2)	06:03	06:58		19:13 (3)	18:33	16:31			08:37
	21:50	12	20:44 (2)	20:57	22	18:52 (3)	07:52	07:51			16:05
16	05:14	20:30 (2)	06:04	06:59		19:14 (3)	18:31	16:29			08:38
	21:49	15	20:45 (2)	20:55	34	18:24 (4)	07:54	07:53			16:05
17	05:16	20:30 (2)	06:06	07:01		19:14 (3)	18:29	16:27			08:38
	21:47	17	20:47 (2)	20:53	40	18:19 (4)	07:55	07:55			16:05
18	05:17	20:27 (2)	06:08	07:03		19:11 (3)	18:26	16:26			08:39
	21:46	19	20:48 (2)	20:50	42	18:16 (4)	07:57	07:57			16:05
19	05:18	20:28 (2)	06:10	07:05		19:08 (3)	18:24	16:24			08:40
	21:45	21	20:49 (2)	20:48	44	18:14 (4)	07:59	07:59			16:05
20	05:20	20:28 (2)	06:12	07:06		19:06 (3)	18:22	16:23			08:41
	21:44	22	20:50 (2)	20:46	44	18:13 (4)	08:01	08:00			16:06
21	05:21	20:27 (2)	06:13	07:08		19:04 (3)	18:20	16:22			08:41
	21:42	24	20:51 (2)	20:44	45	18:10 (4)	08:03	08:02			16:06
22	05:23	20:26 (2)	06:15	07:10		19:01 (3)	18:17	16:20			08:42
	21:41	25	20:52 (2)	20:42	44	18:09 (4)	08:05	08:04			16:06
23	05:24	20:26 (2)	06:17	07:12		18:58 (3)	18:15	16:19			08:42
	21:39	26	20:52 (2)	20:39	42	18:08 (4)	08:07	17:12 (5)			16:07
24	05:26	20:25 (2)	06:19	07:13		18:56 (3)	18:13	16:18			08:43
	21:38	27	20:52 (2)	20:37	40	18:08 (4)	08:09	17:08 (5)			16:08
25	05:27	20:25 (2)	06:20	07:15		18:54 (3)	18:11	16:17			08:43
	21:36	28	20:53 (2)	20:35	38	18:06 (4)	07:11	16:06 (5)			16:08
26	05:29	20:24 (2)	06:22	07:17		18:44 (4)	17:09	16:22 (5)			08:44
	21:35	29	20:53 (2)	20:32	38	18:06 (4)	07:13	16:04 (5)			16:09
27	05:30	20:24 (2)	06:24	07:19		18:44 (4)	17:06	16:23 (5)			08:44
	21:33	29	20:53 (2)	20:30	39	18:05 (4)	07:14	16:03 (5)			16:10
28	05:32	20:24 (2)	06:26	07:21		18:44 (4)	17:04	16:24 (5)			08:44
	21:32	30	20:54 (2)	20:28	39	18:05 (4)	07:16	16:02 (5)			16:11
29	05:34	20:23 (2)	06:27	07:22		18:44 (4)	17:02	16:25 (5)			08:44
	21:30	31	20:54 (2)	20:25	36	18:05 (4)	07:18	16:02 (5)			16:11
30	05:35	20:24 (2)	06:29	07:24		18:41 (4)	17:00	16:25 (5)			08:44
	21:28	30	20:54 (2)	20:23	34	18:04 (4)	07:20	16:01 (5)			16:12
31	05:37	20:24 (2)	06:31	19:07		18:38 (4)	16:58	16:25 (5)			08:44
	21:26	31	20:55 (2)	20:21			07:22	16:01 (5)			16:13
Potential sun hours	512		460	382		16:56	24	16:25 (5)			233
Total, worst case		424	216	676		328		259			
Sun reduction	0.32		0.34	0.32			340		101		
Oper. time red.	1.00		1.00	1.00					0.27		
Wind dir. red.	0.64		0.64	0.68					1.00		
Total reduction	0.21		0.22	0.22					0.65		
Total, real	88		47	146			66		0.17		
									18		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LB - H314

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	18:44 (4)	05:52
	16:15	17:06	18:02	20:00	49	19:33 (3)
2	08:44	08:12	07:14	06:59	18:44 (4)	05:50
	16:16	17:08	18:04	20:02	51	19:35 (3)
3	08:43	08:10	07:11	06:56	18:46 (4)	05:48
	16:17	17:10	18:06	20:04	47	19:35 (3)
4	08:43	08:08	07:09	06:54	18:48 (4)	05:46
	16:18	17:12	18:07	20:06	42	19:34 (3)
5	08:43	08:07	07:07	06:51	18:50 (4)	05:44
	16:19	17:14	18:09	20:07	34	19:32 (3)
6	08:42	08:05	07:04	06:49	18:53 (4)	05:42
	16:21	17:16	18:11	20:09	24	19:30 (3)
7	08:42	08:03	07:02	06:47	19:20 (3)	05:40
	16:22	17:18	18:13	20:11	6	19:26 (3)
8	08:42	08:01	07:00	06:44		05:38
	16:24	17:20	18:15	20:13		21:08
9	08:41	07:59	16:50 (5)	06:57		05:36
	16:25	17:22	18:17	20:15		21:10
10	08:40	07:57	16:48 (5)	06:55		05:34
	16:26	17:24	18:19	20:17		21:11
11	08:40	07:55	16:48 (5)	06:52		05:33
	16:28	17:26	18:21	20:19		21:13
12	08:39	07:53	16:46 (5)	06:50		05:31
	16:30	17:28	18:23	20:20		21:15
13	08:38	07:51	16:45 (5)	06:48		05:29
	16:31	17:30	18:25	20:22		21:17
14	08:37	07:49	16:45 (5)	06:45	17:56 (4)	05:27
	16:33	17:32	18:27	20:24	4	18:00 (4)
15	08:36	07:47	16:45 (5)	06:43	17:54 (4)	05:26
	16:34	17:34	18:28	20:26	8	18:02 (4)
16	08:35	07:45	16:45 (5)	06:40	17:51 (4)	05:24
	16:36	17:36	18:30	20:28	13	18:04 (4)
17	08:34	07:43	16:45 (5)	06:38	17:50 (4)	05:22
	16:38	17:38	18:32	20:30	16	18:06 (4)
18	08:33	07:41	16:45 (5)	06:35	17:48 (4)	05:21
	16:40	17:40	18:34	20:31	19	18:07 (4)
19	08:32	07:39	16:45 (5)	06:33	17:47 (4)	05:19
	16:41	17:42	18:36	20:33	23	18:10 (4)
20	08:31	07:36	16:46 (5)	06:31	17:45 (4)	05:18
	16:43	17:44	18:38	20:35	26	18:11 (4)
21	08:30	07:34	16:47 (5)	06:28	17:45 (4)	05:16
	16:45	17:46	18:40	20:37	28	18:13 (4)
22	08:28	07:32	16:47 (5)	06:26	17:44 (4)	05:15
	16:47	17:48	18:41	20:39	31	18:15 (4)
23	08:27	07:30	16:49 (5)	06:23	17:43 (4)	05:13
	16:49	17:50	18:43	20:41	34	18:17 (4)
24	08:26	07:28	16:52 (5)	06:21	17:42 (4)	05:12
	16:50	17:52	18:45	20:42	36	18:18 (4)
25	08:24	07:25		06:18	17:42 (4)	05:11
	16:52	17:54		18:47	39	18:21 (3)
26	08:23	07:23		06:16	17:42 (4)	05:09
	16:54	17:56		18:49	40	18:22 (3)
27	08:22	07:21		06:13	17:42 (4)	05:08
	16:56	17:58		18:51	42	18:24 (3)
28	08:20	07:18		06:11	17:43 (4)	05:07
	16:58	18:00		18:53	43	18:26 (3)
29	08:18			07:08	18:42 (4)	05:06
	17:00			19:54	46	19:28 (3)
30	08:17			07:06	18:43 (4)	05:05
	17:02			19:56	47	19:30 (3)
31	08:15			07:04	18:43 (4)	05:04
	17:04			19:58	48	19:31 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case		261	543	253	517	447
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.68	0.67	0.63	0.63
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		40	99	60	125	90

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LB - H314

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July			August			September			October			November			December	
1	04:59		20:43 (2)	05:39		20:42 (2)	06:33			07:26			07:24		16:18 (5)	08:19	
	22:00	15	20:58 (2)	21:25	11	20:53 (2)	20:18			19:05			16:54	5	16:23 (5)	16:10	
2	04:59		20:43 (2)	05:40		20:43 (2)	06:35			07:28			07:26		16:20 (5)	08:21	
	22:00	16	20:59 (2)	21:23	9	20:52 (2)	20:16			19:02			16:52	1	16:21 (5)	16:09	
3	05:00		20:42 (2)	05:42		20:43 (2)	06:36			07:30			07:28			08:22	
	21:59	17	20:59 (2)	21:21	7	20:50 (2)	20:13			19:00			16:50			16:08	
4	05:01		20:42 (2)	05:44		20:45 (2)	06:38			07:31			07:30			08:24	
	21:59	18	21:00 (2)	21:19	3	20:48 (2)	20:11			18:57			16:48			16:08	
5	05:02		20:42 (2)	05:45			06:40		19:17 (3)	07:33			07:32			08:25	
	21:58	19	21:01 (2)	21:17			20:09	6	19:23 (3)	18:55			16:46			16:07	
6	05:03		20:41 (2)	05:47			06:42		18:50 (4)	07:35			07:34			08:26	
	21:58	21	21:02 (2)	21:15			20:06	23	19:26 (3)	18:52			16:44			16:07	
7	05:04		20:41 (2)	05:49			06:43		18:45 (4)	07:37			07:36			08:28	
	21:57	21	21:02 (2)	21:13			20:04	34	19:27 (3)	18:50			16:43			16:06	
8	05:05		20:41 (2)	05:51			06:45		18:42 (4)	07:39			07:38			08:29	
	21:56	22	21:03 (2)	21:11			20:01	42	19:28 (3)	18:48			16:41			16:06	
9	05:06		20:41 (2)	05:52			06:47		18:40 (4)	07:41			07:40			08:30	
	21:55	23	21:04 (2)	21:09			19:59	47	19:29 (3)	18:45			16:39			16:05	
10	05:07		20:40 (2)	05:54			06:49		18:38 (4)	07:42			07:42			08:31	
	21:55	24	21:04 (2)	21:07			19:56	50	19:28 (3)	18:43			16:37			16:05	
11	05:08		20:40 (2)	05:56			06:50		18:36 (4)	07:44			07:44			08:33	
	21:54	25	21:05 (2)	21:05			19:54	50	19:26 (3)	18:40			16:35			16:05	
12	05:09		20:40 (2)	05:57			06:52		18:35 (4)	07:46			07:45			08:34	
	21:53	25	21:05 (2)	21:03			19:51	49	19:24 (3)	18:38			16:34			16:05	
13	05:10		20:39 (2)	05:59			06:54		18:34 (4)	07:48			07:47			08:35	
	21:52	26	21:05 (2)	21:01			19:49	48	19:22 (3)	18:36			16:32			16:05	
14	05:12		20:39 (2)	06:01			06:56		18:33 (4)	07:50			07:49			08:36	
	21:51	27	21:06 (2)	20:59			19:47	45	19:18 (3)	18:33			16:31			16:04	
15	05:13		20:39 (2)	06:03			06:58		18:32 (4)	07:52			07:51			08:37	
	21:50	27	21:06 (2)	20:57			19:44	44	19:16 (3)	18:31			16:29			16:05	
16	05:14		20:38 (2)	06:04			06:59		18:31 (4)	07:54			07:53			08:38	
	21:49	28	21:06 (2)	20:55			19:42	43	19:14 (3)	18:29			16:27			16:05	
17	05:16		20:39 (2)	06:06			07:01		18:30 (4)	07:55		17:27 (5)	07:55			08:38	
	21:47	28	21:07 (2)	20:53			19:39	41	19:11 (3)	18:26	3	17:30 (5)	16:26			16:05	
18	05:17		20:39 (2)	06:08			07:03		18:30 (4)	07:57		17:22 (5)	07:57			08:39	
	21:46	28	21:07 (2)	20:50			19:37	38	19:08 (3)	18:24	12	17:34 (5)	16:24			16:05	
19	05:18		20:38 (2)	06:10			07:05		18:30 (4)	07:59		17:20 (5)	07:59			08:40	
	21:45	29	21:07 (2)	20:48			19:34	36	19:06 (4)	18:22	16	17:36 (5)	16:23			16:05	
20	05:20		20:39 (2)	06:12			07:06		18:30 (4)	08:01		17:18 (5)	08:00			08:41	
	21:44	29	21:08 (2)	20:46			19:32	34	19:04 (4)	18:20	19	17:37 (5)	16:22			16:06	
21	05:21		20:38 (2)	06:13			07:08		18:29 (4)	08:03		17:17 (5)	08:02			08:41	
	21:42	30	21:08 (2)	20:44			19:29	32	19:01 (4)	18:17	21	17:38 (5)	16:20			16:06	
22	05:23		20:38 (2)	06:15			07:10		18:29 (4)	08:05		17:16 (5)	08:04			08:42	
	21:41	29	21:07 (2)	20:42			19:27	29	18:58 (4)	18:15	23	17:39 (5)	16:19			16:06	
23	05:24		20:39 (2)	06:17			07:12		18:30 (4)	08:07		17:15 (5)	08:06			08:42	
	21:39	28	21:07 (2)	20:39			19:24	26	18:56 (4)	18:13	24	17:39 (5)	16:18			16:07	
24	05:26		20:38 (2)	06:19			07:13		18:30 (4)	08:09		17:15 (5)	08:08			08:43	
	21:38	27	21:05 (2)	20:37			19:22	24	18:54 (4)	18:11	24	17:39 (5)	16:17			16:08	
25	05:27		20:39 (2)	06:20			07:15		18:30 (4)	07:11		16:15 (5)	08:09			08:43	
	21:36	25	21:04 (2)	20:35			19:19	21	18:51 (4)	17:09	23	16:38 (5)	16:16			16:08	
26	05:29		20:39 (2)	06:22			07:17		18:31 (4)	07:13		16:14 (5)	08:11			08:43	
	21:35	23	21:02 (2)	20:32			19:17	17	18:48 (4)	17:06	22	16:36 (5)	16:14			16:09	
27	05:30		20:39 (2)	06:24			07:19		18:32 (4)	07:14		16:14 (5)	08:13			08:44	
	21:33	21	21:00 (2)	20:30			19:14	14	18:46 (4)	17:04	20	16:34 (5)	16:13			16:10	
28	05:32		20:39 (2)	06:26			07:21		18:34 (4)	07:16		16:15 (5)	08:14			08:44	
	21:32	20	20:59 (2)	20:28			19:12	10	18:44 (4)	17:02	16	16:31 (5)	16:12			16:11	
29	05:34		20:39 (2)	06:27			07:22		18:36 (4)	07:18		16:15 (5)	08:16			08:44	
	21:30	18	20:57 (2)	20:25			19:09	5	18:41 (4)	17:00	14	16:29 (5)	16:12			16:11	
30	05:35		20:40 (2)	06:29			07:24			07:20		16:16 (5)	08:18			08:44	
	21:28	16	20:56 (2)	20:23			19:07			16:58	11	16:27 (5)	16:11			16:12	
31	05:37		20:41 (2)	06:31						07:22		16:16 (5)				08:44	
	21:26	14	20:55 (2)	20:21						16:56	9	16:25 (5)				16:13	
Potential sun hours	512			460			382			328			259			233	
Total, worst case		719			30		808			257			6				
Sun reduction		0.32			0.34		0.32			0.29			0.27				
Oper. time red.		1.00			1.00		1.00			1.00			1.00				
Wind dir. red.		0.63			0.63		0.67			0.66			0.66				
Total reduction		0.20			0.22		0.22			0.19			0.18				
Total, real		147			6		175			50			1				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LC - H315

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		08:14		07:16				07:01			05:52			20:02 (3)	05:03	20:08 (4)
	16:15		17:06		18:02				20:00			20:55	24		20:26 (3)	21:45	37 20:45 (4)
2	08:44		08:12		07:14				06:59			05:50			20:02 (3)	05:02	20:10 (4)
	16:16		17:08		18:04				20:02			20:57	25		20:27 (4)	21:46	36 20:46 (4)
3	08:43		08:10		07:11				06:56			05:48			20:02 (3)	05:01	20:10 (4)
	16:17		17:10		18:06				20:04			20:59	27		20:29 (4)	21:48	35 20:45 (4)
4	08:43		08:08		07:09				06:54			05:46			20:03 (3)	05:00	20:10 (4)
	16:18		17:12		18:07				20:06			21:01	27		20:30 (4)	21:49	35 20:45 (4)
5	08:43		08:07		07:07			17:40 (5)	06:51			05:44			20:03 (3)	04:59	20:11 (4)
	16:20		17:14		18:09	2		17:42 (5)	20:07			21:03	29		20:32 (4)	21:50	34 20:45 (4)
6	08:42		08:05		07:04			17:37 (5)	06:49			05:42			20:04 (3)	04:59	20:11 (4)
	16:21		17:16		18:11	8		17:45 (5)	20:09			21:04	29		20:33 (4)	21:51	34 20:45 (4)
7	08:42		08:03		07:02			17:34 (5)	06:47			05:40			20:06 (3)	04:58	20:12 (4)
	16:22		17:18		18:13	12		17:46 (5)	20:11			21:06	30		20:36 (4)	21:52	32 20:44 (4)
8	08:41		08:01		07:00			17:33 (5)	06:44			05:38			20:06 (4)	04:57	20:13 (4)
	16:24		17:20		18:15	15		17:48 (5)	20:13			21:08	31		20:37 (4)	21:53	31 20:44 (4)
9	08:41		07:59		06:57			17:31 (5)	06:42			05:36			20:06 (4)	04:57	20:13 (4)
	16:25		17:22		18:17	19		17:50 (5)	20:15			21:10	33		20:39 (4)	21:54	30 20:43 (4)
10	08:40		07:57		06:55			17:30 (5)	06:39			05:34			20:05 (4)	04:56	20:14 (4)
	16:27		17:24		18:19	22		17:52 (5)	20:17			21:11	35		20:40 (4)	21:55	30 20:44 (4)
11	08:40		07:55		06:52			17:30 (5)	06:37			05:33			20:05 (4)	04:56	20:14 (4)
	16:28		17:26		18:21	25		17:55 (5)	20:19			21:13	37		20:42 (4)	21:55	30 20:44 (4)
12	08:39		07:53		06:50			17:28 (5)	06:35			05:31			20:04 (4)	04:55	20:15 (4)
	16:30		17:28		18:23	28		17:56 (5)	20:20			21:15	39		20:43 (4)	21:56	29 20:44 (4)
13	08:38		07:51		06:48			17:28 (5)	06:32			05:29			20:04 (4)	04:55	20:15 (4)
	16:31		17:30		18:25	30		17:58 (5)	20:22			21:17	40		20:44 (4)	21:57	28 20:43 (4)
14	08:37		07:49		06:45			17:27 (5)	06:30			05:27			20:04 (4)	04:55	20:16 (4)
	16:33		17:32		18:27	30		17:57 (5)	20:24			21:18	43		20:47 (4)	21:57	27 20:43 (4)
15	08:36		07:47		06:43			17:28 (5)	06:28			05:26			20:03 (4)	04:55	20:16 (4)
	16:34		17:34		18:28	29		17:57 (5)	20:26			21:20	44		20:47 (4)	21:58	27 20:43 (4)
16	08:35		07:45		06:40			17:27 (5)	06:25			05:24			20:04 (4)	04:54	20:17 (4)
	16:36		17:36		18:30	29		17:56 (5)	20:28			21:22	43		20:47 (4)	21:59	27 20:44 (4)
17	08:34		07:43		06:38			17:28 (5)	06:23			05:22			20:03 (4)	04:54	20:17 (4)
	16:38		17:38		18:32	28		17:56 (5)	20:30			21:23	44		20:47 (4)	21:59	27 20:44 (4)
18	08:33		07:41		06:35			17:28 (5)	06:21			05:21			20:04 (4)	04:54	20:17 (4)
	16:40		17:40		18:34	26		17:54 (5)	20:31			21:25	43		20:47 (4)	22:00	27 20:44 (4)
19	08:32		07:39		06:33			17:29 (5)	06:18			05:19			20:04 (4)	04:54	20:18 (4)
	16:41		17:42		18:36	25		17:54 (5)	20:33			21:27	44		20:48 (4)	22:00	26 20:44 (4)
20	08:31		07:36		06:31			17:29 (5)	06:16			05:18			20:04 (4)	04:54	20:18 (4)
	16:43		17:44		18:38	23		17:52 (5)	20:35			21:28	43		20:47 (4)	22:00	26 20:44 (4)
21	08:30		07:34		06:28			17:31 (5)	06:14			05:16			20:04 (4)	04:54	20:18 (4)
	16:45		17:46		18:40	19		17:50 (5)	20:37			21:30	43		20:47 (4)	22:00	26 20:44 (4)
22	08:28		07:32		06:26			17:33 (5)	06:12		20:06 (3)	05:15			20:05 (4)	04:55	20:19 (4)
	16:47		17:48		18:42	14		17:47 (5)	20:39	4	20:10 (3)	21:31	43		20:48 (4)	22:01	26 20:45 (4)
23	08:27		07:30		06:23			17:37 (5)	06:09		20:05 (3)	05:13			20:04 (4)	04:55	20:19 (4)
	16:49		17:50		18:43	7		17:44 (5)	20:41	7	20:12 (3)	21:33	43		20:47 (4)	22:01	26 20:45 (4)
24	08:26		07:28		06:21				06:07		20:04 (3)	05:12			20:05 (4)	04:55	20:19 (4)
	16:51		17:52		18:45				20:42	10	20:14 (3)	21:34	42		20:47 (4)	22:01	26 20:45 (4)
25	08:24		07:25		06:18				06:05		20:03 (3)	05:11			20:05 (4)	04:56	20:19 (4)
	16:52		17:54		18:47				20:44	12	20:15 (3)	21:36	42		20:47 (4)	22:01	27 20:46 (4)
26	08:23		07:23		06:16				06:03		20:03 (3)	05:09			20:06 (4)	04:56	20:19 (4)
	16:54		17:56		18:49				20:46	14	20:17 (3)	21:37	41		20:47 (4)	22:01	27 20:46 (4)
27	08:22		07:21		06:13				06:01		20:02 (3)	05:08			20:06 (4)	04:56	20:18 (4)
	16:56		17:58		18:51				20:48	17	20:19 (3)	21:39	41		20:47 (4)	22:01	27 20:45 (4)
28	08:20		07:18		06:11				05:58		20:02 (3)	05:07			20:07 (4)	04:57	20:19 (4)
	16:58		18:00		18:53				20:50	19	20:21 (3)	21:40	39		20:46 (4)	22:01	27 20:46 (4)
29	08:18				07:08				05:56		20:02 (3)	05:06			20:07 (4)	04:57	20:19 (4)
	17:00				19:54				20:52	20	20:22 (3)	21:41	39		20:46 (4)	22:01	28 20:47 (4)
30	08:17				07:06				05:54		20:02 (3)	05:05			20:07 (4)	04:58	20:19 (4)
	17:02				19:56				20:53	22	20:24 (3)	21:43	39		20:46 (4)	22:00	28 20:47 (4)
31	08:15				07:04							05:04			20:08 (4)		
	17:04				19:58							21:44	37		20:45 (4)		
Potential sun hours	250		273		367			420				494			510		
Total, worst case					391			125				1159			876		
Sun reduction					0.27			0.35				0.38			0.32		
Oper. time red.					1.00			1.00				1.00			1.00		
Wind dir. red.					0.68			0.65				0.64			0.64		
Total reduction					0.18			0.23				0.24			0.20		
Total, real					72			29				283			179		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LC - H315

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:19 (4)	05:39	20:15 (4)	06:33	07:26	18:07 (5)	07:24	08:19		
	22:00	29	20:48 (4)	21:25	38	20:53 (4)	20:18				16:10
2	05:00	20:19 (4)	05:40	20:16 (4)	06:35	07:28	18:07 (5)	07:26	08:21		
	22:00	30	20:49 (4)	21:23	36	20:52 (4)	20:16	19:02	26	18:33 (5)	16:52
3	05:00	20:18 (4)	05:42	20:15 (4)	06:36	07:30	18:08 (5)	07:28	08:22		
	21:59	31	20:49 (4)	21:21	35	20:50 (4)	20:13	19:00	23	18:31 (5)	16:50
4	05:01	20:18 (4)	05:44	20:16 (4)	06:38	07:31	18:08 (5)	07:30	08:24		
	21:59	31	20:49 (4)	21:19	32	20:48 (4)	20:11	18:57	21	18:29 (5)	16:48
5	05:02	20:18 (4)	05:45	20:16 (3)	06:40	07:33	18:09 (5)	07:32	08:25		
	21:58	32	20:50 (4)	21:17	30	20:46 (4)	20:09	18:55	17	18:26 (5)	16:46
6	05:03	20:18 (4)	05:47	20:15 (3)	06:42	07:35	18:10 (5)	07:34	08:26		
	21:57	33	20:51 (4)	21:15	30	20:45 (4)	20:06	18:52	14	18:24 (5)	16:44
7	05:04	20:18 (4)	05:49	20:14 (3)	06:43	07:37	18:11 (5)	07:36	08:28		
	21:57	33	20:51 (4)	21:13	29	20:43 (4)	20:04	18:50	10	18:21 (5)	16:43
8	05:05	20:18 (4)	05:51	20:12 (3)	06:45	07:39	18:13 (5)	07:38	08:29		
	21:56	34	20:52 (4)	21:11	29	20:41 (4)	20:01	18:48	5	18:18 (5)	16:41
9	05:06	20:17 (4)	05:52	20:12 (3)	06:47	07:41		07:40	08:30		
	21:55	35	20:52 (4)	21:09	27	20:39 (4)	19:59	18:45		16:39	16:05
10	05:07	20:17 (4)	05:54	20:10 (3)	06:49	07:42		07:42	08:31		
	21:55	36	20:53 (4)	21:07	27	20:37 (4)	19:56	18:43		16:37	16:05
11	05:08	20:17 (4)	05:56	20:10 (3)	06:50	07:44		07:44	08:33		
	21:54	36	20:53 (4)	21:05	25	20:35 (4)	19:54	18:40		16:36	16:05
12	05:09	20:17 (4)	05:57	20:10 (3)	06:52	07:46		07:45	08:34		
	21:53	37	20:54 (4)	21:03	24	20:34 (3)	19:51	18:38		16:34	16:05
13	05:11	20:16 (4)	05:59	20:09 (3)	06:54	07:48		07:47	08:35		
	21:52	38	20:54 (4)	21:01	22	20:31 (3)	19:49	18:36		16:32	16:05
14	05:12	20:16 (4)	06:01	20:09 (3)	06:56	07:50		07:49	08:36		
	21:51	38	20:54 (4)	20:59	20	20:29 (3)	19:47	18:33		16:31	16:05
15	05:13	20:15 (4)	06:03	20:09 (3)	06:58	07:52		07:51	08:37		
	21:50	40	20:55 (4)	20:57	19	20:28 (3)	19:44	18:31		16:29	16:05
16	05:14	20:16 (4)	06:05	20:09 (3)	06:59	07:54		07:53	08:38		
	21:49	40	20:56 (4)	20:55	16	20:25 (3)	19:42	18:29		16:27	16:05
17	05:16	20:15 (4)	06:06	20:09 (3)	07:01	07:55		07:55	08:38		
	21:47	41	20:56 (4)	20:53	14	20:23 (3)	19:39	18:26		16:26	16:05
18	05:17	20:15 (4)	06:08	20:10 (3)	07:03	07:57		07:57	08:39		
	21:46	41	20:56 (4)	20:50	12	20:22 (3)	19:37	18:24		16:25	16:05
19	05:18	20:15 (4)	06:10	20:10 (3)	07:05	07:59		07:59	08:40		
	21:45	41	20:56 (4)	20:48	9	20:19 (3)	19:34	18:22		16:23	16:05
20	05:20	20:15 (4)	06:12	20:11 (3)	07:06		18:26 (5)	08:01		08:00	08:41
	21:44	42	20:57 (4)	20:46	6	20:17 (3)	19:32	1	18:27 (5)	18:20	16:06
21	05:21	20:15 (4)	06:13	20:12 (3)	07:08		18:19 (5)	08:03		08:02	08:41
	21:42	42	20:57 (4)	20:44	3	20:15 (3)	19:29	13	18:32 (5)	18:17	16:06
22	05:23	20:14 (4)	06:15		07:10		18:16 (5)	08:05		08:04	08:42
	21:41	43	20:57 (4)	20:42		19:27	18	18:34 (5)	18:15	16:19	16:06
23	05:24	20:15 (4)	06:17		07:12		18:14 (5)	08:07		08:06	08:42
	21:39	43	20:58 (4)	20:39		19:24	22	18:36 (5)	18:13	16:18	16:07
24	05:26	20:14 (4)	06:19		07:13		18:13 (5)	08:09		08:08	08:43
	21:38	44	20:58 (4)	20:37		19:22	24	18:37 (5)	18:11	16:17	16:08
25	05:27	20:15 (4)	06:20		07:15		18:11 (5)	07:11		08:09	08:43
	21:36	43	20:58 (4)	20:35		19:19	26	18:37 (5)	17:09	16:16	16:08
26	05:29	20:14 (4)	06:22		07:17		18:10 (5)	07:13		08:11	08:43
	21:35	44	20:58 (4)	20:32		19:17	27	18:37 (5)	17:06	16:15	16:09
27	05:30	20:15 (4)	06:24		07:19		18:09 (5)	07:14		08:13	08:44
	21:33	43	20:58 (4)	20:30		19:14	29	18:38 (5)	17:04	16:13	16:10
28	05:32	20:14 (4)	06:26		07:21		18:09 (5)	07:16		08:14	08:44
	21:32	44	20:58 (4)	20:28		19:12	29	18:38 (5)	17:02	16:12	16:11
29	05:34	20:15 (4)	06:28		07:22		18:08 (5)	07:18		08:16	08:44
	21:30	43	20:58 (4)	20:25		19:09	30	18:38 (5)	17:00	16:12	16:11
30	05:35	20:15 (4)	06:29		07:24		18:07 (5)	07:20		08:17	08:44
	21:28	41	20:56 (4)	20:23		19:07	30	18:37 (5)	16:58	16:11	16:12
31	05:37	20:15 (4)	06:31					07:22			08:44
	21:26	40	20:55 (4)	20:21				16:56			16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	1188		483		249		145				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.64		0.64		0.68		0.68				
Total reduction	0.21		0.22		0.22		0.20				
Total, real	246		106		54		29				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LD - H316

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	05:52	20:14 (3) 05:03
	16:15	17:06	18:02	20:00	20:55	12 20:26 (3) 21:45
2	08:44	08:12	07:14	06:59	05:50	20:13 (3) 05:02
	16:16	17:08	18:04	20:02	20:57	14 20:27 (3) 21:46
3	08:43	08:10	07:11	06:56	05:48	20:13 (3) 05:01
	16:17	17:10	18:06	20:04	20:59	16 20:29 (3) 21:48
4	08:43	08:08	07:09	06:54	05:46	20:12 (3) 05:00
	16:18	17:12	18:07	20:06	21:01	18 20:30 (3) 21:49
5	08:43	08:07	07:07	06:51	05:44	20:12 (3) 04:59
	16:20	17:14	18:09	20:07	21:03	20 20:32 (3) 21:50
6	08:42	08:05	07:04	06:49	05:42	20:12 (3) 04:59
	16:21	17:16	18:11	20:09	21:04	21 20:33 (3) 21:51
7	08:42	08:03	07:02	06:47	05:40	20:13 (3) 04:58
	16:22	17:18	18:13	20:11	21:06	23 20:36 (3) 21:52
8	08:41	08:01	07:00	06:44	05:38	20:13 (3) 04:57
	16:24	17:20	18:15	20:13	21:08	24 20:37 (3) 21:53
9	08:41	07:59	06:57	06:42	05:36	20:13 (3) 04:57
	16:25	17:22	18:17	20:15	21:10	23 20:36 (3) 21:54
10	08:40	07:57	06:55	17:50 (5) 06:39	05:34	20:13 (3) 04:56
	16:27	17:24	18:19	2 17:52 (5) 20:17	21:11	27 20:40 (4) 21:55
11	08:40	07:55	06:52	17:47 (5) 06:37	05:33	20:14 (3) 04:56
	16:28	17:26	18:21	8 17:55 (5) 20:19	21:13	28 20:42 (4) 21:55
12	08:39	07:53	06:50	17:44 (5) 06:35	05:31	20:15 (3) 04:55
	16:30	17:28	18:23	12 17:56 (5) 20:20	21:15	28 20:43 (4) 21:56
13	08:38	07:51	06:48	17:43 (5) 06:32	05:29	20:15 (3) 04:55
	16:31	17:30	18:25	15 17:58 (5) 20:22	21:17	29 20:44 (4) 21:57
14	08:37	07:49	06:45	17:41 (5) 06:30	05:27	20:17 (3) 04:55
	16:33	17:32	18:27	19 18:00 (5) 20:24	21:18	30 20:47 (4) 21:57
15	08:36	07:47	06:43	17:40 (5) 06:28	05:26	20:18 (3) 04:55
	16:34	17:34	18:28	22 18:02 (5) 20:26	21:20	30 20:48 (4) 21:58
16	08:35	07:45	06:40	17:39 (5) 06:25	05:24	20:21 (3) 04:54
	16:36	17:36	18:30	25 18:04 (5) 20:28	21:22	28 20:50 (4) 21:59
17	08:34	07:43	06:38	17:39 (5) 06:23	05:22	20:28 (4) 04:54
	16:38	17:38	18:32	27 18:06 (5) 20:30	21:23	23 20:51 (4) 21:59
18	08:33	07:41	06:35	17:37 (5) 06:21	05:21	20:27 (4) 04:54
	16:40	17:40	18:34	30 18:07 (5) 20:31	21:25	26 20:53 (4) 22:00
19	08:32	07:39	06:33	17:37 (5) 06:18	05:19	20:27 (4) 04:54
	16:41	17:42	18:36	31 18:08 (5) 20:33	21:27	27 20:54 (4) 22:00
20	08:31	07:36	06:31	17:37 (5) 06:16	05:18	20:26 (4) 04:54
	16:43	17:44	18:38	30 18:07 (5) 20:35	21:28	29 20:55 (4) 22:00
21	08:30	07:34	06:28	17:37 (5) 06:14	05:16	20:26 (4) 04:54
	16:45	17:46	18:40	30 18:07 (5) 20:37	21:30	31 20:57 (4) 22:00
22	08:28	07:32	06:26	17:37 (5) 06:12	05:15	20:26 (4) 04:55
	16:47	17:48	18:42	29 18:06 (5) 20:39	21:31	33 20:59 (4) 22:01
23	08:27	07:30	06:23	17:37 (5) 06:09	05:13	20:25 (4) 04:55
	16:49	17:50	18:43	29 18:06 (5) 20:41	21:33	34 20:59 (4) 22:01
24	08:26	07:28	06:21	17:37 (5) 06:07	05:12	20:25 (4) 04:55
	16:51	17:52	18:45	27 18:04 (5) 20:42	21:34	36 21:01 (4) 22:01
25	08:24	07:25	06:18	17:39 (5) 06:05	05:11	20:25 (4) 04:56
	16:52	17:54	18:47	24 18:03 (5) 20:44	21:36	37 21:02 (4) 22:01
26	08:23	07:23	06:16	17:40 (5) 06:03	05:09	20:25 (4) 04:56
	16:54	17:56	18:49	22 18:02 (5) 20:46	21:37	39 21:04 (4) 22:01
27	08:22	07:21	06:13	17:41 (5) 06:01	05:08	20:25 (4) 04:56
	16:56	17:58	18:51	18 17:59 (5) 20:48	1 20:19 (3) 21:39	40 21:05 (4) 22:01
28	08:20	07:18	06:11	17:44 (5) 05:58	20:17 (3) 05:07	20:25 (4) 04:57
	16:58	18:00	18:53	13 17:57 (5) 20:50	4 20:21 (3) 21:40	41 21:06 (4) 22:01
29	08:18		07:09	05:56	20:16 (3) 05:06	20:25 (4) 04:58
	17:00		19:54	20:52	6 20:22 (3) 21:41	42 21:07 (4) 22:01
30	08:17		07:06	05:54	20:15 (3) 05:05	20:25 (4) 04:58
	17:02		19:56	20:53	9 20:24 (3) 21:43	43 21:08 (4) 22:00
31	08:15		07:04		05:04	20:25 (4)
	17:04		19:58		21:44	44 21:09 (4)
Potential sun hours	250	273	367	420	494	510
Total, worst case			413	20	896	1293
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.64	0.63	0.63
Total reduction			0.18	0.23	0.24	0.20
Total, real			75	5	216	259

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LD - H316

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:32 (4)	05:39	20:25 (3)	06:33	07:26	18:22 (5)	07:24	08:19		
	22:00	43	21:15 (4)	21:25	28	20:53 (4)	20:18	19:05	14	18:36 (5)	16:54
2	05:00	20:32 (4)	05:40	20:25 (3)	06:35	07:28	18:24 (5)	07:26	08:21		
	22:00	44	21:16 (4)	21:23	27	20:52 (4)	20:16	19:02	9	18:33 (5)	16:52
3	05:00	20:32 (4)	05:42	20:23 (3)	06:36	07:30	18:26 (5)	07:28	08:22		
	21:59	43	21:15 (4)	21:21	26	20:50 (4)	20:13	19:00	5	18:31 (5)	16:50
4	05:01	20:32 (4)	05:44	20:23 (3)	06:38	07:31	18:31 (5)	07:30	08:24		
	21:59	44	21:16 (4)	21:19	24	20:47 (3)	20:11	18:57		16:48	16:08
5	05:02	20:32 (4)	05:45	20:22 (3)	06:40	07:33		07:32	08:25		
	21:58	44	21:16 (4)	21:17	24	20:46 (3)	20:09	18:55		16:46	16:07
6	05:03	20:33 (4)	05:47	20:22 (3)	06:42	07:35		07:34	08:26		
	21:57	43	21:16 (4)	21:15	23	20:45 (3)	20:06	18:52		16:44	16:07
7	05:04	20:33 (4)	05:49	20:22 (3)	06:43	07:37		07:36	08:28		
	21:57	44	21:17 (4)	21:13	21	20:43 (3)	20:04	18:50		16:43	16:06
8	05:05	20:33 (4)	05:51	20:22 (3)	06:45	07:39		07:38	08:29		
	21:56	44	21:17 (4)	21:11	19	20:41 (3)	20:01	18:48		16:41	16:06
9	05:06	20:33 (4)	05:52	20:22 (3)	06:47	07:41		07:40	08:30		
	21:55	44	21:17 (4)	21:09	17	20:39 (3)	19:59	18:45		16:39	16:05
10	05:07	20:33 (4)	05:54	20:21 (3)	06:49	07:42		07:42	08:31		
	21:55	44	21:17 (4)	21:07	16	20:37 (3)	19:56	18:43		16:37	16:05
11	05:08	20:33 (4)	05:56	20:22 (3)	06:50	07:44		07:44	08:33		
	21:54	44	21:17 (4)	21:05	13	20:35 (3)	19:54	18:40		16:36	16:05
12	05:09	20:33 (4)	05:57	20:23 (3)	06:52	07:46		07:45	08:34		
	21:53	44	21:17 (4)	21:03	11	20:34 (3)	19:51	18:38		16:34	16:05
13	05:11	20:34 (4)	05:59	20:22 (3)	06:54	07:48		07:47	08:35		
	21:52	43	21:17 (4)	21:01	9	20:31 (3)	19:49	18:36		16:32	16:05
14	05:12	20:34 (4)	06:01	20:23 (3)	06:56	07:50		07:49	08:36		
	21:51	42	21:16 (4)	20:59	6	20:29 (3)	19:47	18:33		16:31	16:05
15	05:13	20:34 (4)	06:03	20:25 (3)	06:58	18:34 (5)	07:52	16:31	08:37		
	21:50	41	21:15 (4)	20:57	3	20:28 (3)	19:44	11	18:45 (5)	18:31	16:29
16	05:14	20:35 (4)	06:05	19:42	17	18:48 (5)	18:29	16:27	16:05		
	21:49	40	21:15 (4)	20:55		18:28 (5)	07:55	16:26	16:05		
17	05:16	20:35 (4)	06:06	19:39	21	18:49 (5)	18:26	16:25	16:05		
	21:47	39	21:14 (4)	20:53		18:26 (5)	07:57	16:25	16:05		
18	05:17	20:35 (4)	06:08	19:37	24	18:50 (5)	18:24	16:25	16:05		
	21:46	37	21:12 (4)	20:50		18:25 (5)	07:59	16:23	16:05		
19	05:18	20:35 (4)	06:10	19:34	26	18:51 (5)	18:22	16:23	16:05		
	21:45	36	21:11 (4)	20:48		18:24 (5)	08:01	16:22	16:06		
20	05:20	20:36 (4)	06:12	19:32	28	18:52 (5)	18:20	16:22	16:06		
	21:44	34	21:10 (4)	20:46		18:22 (5)	08:03	16:20	16:06		
21	05:21	20:36 (4)	06:13	19:29	29	18:51 (5)	18:17	16:20	16:06		
	21:42	33	21:09 (4)	20:44		18:22 (5)	08:05	16:19	16:06		
22	05:23	20:36 (4)	06:15	19:27	30	18:52 (5)	18:15	16:19	16:06		
	21:41	31	21:07 (4)	20:42		18:21 (5)	08:07	16:18	16:07		
23	05:24	20:37 (4)	06:17	19:24	31	18:52 (5)	18:13	16:18	16:07		
	21:39	30	21:07 (4)	20:39		18:21 (5)	08:09	16:17	16:08		
24	05:26	20:37 (4)	06:19	19:22	31	18:52 (5)	18:11	16:17	16:08		
	21:38	28	21:05 (4)	20:37		18:20 (5)	07:11	16:16	16:08		
25	05:27	20:38 (4)	06:20	19:19	31	18:51 (5)	17:09	16:16	16:08		
	21:36	26	21:04 (4)	20:35		18:20 (5)	07:13	16:15	16:09		
26	05:29	20:38 (4)	06:22	19:17	28	18:48 (5)	17:06	16:15	16:09		
	21:35	24	21:02 (4)	20:32		18:20 (5)	07:14	16:14	16:10		
27	05:30	20:39 (4)	06:24	19:14	26	18:46 (5)	17:04	16:14	16:10		
	21:33	22	21:01 (4)	20:30		18:21 (5)	07:16	16:13	16:11		
28	05:32	20:31 (3)	06:26	19:12	23	18:44 (5)	17:02	16:12	16:11		
	21:32	28	20:59 (4)	20:28		18:21 (5)	07:18	16:12	16:11		
29	05:34	20:29 (3)	06:28	19:09	20	18:41 (5)	17:00	16:12	16:11		
	21:30	29	20:58 (4)	20:25		18:21 (5)	07:20	16:12	16:11		
30	05:35	20:27 (3)	06:29	19:07	17	18:38 (5)	16:58	16:11	16:12		
	21:28	29	20:56 (4)	20:23			07:22	16:11	16:12		
31	05:37	20:26 (3)	06:31						16:12		
	21:26	29	20:55 (4)	20:21					16:13		
Potential sun hours	512		460	382	393	28	259	233			
Total, worst case	1146		267		0.32	0.29					
Sun reduction	0.32		0.34		1.00	1.00					
Oper. time red.	1.00		1.00		0.67	0.67					
Wind dir. red.	0.63		0.64		0.22	0.20					
Total reduction	0.20		0.22			6					
Total, real	233		59	85							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LE - H317

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		18:50 (5)	05:52			05:03		20:42 (4)
	16:15	17:06	18:02						20:00	15	19:05 (5)	20:55			21:45	28	21:10 (4)
2	08:44	08:12	07:14						06:59		18:52 (5)	05:50		20:25 (3)	05:02		20:43 (4)
	16:16	17:08	18:04						20:02	9	19:01 (5)	20:57	2	20:27 (3)	21:46	29	21:12 (4)
3	08:43	08:10	07:12						06:56			05:48		20:24 (3)	05:01		20:43 (4)
	16:17	17:10	18:06						20:04			20:59	5	20:29 (3)	21:48	30	21:13 (4)
4	08:43	08:08	07:09						06:54			05:46		20:23 (3)	05:00		20:42 (4)
	16:18	17:12	18:07						20:06			21:01	7	20:30 (3)	21:49	32	21:14 (4)
5	08:43	08:07	07:07						06:51			05:44		20:22 (3)	04:59		20:43 (4)
	16:20	17:14	18:09						20:07			21:03	10	20:32 (3)	21:50	32	21:15 (4)
6	08:42	08:05	07:04						06:49			05:42		20:21 (3)	04:59		20:42 (4)
	16:21	17:16	18:11						20:09			21:04	12	20:33 (3)	21:51	34	21:16 (4)
7	08:42	08:03	07:02						06:47			05:40		20:21 (3)	04:58		20:42 (4)
	16:22	17:18	18:13						20:11			21:06	15	20:36 (3)	21:52	34	21:16 (4)
8	08:41	08:01	07:00						06:44			05:38		20:21 (3)	04:57		20:42 (4)
	16:24	17:20	18:15						20:13			21:08	16	20:37 (3)	21:53	36	21:18 (4)
9	08:41	07:59	06:57						06:42			05:36		20:20 (3)	04:57		20:42 (4)
	16:25	17:22	18:17						20:15			21:10	18	20:38 (3)	21:54	36	21:18 (4)
10	08:40	07:57	06:55						06:39			05:34		20:20 (3)	04:56		20:42 (4)
	16:27	17:24	18:19						20:17			21:11	20	20:40 (3)	21:55	37	21:19 (4)
11	08:40	07:55	06:52						06:37			05:33		20:21 (3)	04:56		20:43 (4)
	16:28	17:26	18:21						20:19			21:13	21	20:42 (3)	21:55	37	21:20 (4)
12	08:39	07:53	06:50						06:35			05:31		20:21 (3)	04:55		20:43 (4)
	16:30	17:28	18:23						20:20			21:15	22	20:43 (3)	21:56	38	21:21 (4)
13	08:38	07:51	06:48						06:32			05:29		20:20 (3)	04:55		20:43 (4)
	16:31	17:30	18:25						20:22			21:17	24	20:44 (3)	21:57	38	21:21 (4)
14	08:37	07:49	06:45					17:57 (5)	06:30			05:27		20:21 (3)	04:55		20:43 (4)
	16:33	17:32	18:27	3	18:00 (5)	20:24			20:24			21:18	24	20:45 (3)	21:57	39	21:22 (4)
15	08:36	07:47	06:43					17:54 (5)	06:28			05:26		20:21 (3)	04:55		20:43 (4)
	16:34	17:34	18:28	8	18:02 (5)	20:26			20:26			21:20	23	20:44 (3)	21:58	39	21:22 (4)
16	08:35	07:45	06:40					17:51 (5)	06:25			05:24		20:22 (3)	04:54		20:44 (4)
	16:36	17:36	18:30	13	18:04 (5)	20:28			20:28			21:22	22	20:44 (3)	21:59	39	21:23 (4)
17	08:34	07:43	06:38					17:50 (5)	06:23			05:22		20:23 (3)	04:54		20:44 (4)
	16:38	17:38	18:32	16	18:06 (5)	20:30			20:30			21:23	20	20:43 (3)	21:59	39	21:23 (4)
18	08:33	07:41	06:35					17:48 (5)	06:21			05:21		20:24 (3)	04:54		20:44 (4)
	16:40	17:40	18:34	19	18:07 (5)	20:31			20:31			21:25	19	20:43 (3)	22:00	40	21:24 (4)
19	08:32	07:39	06:33					17:47 (5)	06:18			05:19		20:25 (3)	04:54		20:44 (4)
	16:41	17:42	18:36	23	18:10 (5)	20:33			20:33			21:27	20	20:54 (4)	22:00	40	21:24 (4)
20	08:31	07:36	06:31					17:46 (5)	06:16			05:18		20:26 (3)	04:54		20:44 (4)
	16:43	17:44	18:38	25	18:11 (5)	20:35			20:35			21:28	21	20:55 (4)	22:00	40	21:24 (4)
21	08:30	07:34	06:28					17:45 (5)	06:14			05:16		20:27 (3)	04:54		20:44 (4)
	16:45	17:46	18:40	28	18:13 (5)	20:37			20:37			21:30	22	20:57 (4)	22:00	40	21:24 (4)
22	08:28	07:32	06:26					17:44 (5)	06:12			05:15		20:30 (3)	04:55		20:45 (4)
	16:47	17:48	18:42	31	18:15 (5)	20:39			20:39			21:31	20	20:59 (4)	22:01	40	21:25 (4)
23	08:27	07:30	06:23					17:44 (5)	06:09			05:13		20:46 (4)	04:55		20:45 (4)
	16:49	17:50	18:43	32	18:16 (5)	20:41			20:41			21:33	13	20:59 (4)	22:01	40	21:25 (4)
24	08:26	07:28	06:21					17:43 (5)	06:07			05:12		20:45 (4)	04:55		20:45 (4)
	16:51	17:52	18:45	32	18:15 (5)	20:42			20:42			21:34	16	21:01 (4)	22:01	40	21:25 (4)
25	08:24	07:25	06:18					17:44 (5)	06:05			05:11		20:45 (4)	04:56		20:46 (4)
	16:52	17:54	18:47	31	18:15 (5)	20:44			20:44			21:36	17	21:02 (4)	22:01	39	21:25 (4)
26	08:23	07:23	06:16					17:44 (5)	06:03			05:09		20:44 (4)	04:56		20:46 (4)
	16:54	17:56	18:49	31	18:15 (5)	20:46			20:46			21:37	20	21:04 (4)	22:01	39	21:25 (4)
27	08:22	07:21	06:13					17:44 (5)	06:01			05:08		20:44 (4)	04:56		20:45 (4)
	16:56	17:58	18:51	29	18:13 (5)	20:48			20:48			21:39	21	21:05 (4)	22:01	39	21:24 (4)
28	08:20	07:18	06:11					17:45 (5)	05:58			05:07		20:44 (4)	04:57		20:46 (4)
	16:58	18:00	18:53	28	18:13 (5)	20:50			20:50			21:40	22	21:06 (4)	22:01	39	21:25 (4)
29	08:18		07:09					18:45 (5)	05:56			05:06		20:43 (4)	04:58		20:47 (4)
	17:00		19:54	26	19:11 (5)	20:52			20:52			21:41	24	21:07 (4)	22:01	38	21:25 (4)
30	08:17		07:06					18:46 (5)	05:54			05:05		20:43 (4)	04:58		20:46 (4)
	17:02		19:56	24	19:10 (5)	20:53			20:53			21:43	25	21:08 (4)	22:00	38	21:24 (4)
31	08:15		07:04					18:47 (5)				05:04		20:43 (4)			
	17:04		19:58	20	19:07 (5)							21:44	26	21:09 (4)			
Potential sun hours	250	273	367		420							494			510		
Total, worst case				419		24						547			1109		
Sun reduction				0.27		0.35						0.38			0.32		
Oper. time red.				1.00		1.00						1.00			1.00		
Wind dir. red.				0.67		0.67						0.63			0.61		
Total reduction				0.18		0.24						0.24			0.20		
Total, real				77		6						131			218		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LE - H317

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:47 (4)	05:39	20:31 (3)	06:33		07:26	07:24	08:19		
	22:00	37	21:24 (4)	21:25	22	20:53 (3)	20:18		19:05	16:54	16:10
2	05:00		20:48 (4)	05:40		20:31 (3)	06:35		07:28	07:26	08:21
	22:00	36	21:24 (4)	21:23	21	20:52 (3)	20:16		19:02	16:52	16:09
3	05:00		20:47 (4)	05:42		20:31 (3)	06:36		07:30	07:28	08:22
	21:59	36	21:23 (4)	21:21	19	20:50 (3)	20:13		19:00	16:50	16:08
4	05:01		20:48 (4)	05:44		20:31 (3)	06:38		07:31	07:30	08:24
	21:59	35	21:23 (4)	21:19	17	20:48 (3)	20:11		18:57	16:48	16:08
5	05:02		20:48 (4)	05:45		20:30 (3)	06:40		07:33	07:32	08:25
	21:58	35	21:23 (4)	21:17	16	20:46 (3)	20:09		18:55	16:46	16:07
6	05:03		20:49 (4)	05:47		20:31 (3)	06:42		07:35	07:34	08:26
	21:57	33	21:22 (4)	21:15	14	20:45 (3)	20:06		18:52	16:44	16:07
7	05:04		20:49 (4)	05:49		20:32 (3)	06:43		07:37	07:36	08:28
	21:57	33	21:22 (4)	21:13	11	20:43 (3)	20:04		18:50	16:43	16:06
8	05:05		20:49 (4)	05:51		20:31 (3)	06:45		07:39	07:38	08:29
	21:56	32	21:21 (4)	21:11	10	20:41 (3)	20:01		18:48	16:41	16:06
9	05:06		20:50 (4)	05:52		20:32 (3)	06:47		07:41	07:40	08:30
	21:55	31	21:21 (4)	21:09	7	20:39 (3)	19:59		18:45	16:39	16:05
10	05:07		20:50 (4)	05:54		20:33 (3)	06:49		07:42	07:42	08:31
	21:55	30	21:20 (4)	21:07	4	20:37 (3)	19:56	8	18:54 (5)	18:43	16:05
11	05:08		20:51 (4)	05:56		20:34 (3)	06:50		07:44	07:44	08:33
	21:54	28	21:19 (4)	21:05	1	20:35 (3)	19:54	15	18:57 (5)	18:40	16:05
12	05:09		20:51 (4)	05:57			06:52		07:46	07:45	08:34
	21:53	27	21:18 (4)	21:03			19:51	19	18:59 (5)	18:38	16:05
13	05:11		20:51 (4)	05:59			06:54		07:48	07:47	08:35
	21:52	26	21:17 (4)	21:01			19:49	23	19:01 (5)	18:36	16:05
14	05:12		20:52 (4)	06:01			06:56		07:50	07:49	08:36
	21:51	24	21:16 (4)	20:59			19:47	25	19:01 (5)	18:33	16:05
15	05:13		20:52 (4)	06:03			06:58		07:52	07:51	08:37
	21:50	23	21:15 (4)	20:57			19:44	28	19:02 (5)	18:31	16:05
16	05:14		20:53 (4)	06:05			06:59		07:54	07:53	08:38
	21:48	22	21:15 (4)	20:55			19:42	29	19:03 (5)	18:29	16:05
17	05:16		20:54 (4)	06:06			07:01		07:55	07:55	08:38
	21:47	20	21:14 (4)	20:53			19:39	30	19:02 (5)	18:26	16:05
18	05:17		20:54 (4)	06:08			07:03		07:57	07:57	08:39
	21:46	18	21:12 (4)	20:50			19:37	31	19:02 (5)	18:24	16:05
19	05:18		20:55 (4)	06:10			07:05		07:59	07:59	08:40
	21:45	16	21:11 (4)	20:48			19:34	31	19:02 (5)	18:22	16:05
20	05:20		20:56 (4)	06:12			07:06		08:01	08:00	08:41
	21:44	14	21:10 (4)	20:46			19:32	31	19:02 (5)	18:20	16:06
21	05:21		20:41 (3)	06:13			07:08		08:03	08:02	08:41
	21:42	17	21:09 (4)	20:44			19:29	31	19:01 (5)	18:17	16:06
22	05:23		20:38 (3)	06:15			07:10		08:05	08:04	08:42
	21:41	21	21:07 (4)	20:42			19:27	29	18:59 (5)	18:15	16:06
23	05:24		20:37 (3)	06:17			07:12		08:07	08:06	08:42
	21:39	22	21:07 (4)	20:39			19:24	26	18:56 (5)	18:13	16:07
24	05:26		20:36 (3)	06:19			07:13		08:09	08:08	08:43
	21:38	21	21:05 (4)	20:37			19:22	23	18:54 (5)	18:11	16:08
25	05:27		20:35 (3)	06:20			07:15		07:11	08:09	08:43
	21:36	19	21:04 (4)	20:35			19:19	21	18:51 (5)	17:09	16:08
26	05:29		20:34 (3)	06:22			07:17		07:13	08:11	08:43
	21:35	20	20:54 (3)	20:32			19:17	17	18:48 (5)	17:06	16:09
27	05:30		20:34 (3)	06:24			07:19		07:14	08:13	08:44
	21:33	21	20:55 (3)	20:30			19:14	14	18:46 (5)	17:04	16:10
28	05:32		20:33 (3)	06:26			07:21		07:16	08:14	08:44
	21:32	22	20:55 (3)	20:28			19:12	10	18:44 (5)	17:02	16:11
29	05:34		20:33 (3)	06:28			07:22		07:18	08:16	08:44
	21:30	23	20:56 (3)	20:25			19:09	5	18:41 (5)	17:00	16:11
30	05:35		20:32 (3)	06:29			07:24		07:20	08:17	08:44
	21:28	24	20:56 (3)	20:23			19:07		16:58	16:11	16:12
31	05:37		20:32 (3)	06:31					07:22		08:44
	21:26	23	20:55 (3)	20:21					16:56		16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	789		142		446						
Sun reduction	0.32		0.34		0.32						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.62		0.64		0.67						
Total reduction	0.20		0.22		0.22						
Total, real	158		31		96						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LF - H318

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		18:56 (5)	05:52			05:03		21:00 (4)
	16:15	17:06	18:02						20:00	29	19:25 (5)	20:55			21:45	10	21:10 (4)
2	08:44	08:12	07:14						06:59		18:56 (5)	05:50			05:02		21:00 (4)
	16:16	17:08	18:04						20:02	28	19:24 (5)	20:57			21:46	12	21:12 (4)
3	08:43	08:10	07:11						06:56		18:57 (5)	05:48			05:01		21:00 (4)
	16:17	17:10	18:06						20:04	26	19:23 (5)	20:59			21:48	13	21:13 (4)
4	08:43	08:08	07:09						06:54		18:58 (5)	05:46			05:00		20:59 (4)
	16:18	17:12	18:07						20:06	24	19:22 (5)	21:01			21:49	15	21:14 (4)
5	08:43	08:07	07:07						06:51		18:58 (5)	05:44			04:59		21:00 (4)
	16:20	17:14	18:09						20:07	22	19:20 (5)	21:03			21:50	15	21:15 (4)
6	08:42	08:05	07:04						06:49		19:00 (5)	05:42			04:59		20:59 (4)
	16:21	17:16	18:11						20:09	18	19:18 (5)	21:04			21:51	17	21:16 (4)
7	08:42	08:03	07:02						06:47		19:02 (5)	05:40			04:58		20:58 (4)
	16:22	17:18	18:13						20:11	13	19:15 (5)	21:06	3		20:36 (3)	18	21:16 (4)
8	08:41	08:01	07:00						06:44			05:38			04:57		20:59 (4)
	16:24	17:20	18:15						20:13			21:08	6		20:37 (3)	19	21:18 (4)
9	08:41	07:59	06:57						06:42			05:36			20:31 (3)		20:59 (4)
	16:25	17:22	18:17						20:15			21:10	7		20:38 (3)	20	21:19 (4)
10	08:40	07:57	06:55						06:39			05:34			20:30 (3)		20:59 (4)
	16:27	17:24	18:19						20:17			21:11	10		20:40 (3)	20	21:19 (4)
11	08:40	07:55	06:52						06:37			05:33			20:30 (3)		20:59 (4)
	16:28	17:26	18:21						20:19			21:13	12		20:42 (3)	21	21:20 (4)
12	08:39	07:53	06:50						06:35			05:31			20:29 (3)		20:59 (4)
	16:30	17:28	18:23						20:20			21:15	14		20:43 (3)	22	21:21 (4)
13	08:38	07:51	06:48						06:32			05:29			20:29 (3)		20:58 (4)
	16:31	17:30	18:25						20:22			21:17	15		20:44 (3)	23	21:21 (4)
14	08:37	07:49	06:45						06:30			05:27			20:29 (3)		20:59 (4)
	16:33	17:32	18:27						20:24			21:18	18		20:47 (3)	23	21:22 (4)
15	08:36	07:47	06:43						06:28			05:26			20:29 (3)		20:59 (4)
	16:34	17:34	18:28						20:26			21:20	19		20:48 (3)	23	21:22 (4)
16	08:35	07:45	06:40						06:25			05:24			20:30 (3)		20:59 (4)
	16:36	17:36	18:30						20:28			21:22	20		20:50 (3)	24	21:23 (4)
17	08:34	07:43	06:38						06:23			05:22			20:29 (3)		20:59 (4)
	16:38	17:38	18:32						20:30			21:23	22		20:51 (3)	24	21:23 (4)
18	08:33	07:41	06:35						06:21			05:21			20:30 (3)		20:59 (4)
	16:40	17:40	18:34						20:31			21:25	23		20:53 (3)	25	21:24 (4)
19	08:32	07:39	06:33						06:18			05:19			20:31 (3)		21:00 (4)
	16:41	17:42	18:36						20:33			21:27	23		20:54 (3)	24	21:24 (4)
20	08:31	07:36	06:31						06:16			05:18			20:31 (3)		21:00 (4)
	16:43	17:44	18:38	4				18:07 (5)	20:35			21:28	21		20:52 (3)	24	21:24 (4)
21	08:30	07:34	06:28					18:05 (5)	06:14			05:16			20:32 (3)		21:00 (4)
	16:45	17:46	18:40	8				18:13 (5)	20:37			21:30	20		20:52 (3)	24	21:24 (4)
22	08:28	07:32	06:26					18:02 (5)	06:12			05:15			20:33 (3)		21:01 (4)
	16:47	17:48	18:42	13				18:15 (5)	20:39			21:31	19		20:52 (3)	24	21:25 (4)
23	08:27	07:30	06:23					18:01 (5)	06:09			05:13			20:33 (3)		21:01 (4)
	16:49	17:50	18:43	16				18:17 (5)	20:41			21:33	18		20:51 (3)	24	21:25 (4)
24	08:26	07:28	06:21					17:59 (5)	06:07			05:12			20:34 (3)		21:01 (4)
	16:51	17:52	18:45	19				18:18 (5)	20:42			21:34	16		20:50 (3)	24	21:25 (4)
25	08:24	07:25	06:18					17:59 (5)	06:05			05:11			20:35 (3)		21:01 (4)
	16:52	17:54	18:47	22				18:21 (5)	20:44			21:36	14		20:49 (3)	24	21:25 (4)
26	08:23	07:23	06:16					17:58 (5)	06:03			05:09			20:36 (3)		21:01 (4)
	16:54	17:56	18:49	25				18:23 (5)	20:46			21:37	12		20:48 (3)	24	21:25 (4)
27	08:22	07:21	06:13					17:57 (5)	06:01			05:08			20:38 (3)		21:01 (4)
	16:56	17:58	18:51	27				18:24 (5)	20:48			21:39	10		21:05 (4)	23	21:24 (4)
28	08:20	07:18	06:11					17:57 (5)	05:58			05:07			20:40 (3)		21:02 (4)
	16:58	18:00	18:53	29				18:26 (5)	20:50			21:40	8		21:06 (4)	23	21:25 (4)
29	08:18		07:09					18:56 (5)	05:56			05:06			21:02 (4)		21:03 (4)
	17:00		19:54	31				19:27 (5)	20:52			21:41	5		21:07 (4)	22	21:25 (4)
30	08:17		07:06					18:56 (5)	05:54			05:05			21:01 (4)		21:02 (4)
	17:02		19:56	31				19:27 (5)	20:53			21:43	7		21:08 (4)	22	21:24 (4)
31	08:15		07:04					18:55 (5)				05:04			21:01 (4)		
	17:04		19:58	31				19:26 (5)				21:44	8		21:09 (4)		
Potential sun hours	250	273	367					420				494			510		
Total, worst case						256			160			350			626		
Sun reduction						0.27			0.35			0.38			0.32		
Oper. time red.						1.00			1.00			1.00			1.00		
Wind dir. red.						0.68			0.68			0.63			0.61		
Total reduction						0.18			0.24			0.24			0.19		
Total, real						47			38			84			121		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LF - H318

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	21:03 (4) 21:24 (4)	05:39 21:25	20:40 (3) 20:53 (3)	06:33 20:18	07:26 19:05
2	05:00 22:00	21:04 (4) 21:24 (4)	05:40 21:23	20:40 (3) 20:52 (3)	06:35 20:16	07:28 19:02
3	05:00 21:59	21:03 (4) 21:23 (4)	05:42 21:21	20:40 (3) 20:50 (3)	06:36 20:13	07:30 19:00
4	05:01 21:59	21:04 (4) 21:23 (4)	05:44 21:19	20:41 (3) 20:48 (3)	06:38 20:11	07:31 18:57
5	05:02 21:58	21:05 (4) 21:23 (4)	05:45 21:17	20:41 (3) 20:46 (3)	06:40 20:09	07:33 18:59 (5)
6	05:03 21:57	21:05 (4) 21:22 (4)	05:47 21:15	20:42 (3) 20:45 (3)	06:42 20:06	07:35 18:57 (5)
7	05:04 21:57	21:06 (4) 21:22 (4)	05:49 21:13	06:43 20:04	17 19:12 (5)	07:37 18:55
8	05:05 21:56	21:06 (4) 21:21 (4)	05:51 21:11	06:45 20:01	24 18:52 (5)	07:39 18:57 (5)
9	05:06 21:55	21:07 (4) 21:21 (4)	05:52 21:09	06:47 19:59	26 18:51 (5)	07:41 18:45
10	05:07 21:55	21:08 (4) 21:20 (4)	05:54 21:07	06:49 19:56	28 18:49 (5)	07:42 18:43
11	05:08 21:54	21:08 (4) 21:19 (4)	05:56 21:05	06:50 19:54	30 18:48 (5)	07:44 18:40
12	05:09 21:53	21:09 (4) 21:18 (4)	05:57 21:03	06:52 19:51	30 18:48 (5)	07:46 18:38
13	05:11 21:52	21:09 (4) 21:17 (4)	05:59 21:01	06:54 19:49	31 18:47 (5)	07:48 18:36
14	05:12 21:51	21:10 (4) 21:16 (4)	06:01 20:59	06:56 19:47	31 18:46 (5)	07:50 18:33
15	05:13 21:50	21:11 (4) 21:15 (4)	06:03 20:57	06:58 19:44	30 18:46 (5)	07:52 18:31
16	05:14 21:48	20:48 (3) 21:15 (4)	06:05 20:55	06:59 19:42	28 18:46 (5)	07:54 18:29
17	05:16 21:47	20:47 (3) 20:57 (3)	06:06 20:53	07:01 19:39	26 18:45 (5)	07:55 18:26
18	05:17 21:46	20:45 (3) 20:58 (3)	06:08 20:50	07:03 19:37	22 18:46 (5)	07:57 18:24
19	05:18 21:45	20:44 (3) 20:59 (3)	06:10 20:48	07:05 19:34	20 18:46 (5)	07:59 18:22
20	05:20 21:44	20:44 (3) 21:01 (3)	06:12 20:46	07:06 19:32	17 18:47 (5)	08:01 18:20
21	05:21 21:42	20:43 (3) 21:01 (3)	06:13 20:44	07:08 19:29	14 18:47 (5)	08:03 18:17
22	05:23 21:41	20:42 (3) 21:02 (3)	06:15 20:42	07:10 19:27	10 18:49 (5)	08:05 18:15
23	05:24 21:39	20:42 (3) 21:03 (3)	06:17 20:39	07:12 19:24	5 18:51 (5)	08:07 18:13
24	05:26 21:38	20:41 (3) 21:03 (3)	06:19 20:37	07:13 19:22		08:09 18:11
25	05:27 21:36	20:41 (3) 21:04 (3)	06:20 20:35	07:15 19:19		08:11 18:09
26	05:29 21:35	20:40 (3) 21:02 (3)	06:22 20:32	07:17 19:17		08:13 18:07
27	05:30 21:33	20:41 (3) 21:01 (3)	06:24 20:30	07:19 19:14		08:15 18:04
28	05:32 21:32	20:40 (3) 20:59 (3)	06:26 20:28	07:21 19:12		08:17 18:02
29	05:34 21:30	20:40 (3) 20:58 (3)	06:28 20:25	07:22 19:09		08:18 18:00
30	05:35 21:28	20:40 (3) 20:56 (3)	06:29 20:23	07:24 19:07		08:19 18:00
31	05:37 21:26	20:40 (3) 20:55 (3)	06:31 20:21			08:21 18:00
Potential sun hours	512	460	382	328	259	233
Total, worst case	489	50	423			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.62	0.63	0.68			
Total reduction	0.20	0.22	0.22			
Total, real	98	11	92			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LG - H319

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June				
1	08:44	08:14	07:16				07:01	18:56 (5)	05:52		05:03	20:41 (3)			
	16:15	17:06	18:02				20:00	32	19:28 (5)	20:55	21:45	12	20:53 (3)		
2	08:44	08:12	07:14				06:59	18:55 (5)	05:50		05:02	20:44 (3)			
	16:16	17:08	18:04				20:02	31	19:26 (5)	20:57	21:46	9	20:53 (3)		
3	08:43	08:10	07:12				06:56	18:56 (5)	05:48		05:01	20:45 (3)			
	16:17	17:10	18:06				20:04	30	19:26 (5)	20:59	21:48	6	20:51 (3)		
4	08:43	08:08	07:09				06:54	18:57 (5)	05:46		05:00				
	16:18	17:12	18:07				20:06	28	19:25 (5)	21:01	21:49				
5	08:43	08:07	07:07				06:51	18:57 (5)	05:44		04:59				
	16:20	17:14	18:09				20:07	26	19:23 (5)	21:03	21:50				
6	08:42	08:05	07:04				06:49	18:58 (5)	05:42		04:59		21:14 (4)		
	16:21	17:16	18:11				20:09	24	19:22 (5)	21:04	21:51	2	21:16 (4)		
7	08:42	08:03	07:02				06:47	18:59 (5)	05:40		04:58		21:13 (4)		
	16:22	17:18	18:13				20:11	21	19:20 (5)	21:06	21:52	3	21:16 (4)		
8	08:41	08:01	07:00				06:44	19:01 (5)	05:38		04:57		21:13 (4)		
	16:24	17:20	18:15				20:13	17	19:18 (5)	21:08	21:53	5	21:18 (4)		
9	08:41	07:59	06:57				06:42	19:04 (5)	05:36	20:37 (3)	04:57		21:13 (4)		
	16:25	17:22	18:17				20:15	11	19:15 (5)	21:10	1	20:38 (3)	21:54	6	21:19 (4)
10	08:40	07:57	06:55				06:39		05:34		20:36 (3)		04:56		21:12 (4)
	16:27	17:24	18:19				20:17		21:11	4	20:40 (3)	21:55	7	21:19 (4)	
11	08:40	07:55	06:52				06:37		05:33		20:36 (3)		04:56		21:13 (4)
	16:28	17:26	18:21				20:19		21:13	6	20:42 (3)	21:55	7	21:20 (4)	
12	08:39	07:53	06:50				06:35		05:31		20:35 (3)		04:55		21:13 (4)
	16:30	17:28	18:23				20:20		21:15	8	20:43 (3)	21:56	8	21:21 (4)	
13	08:38	07:51	06:48				06:32		05:29		20:34 (3)		04:55		21:12 (4)
	16:31	17:30	18:25				20:22		21:17	10	20:44 (3)	21:57	9	21:21 (4)	
14	08:37	07:49	06:45				06:30		05:27		20:34 (3)		04:55		21:12 (4)
	16:33	17:32	18:27				20:24		21:18	13	20:47 (3)	21:57	10	21:22 (4)	
15	08:36	07:47	06:43				06:28		05:26		20:33 (3)		04:55		21:12 (4)
	16:34	17:34	18:28				20:26		21:20	15	20:48 (3)	21:58	10	21:22 (4)	
16	08:35	07:45	06:40				06:25		05:24		20:34 (3)		04:54		21:12 (4)
	16:36	17:36	18:30				20:28		21:22	16	20:50 (3)	21:59	11	21:23 (4)	
17	08:34	07:43	06:38				06:23		05:22		20:33 (3)		04:54		21:12 (4)
	16:38	17:38	18:32				20:30		21:23	18	20:51 (3)	21:59	11	21:23 (4)	
18	08:33	07:41	06:35				06:21		05:21		20:33 (3)		04:54		21:12 (4)
	16:40	17:40	18:34				20:31		21:25	20	20:53 (3)	22:00	12	21:24 (4)	
19	08:32	07:39	06:33				06:18		05:19		20:34 (3)		04:54		21:12 (4)
	16:41	17:42	18:36				20:33		21:27	20	20:54 (3)	22:00	12	21:24 (4)	
20	08:31	07:36	06:31				06:16		05:18		20:34 (3)		04:54		21:12 (4)
	16:43	17:44	18:38				20:35		21:28	21	20:55 (3)	22:00	12	21:24 (4)	
21	08:30	07:34	06:28		18:07 (5)	06:14			05:16		20:34 (3)		04:54		21:13 (4)
	16:45	17:46	18:40	6	18:13 (5)	20:37			21:30	23	20:57 (3)	22:00	11	21:24 (4)	
22	08:28	07:32	06:26		18:04 (5)	06:12			05:15		20:35 (3)		04:55		21:14 (4)
	16:47	17:48	18:42	11	18:15 (5)	20:39			21:31	24	20:59 (3)	22:01	11	21:25 (4)	
23	08:27	07:30	06:23		18:03 (5)	06:09			05:13		20:34 (3)		04:55		21:13 (4)
	16:49	17:50	18:43	14	18:17 (5)	20:41			21:33	24	20:58 (3)	22:01	12	21:25 (4)	
24	08:26	07:28	06:21		18:00 (5)	06:07			05:12		20:35 (3)		04:55		21:13 (4)
	16:51	17:52	18:45	18	18:18 (5)	20:42			21:34	23	20:58 (3)	22:01	12	21:25 (4)	
25	08:24	07:25	06:18		18:00 (5)	06:05			05:11		20:36 (3)		04:56		21:14 (4)
	16:52	17:54	18:47	21	18:21 (5)	20:44			21:36	22	20:58 (3)	22:01	11	21:25 (4)	
26	08:23	07:23	06:16		17:59 (5)	06:03			05:09		20:36 (3)		04:56		21:14 (4)
	16:54	17:56	18:49	24	18:23 (5)	20:46			21:37	21	20:57 (3)	22:01	11	21:25 (4)	
27	08:22	07:21	06:13		17:57 (5)	06:01			05:08		20:37 (3)		04:56		21:14 (4)
	16:56	17:58	18:51	27	18:24 (5)	20:48			21:39	20	20:57 (3)	22:01	10	21:24 (4)	
28	08:20	07:18	06:11		17:57 (5)	05:58			05:07		20:38 (3)		04:57		21:15 (4)
	16:58	18:00	18:53	29	18:26 (5)	20:50			21:40	18	20:56 (3)	22:01	10	21:25 (4)	
29	08:18		07:09		18:56 (5)	05:56			05:06		20:39 (3)		04:58		21:16 (4)
	17:00		19:54	32	19:28 (5)	20:52			21:41	17	20:56 (3)	22:01	9	21:25 (4)	
30	08:17		07:06		18:56 (5)	05:54			05:05		20:40 (3)		04:58		21:16 (4)
	17:02		19:56	33	19:29 (5)	20:53			21:43	15	20:55 (3)	22:00	8	21:24 (4)	
31	08:15		07:04		18:55 (5)				05:04		20:40 (3)				
	17:04		19:58	33	19:28 (5)				21:44	14	20:54 (3)				
Potential sun hours	250	273	367		420				494		510				
Total, worst case			248		220				373		257				
Sun reduction			0.27		0.35				0.38		0.32				
Oper. time red.			1.00		1.00				1.00		1.00				
Wind dir. red.			0.68		0.68				0.63		0.61				
Total reduction			0.18		0.24				0.24		0.20				
Total, real			45		52				90		50				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LG - H319

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	21:17 (4)	05:39	20:45 (3)	06:33	07:26	07:24	08:19			
	22:00	7	21:24 (4)	21:25	8	20:53 (3)	20:18	19:05	16:54	16:10	
2	05:00	21:18 (4)	05:40	20:46 (3)	06:35	07:28	07:26	08:21			
	22:00	6	21:24 (4)	21:23	6	20:52 (3)	20:16	19:02	16:52	16:09	
3	05:00	21:17 (4)	05:42	20:46 (3)	06:36	19:02 (5)	07:30	07:28	08:22		
	21:59	6	21:23 (4)	21:21	4	20:50 (3)	20:13	11	19:13 (5)	19:00	16:08
4	05:01	21:18 (4)	05:44	20:46 (3)	06:38	18:58 (5)	07:31	07:30	08:24		
	21:59	5	21:23 (4)	21:19	20:11	17	19:15 (5)	18:57	16:48	16:08	
5	05:02	21:19 (4)	05:45	20:11	17	19:15 (5)	18:57	16:48	16:08		
	21:58	4	21:23 (4)	21:17	20:09	21	19:17 (5)	18:55	16:46	16:07	
6	05:03	21:20 (4)	05:47	20:09	21	19:17 (5)	18:55	16:46	16:07		
	21:57	2	21:22 (4)	21:15	20:06	24	19:18 (5)	18:52	16:44	16:07	
7	05:04	21:21 (4)	05:49	20:06	24	19:18 (5)	18:52	16:44	16:07		
	21:57	1	21:22 (4)	21:13	20:04	27	19:19 (5)	18:50	16:43	16:06	
8	05:05	21:22 (4)	05:51	20:04	27	19:19 (5)	18:50	16:43	16:06		
	21:56		21:11	20:01	28	19:19 (5)	18:48	16:41	16:06		
9	05:06	20:54 (3)	05:52	20:01	28	19:19 (5)	18:48	16:41	16:06		
	21:55	3	20:57 (3)	21:09	19:59	30	19:20 (5)	18:45	16:39	16:05	
10	05:07	20:52 (3)	05:54	21:09	19:59	30	19:20 (5)	18:45	16:39	16:05	
	21:55	8	21:00 (3)	21:07	06:49	30	19:20 (5)	18:45	16:39	16:05	
11	05:08	21:00 (3)	05:56	21:07	06:49	30	19:20 (5)	18:45	16:39	16:05	
	21:54	11	21:01 (3)	21:05	19:54	32	19:20 (5)	18:40	16:36	16:05	
12	05:09	20:49 (3)	05:57	21:05	19:54	32	19:20 (5)	18:40	16:36	16:05	
	21:53	13	21:02 (3)	21:03	06:52	32	19:20 (5)	18:38	16:34	16:05	
13	05:11	20:48 (3)	05:59	21:03	06:52	32	19:20 (5)	18:38	16:34	16:05	
	21:52	15	21:03 (3)	21:01	19:49	33	19:20 (5)	18:36	16:32	16:05	
14	05:12	20:48 (3)	06:01	21:01	19:49	33	19:20 (5)	18:36	16:32	16:05	
	21:51	16	21:04 (3)	20:59	06:56	33	19:20 (5)	18:36	16:32	16:05	
15	05:13	20:47 (3)	06:03	20:59	06:56	33	19:20 (5)	18:36	16:32	16:05	
	21:50	18	21:05 (3)	20:57	19:47	32	19:18 (5)	18:33	16:31	16:05	
16	05:14	20:47 (3)	06:05	20:57	19:47	32	19:18 (5)	18:33	16:31	16:05	
	21:48	19	21:06 (3)	20:55	06:58	30	19:16 (5)	18:31	16:29	16:05	
17	05:16	20:46 (3)	06:06	20:55	06:58	30	19:16 (5)	18:31	16:29	16:05	
	21:47	21	21:07 (3)	20:53	19:44	30	19:16 (5)	18:31	16:29	16:05	
18	05:17	20:46 (3)	06:08	20:53	19:44	30	19:16 (5)	18:31	16:29	16:05	
	21:46	21	21:07 (3)	20:50	06:59	27	19:14 (5)	18:29	16:27	16:05	
19	05:18	20:45 (3)	06:10	20:50	06:59	27	19:14 (5)	18:29	16:27	16:05	
	21:45	22	21:07 (3)	20:48	19:42	27	19:14 (5)	18:29	16:27	16:05	
20	05:20	20:45 (3)	06:12	20:48	19:42	27	19:14 (5)	18:29	16:27	16:05	
	21:44	23	21:08 (3)	20:46	07:01	25	19:11 (5)	18:26	16:26	16:05	
21	05:21	20:45 (3)	06:13	20:46	07:01	25	19:11 (5)	18:26	16:26	16:05	
	21:42	23	21:08 (3)	20:44	19:39	25	19:11 (5)	18:26	16:26	16:05	
22	05:23	20:44 (3)	06:15	20:44	19:39	25	19:11 (5)	18:26	16:26	16:05	
	21:41	23	21:07 (3)	20:42	07:03	21	19:08 (5)	18:24	16:25	16:05	
23	05:24	20:44 (3)	06:17	20:42	07:03	21	19:08 (5)	18:24	16:25	16:05	
	21:39	23	21:07 (3)	20:39	19:37	21	19:08 (5)	18:24	16:25	16:05	
24	05:26	20:44 (3)	06:19	20:42	19:37	21	19:08 (5)	18:24	16:25	16:05	
	21:38	21	21:05 (3)	20:37	07:05	18	19:06 (5)	18:22	16:23	16:05	
25	05:27	20:44 (3)	06:20	20:42	07:05	18	19:06 (5)	18:22	16:23	16:05	
	21:36	20	21:04 (3)	20:35	19:34	18	19:06 (5)	18:22	16:23	16:05	
26	05:29	20:44 (3)	06:22	20:42	19:34	18	19:06 (5)	18:22	16:23	16:05	
	21:35	18	21:02 (3)	20:32	07:06	15	19:04 (5)	18:20	16:22	16:06	
27	05:30	20:44 (3)	06:24	20:42	07:06	15	19:04 (5)	18:20	16:22	16:06	
	21:33	17	21:01 (3)	20:30	19:32	15	19:04 (5)	18:20	16:22	16:06	
28	05:32	20:44 (3)	06:26	20:42	19:32	15	19:04 (5)	18:20	16:22	16:06	
	21:32	15	20:59 (3)	20:28	19:29	12	19:01 (5)	18:17	16:20	16:06	
29	05:34	20:45 (3)	06:28	20:42	19:29	12	19:01 (5)	18:17	16:20	16:06	
	21:30	13	20:58 (3)	20:25	07:10	8	18:51 (5)	18:05	16:04	16:08	
30	05:35	20:44 (3)	06:29	20:42	07:10	8	18:51 (5)	18:05	16:04	16:08	
	21:28	12	20:56 (3)	20:23	19:27	8	18:59 (5)	18:15	16:19	16:07	
31	05:37	20:45 (3)	06:31	20:42	19:27	8	18:59 (5)	18:15	16:19	16:07	
	21:26	10	20:55 (3)	20:21	07:12	2	18:56 (5)	18:13	16:18	16:07	
Potential sun hours	512		460		382		328		259		233
Total, worst case		416		18	477						
Sun reduction		0.32		0.34	0.32						
Oper. time red.		1.00		1.00	1.00						
Wind dir. red.		0.63		0.63	0.68						
Total reduction		0.20		0.22	0.22						
Total, real		85		4	103						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LH - H320

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LI - H321

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
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29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LJ - H322

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LK - H323

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LL - H324

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LM - H325

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:21 (5)	07:16	17:06 (4)	07:01	05:52	19:51 (2)	05:03		
	16:15	17:06	13 16:34 (5)	18:02	28 17:34 (4)	20:00	20:55	25 20:16 (2)	21:45		
2	08:44	08:12	16:22 (5)	07:14	17:05 (4)	06:59	05:50	19:52 (2)	05:02		
	16:16	17:08	15 16:37 (5)	18:04	31 17:36 (4)	20:02	20:57	22 20:14 (2)	21:46		
3	08:43	08:10	16:22 (5)	07:11	17:06 (4)	06:56	05:48	19:53 (2)	05:01		
	16:17	17:10	17 16:39 (5)	18:06	32 17:38 (4)	20:04	20:59	20 20:13 (2)	21:48		
4	08:43	08:08	16:22 (5)	07:09	17:06 (4)	06:54	05:46	19:54 (2)	05:00		
	16:18	17:12	19 16:41 (5)	18:07	34 17:40 (4)	20:06	21:01	17 20:11 (2)	21:49		
5	08:43	08:07	16:22 (5)	07:07	17:06 (4)	06:51	05:44	19:56 (2)	04:59		
	16:19	17:14	21 16:43 (5)	18:09	33 17:39 (4)	20:07	21:03	13 20:09 (2)	21:50		
6	08:42	08:05	16:23 (5)	07:04	17:07 (4)	06:49	05:42	19:59 (2)	04:59		
	16:21	17:16	21 16:44 (5)	18:11	31 17:38 (4)	20:09	21:04	7 20:06 (2)	21:51		
7	08:42	08:03	16:24 (5)	07:02	17:07 (4)	06:47	05:40		04:58		
	16:22	17:18	19 16:43 (5)	18:13	30 17:37 (4)	20:11	21:06		21:52		
8	08:42	08:01	16:25 (5)	07:00	17:08 (4)	06:44	05:38		04:57		
	16:24	17:20	17 16:42 (5)	18:15	28 17:36 (4)	20:13	21:08		21:53		
9	08:41	07:59	16:26 (5)	06:57	17:09 (4)	06:42	05:36		04:57		
	16:25	17:22	15 16:41 (5)	18:17	25 17:34 (4)	20:15	21:10		21:54		
10	08:40	07:57	16:28 (5)	06:55	17:11 (4)	06:39	05:34		04:56		
	16:26	17:24	11 16:39 (5)	18:19	21 17:32 (4)	20:17	21:11		21:55		
11	08:40	07:55	16:33 (5)	06:52	17:14 (4)	06:37	05:33		04:56		
	16:28	17:26	2 16:35 (5)	18:21	19 17:55 (3)	20:19	21:13		21:55		
12	08:39	07:53		06:50	17:17 (4)	06:35	05:31		04:55		
	16:30	17:28		18:23	13 17:56 (3)	20:20	21:15		21:56		
13	08:38	07:51		06:48	17:50 (3)	06:32	05:29		04:55		
	16:31	17:30		18:25	8 17:58 (3)	20:22	21:17		21:57		
14	08:37	07:49		06:45	17:49 (3)	06:30	05:27		04:55		
	16:33	17:32		18:27	11 18:00 (3)	20:24	21:18		21:57		
15	08:36	07:47		06:43	17:49 (3)	06:28	05:26		04:54		
	16:34	17:34		18:28	13 18:02 (3)	20:26	21:20		21:58		
16	08:35	07:45		06:40	17:48 (3)	06:25	19:57 (2)	05:24	04:54		
	16:36	17:36		18:30	16 18:04 (3)	20:28	2 19:59 (2)	21:22	21:59		
17	08:34	07:43		06:38	17:49 (3)	06:23	19:55 (2)	05:22	04:54		
	16:38	17:38		18:32	17 18:06 (3)	20:30	6 20:01 (2)	21:23	21:59		
18	08:33	07:41		06:35	17:49 (3)	06:21	19:54 (2)	05:21	04:54		
	16:40	17:40		18:34	18 18:07 (3)	20:31	9 20:03 (2)	21:25	22:00		
19	08:32	07:39		06:33	17:50 (3)	06:18	19:53 (2)	05:19	04:54		
	16:41	17:42		18:36	18 18:08 (3)	20:33	12 20:05 (2)	21:27	22:00		
20	08:31	07:36		06:31	17:50 (3)	06:16	19:52 (2)	05:18	04:54		
	16:43	17:44	2 17:16 (4)	18:38	16 18:06 (3)	20:35	15 20:07 (2)	21:28	22:00		
21	08:30	07:34		06:28	17:53 (3)	06:14	19:50 (2)	05:16	04:54		
	16:45	17:46	6 17:18 (4)	18:40	12 18:05 (3)	20:37	18 20:08 (2)	21:30	22:01		
22	08:28	07:32		06:26	17:10 (4)	06:12	19:50 (2)	05:15	04:55		
	16:47	17:48	9 17:19 (4)	18:41	4 18:00 (3)	20:39	20 20:10 (2)	21:31	22:01		
23	08:27	07:30		06:23	17:10 (4)	06:09	19:50 (2)	05:13	04:55		
	16:49	17:50	12 17:22 (4)	18:43		20:41	22 20:12 (2)	21:33	22:01		
24	08:26	07:28		06:21		06:07	19:49 (2)	05:12	04:55		
	16:50	17:52	15 17:24 (4)	18:45		20:42	25 20:14 (2)	21:34	22:01		
25	08:24	07:25		06:18		06:05	19:49 (2)	05:11	04:55		
	16:52	17:54	19 17:26 (4)	18:47		20:44	26 20:15 (2)	21:36	22:01		
26	08:23	07:23		06:16		06:03	19:49 (2)	05:09	04:56		
	16:54	17:56	21 17:28 (4)	18:49		20:46	28 20:17 (2)	21:37	22:01		
27	08:22	07:21		06:13		06:00	19:49 (2)	05:08	04:56		
	16:56	17:58	24 17:31 (4)	18:51		20:48	29 20:18 (2)	21:39	22:01		
28	08:20	07:18		06:11		05:58	19:50 (2)	05:07	04:57		
	16:58	18:00	26 17:32 (4)	18:53		20:50	28 20:18 (2)	21:40	22:01		
29	08:18	16:22 (5)		07:08		05:56	19:50 (2)	05:06	04:57		
	17:00	6 16:28 (5)		19:54		20:52	27 20:17 (2)	21:41	22:01		
30	08:17	16:21 (5)		07:06		05:54	19:50 (2)	05:05	04:58		
	17:02	9 16:30 (5)		19:56		20:53	27 20:17 (2)	21:43	22:00		
31	08:15	16:21 (5)		07:04				05:04			
	17:04	11 16:32 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case	29		304	458		294		104			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.67	0.68		0.65		0.65			
Total reduction	0.16		0.16	0.18		0.23		0.25			
Total, real	5		47	84		67		26			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LM - H325

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:29 (3) 16:54	15:58 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:36 (3) 16:52	15:56 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:50 (4) 16:50	15:54 (5) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:48 (4) 16:48	15:53 (5) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:46 (4) 16:46	15:53 (5) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:45 (4) 16:44	15:52 (5) 16:07
7	05:04 21:57	05:49 21:13	20:08 (2) 20:04	07:37 18:50	17:42 (4) 16:43	15:52 (5) 16:06
8	05:05 21:56	05:50 21:11	20:05 (2) 20:01	07:39 18:48	17:42 (4) 16:41	15:52 (5) 16:06
9	05:06 21:55	05:52 21:09	20:03 (2) 19:59	07:41 18:45	17:41 (4) 16:39	15:52 (5) 16:05
10	05:07 21:55	05:54 21:07	20:01 (2) 19:56	07:42 18:43	17:40 (4) 16:37	15:53 (5) 16:05
11	05:08 21:54	05:56 21:05	20:00 (2) 19:54	07:44 18:40	17:40 (4) 16:35	15:53 (5) 16:05
12	05:09 21:53	05:57 21:03	19:59 (2) 19:51	07:46 18:38	17:39 (4) 16:34	15:53 (5) 16:05
13	05:10 21:52	05:59 21:01	19:58 (2) 19:49	07:48 18:36	17:39 (4) 16:32	15:54 (5) 16:05
14	05:12 21:51	06:01 20:59	19:57 (2) 19:47	07:50 18:33	17:39 (4) 16:31	15:55 (5) 16:04
15	05:13 21:50	06:03 20:57	19:57 (2) 19:44	07:52 18:31	17:39 (4) 16:29	15:58 (5) 16:05
16	05:14 21:49	06:04 20:55	19:56 (2) 19:42	07:54 18:29	17:39 (4) 16:27	15:58 (5) 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 19:39	07:55 18:26	17:40 (4) 16:26	15:58 (5) 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 19:37	07:57 18:24	17:40 (4) 16:24	15:58 (5) 16:05
19	05:18 21:45	06:10 20:48	19:55 (2) 19:34	07:59 18:22	17:41 (4) 16:23	15:58 (5) 16:05
20	05:20 21:44	06:12 20:46	19:55 (2) 19:32	08:01 18:20	17:42 (4) 16:22	15:58 (5) 16:06
21	05:21 21:42	06:13 20:44	19:56 (2) 19:29	08:03 18:17	17:43 (4) 16:20	15:58 (5) 16:06
22	05:23 21:41	06:15 20:42	19:55 (2) 19:27	18:38 (3) 18:15	08:05 16:19	15:58 (5) 16:06
23	05:24 21:39	06:17 20:39	19:56 (2) 19:24	18:36 (3) 18:13	08:07 16:18	15:58 (5) 16:07
24	05:26 21:38	06:19 20:37	19:57 (2) 19:22	18:34 (3) 18:11	08:09 16:17	15:58 (5) 16:08
25	05:27 21:36	06:20 20:35	19:57 (2) 19:19	18:32 (3) 18:51 (3)	07:11 17:09	15:58 (5) 16:08
26	05:29 21:35	06:22 20:32	19:58 (2) 19:17	18:31 (3) 18:48 (3)	07:13 17:06	15:58 (5) 16:09
27	05:30 21:33	06:24 20:30	20:00 (2) 19:14	18:30 (3) 18:46 (3)	07:14 17:04	15:58 (5) 16:10
28	05:32 21:32	06:26 20:28	19:21 19:12	18:30 (3) 18:44 (3)	07:16 17:02	15:58 (5) 16:11
29	05:34 21:30	06:27 20:25	19:22 19:09	18:30 (3) 18:41 (3)	07:18 17:00	15:58 (5) 16:11
30	05:35 21:28	06:29 20:23	19:24 19:07	18:29 (3) 18:38 (3)	07:20 16:58	15:58 (5) 16:12
31	05:37 21:26	06:31 20:21		07:22 16:56	16:00 (5) 16:05 (5)	15:58 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		401	129	468	190	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		89	28	93	33	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LN - H326

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	19:54 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	26	20:20 (5)	21:45	22:00	21:25	20:18	19:05	16:54
2	08:44	08:12	07:14	06:59	05:50		19:54 (5)	05:02	05:00	05:40	06:35	07:28	07:26
	16:16	17:08	18:04	20:02	20:57	25	20:19 (5)	21:46	22:00	21:23	20:16	19:02	16:52
3	08:43	08:10	07:11	06:56	05:48		19:55 (5)	05:01	05:00	05:42	06:36	07:30	07:28
	16:17	17:10	18:06	20:04	20:59	23	20:18 (5)	21:48	21:59	21:21	20:13	19:00	16:50
4	08:43	08:08	07:09	06:54	05:46		19:55 (5)	05:00	05:01	05:44	20:14 (5)	06:38	07:31
	16:18	17:12	18:07	20:06	21:01	22	20:17 (5)	21:49	21:59	21:19	20:18 (5)	20:11	18:57
5	08:43	08:07	07:07	06:51	05:44		19:56 (5)	04:59	05:02	05:45	20:10 (5)	06:40	07:33
	16:20	17:14	18:09	20:07	21:03	20	20:16 (5)	21:50	21:58	21:17	20:21 (5)	20:09	18:55
6	08:42	08:05	07:04	06:49	05:42		19:57 (5)	04:59	05:03	05:47	20:08 (5)	06:42	07:35
	16:21	17:16	18:11	20:09	21:04	17	20:14 (5)	21:51	21:57	21:15	20:24 (5)	20:06	18:52
7	08:42	08:03	07:02	06:47	05:40		19:59 (5)	04:58	05:04	05:49	20:07 (5)	06:43	07:37
	16:22	17:18	18:13	20:11	21:06	15	20:14 (5)	21:52	21:57	21:13	20:25 (5)	20:04	18:50
8	08:41	08:01	07:00	06:44	05:38		20:01 (5)	04:57	05:05	05:51	20:05 (5)	06:45	07:39
	16:24	17:20	18:15	20:13	21:08	10	20:11 (5)	21:53	21:56	21:11	20:26 (5)	20:01	18:48
9	08:41	07:59	06:57	06:42	05:36			04:57	05:06	05:52	20:05 (5)	06:47	07:41
	16:25	17:22	18:17	20:15	21:10			21:54	21:55	21:09	20:27 (5)	19:59	18:45
10	08:40	07:57	06:55	06:39	05:34			04:56	05:07	05:54	20:03 (5)	06:49	07:42
	16:27	17:24	18:19	20:17	21:11			21:54	21:54	21:07	20:27 (5)	19:56	18:43
11	08:40	07:55	06:52	06:37	05:33			04:56	05:08	05:56	20:03 (5)	06:50	07:44
	16:28	17:26	18:21	20:18	21:13			21:55	21:54	21:05	20:27 (5)	19:54	18:40
12	08:39	07:53	06:50	06:35	05:31			04:55	05:09	05:57	20:03 (5)	06:52	07:46
	16:30	17:28	18:23	20:20	21:15			21:56	21:53	21:03	20:28 (5)	19:51	18:38
13	08:38	07:51	06:48	06:32	05:29			04:55	05:11	05:59	20:01 (5)	06:54	07:48
	16:31	17:30	18:25	20:22	21:17			21:57	21:52	21:01	20:28 (5)	19:49	18:36
14	08:37	07:49	06:45	06:30	05:27			04:55	05:12	06:01	20:01 (5)	06:56	07:50
	16:33	17:32	18:27	20:24	21:18			21:57	21:51	20:59	20:28 (5)	19:47	18:33
15	08:36	07:47	06:43	06:28	05:26			04:55	05:13	06:03	20:02 (5)	06:58	07:52
	16:34	17:34	18:28	20:26	21:20			21:58	21:50	20:57	20:28 (5)	19:44	18:31
16	08:35	07:45	06:40	06:25	05:24			04:54	05:14	06:05	20:01 (5)	06:59	07:54
	16:36	17:36	18:30	20:28	21:22			21:59	21:48	20:55	20:25 (5)	19:42	18:29
17	08:34	07:43	06:38	06:23	05:22			04:54	05:16	06:06	20:01 (5)	07:01	07:55
	16:38	17:38	18:32	20:30	21:23			21:59	21:47	20:53	20:23 (5)	19:39	18:26
18	08:33	07:41	06:35	06:21	05:21			04:54	05:17	06:08	20:02 (5)	07:03	07:57
	16:40	17:40	18:34	20:31	21:25			21:59	21:46	20:50	20:22 (5)	19:37	18:24
19	08:32	07:39	06:33	06:18	20:03 (5)	05:19		04:54	05:18	06:10	20:01 (5)	07:05	07:59
	16:41	17:42	18:36	20:33	2	20:05 (5)	21:27	22:00	21:45	20:48	18	20:19 (5)	19:34
20	08:31	07:36	06:31	06:16	20:01 (5)	05:18		04:54	05:20	06:12	20:02 (5)	07:06	08:01
	16:43	17:44	18:38	20:35	6	20:07 (5)	21:28	22:00	21:43	20:46	15	20:17 (5)	19:32
21	08:30	07:34	06:28	06:14	19:58 (5)	05:16		04:54	05:21	06:13	20:03 (5)	07:08	08:03
	16:45	17:46	18:40	20:37	10	20:08 (5)	21:30	22:00	21:42	20:44	12	20:15 (5)	19:29
22	08:28	07:32	06:26	06:12	19:57 (5)	05:15		04:55	05:23	06:15	20:03 (5)	07:10	08:05
	16:47	17:48	18:41	20:39	13	20:10 (5)	21:31	22:01	21:41	20:42	9	20:12 (5)	19:27
23	08:27	07:30	06:23	06:09	19:56 (5)	05:13		04:55	05:24	06:17	20:05 (5)	07:12	08:07
	16:49	17:50	18:43	20:41	16	20:12 (5)	21:33	22:01	21:39	20:39	5	20:10 (5)	19:24
24	08:26	07:28	06:21	06:07	19:55 (5)	05:12		04:55	05:26	06:19	20:07 (5)	07:13	08:09
	16:51	17:52	18:45	20:42	18	20:13 (5)	21:34	22:01	21:38	20:37	2	20:09 (5)	19:22
25	08:24	07:25	06:18	06:05	19:55 (5)	05:11		04:56	05:27	06:20		07:15	07:11
	16:52	17:54	18:47	20:44	20	20:15 (5)	21:36	22:01	21:36	20:35		19:19	17:09
26	08:23	07:23	06:16	06:03	19:54 (5)	05:09		04:56	05:29	06:22		07:17	07:13
	16:54	17:56	18:49	20:46	23	20:17 (5)	21:37	22:01	21:35	20:32		19:17	17:06
27	08:21	07:21	06:13	06:01	19:54 (5)	05:08		04:56	05:30	06:24		07:19	07:14
	16:56	17:58	18:51	20:48	25	20:19 (5)	21:39	22:01	21:33	20:30		19:14	17:04
28	08:20	07:18	06:11	05:58	19:54 (5)	05:07		04:57	05:32	06:26		07:21	07:16
	16:58	18:00	18:53	20:50	27	20:21 (5)	21:40	22:01	21:32	20:28		19:12	17:02
29	08:18		07:08	05:56	19:54 (5)	05:06		04:58	05:34	06:28		07:22	07:18
	17:00		19:54	20:52	26	20:20 (5)	21:41	22:00	21:30	20:25		19:09	17:00
30	08:17		07:06	05:54	19:54 (5)	05:05		04:58	05:35	06:29		07:24	07:20
	17:02		19:56	20:53	26	20:20 (5)	21:43	22:00	21:28	20:23		19:07	16:58
31	08:15		07:04			05:04			05:37	06:31		07:22	
	17:04		19:58			21:44			21:26	20:21		16:56	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259
Total, worst case				212	158				372				
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.65	0.65				0.65				
Total reduction				0.23	0.25				0.22				
Total, real				48	39				82				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LO - H327

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	19:51 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:55	20:11 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	19:52 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	20:10 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56	05:48	19:53 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	20:08 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46	19:55 (5)	05:00	05:01	05:44	06:38	07:31	07:30	08:23	
	16:18	17:12	18:07	20:06	21:01	20:06 (5)	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44		04:59	05:02	05:45	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:03		21:50	21:58	21:17	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04		21:51	21:57	21:15	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:13	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38		04:57	05:05	05:51	20:07 (5)	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:11	6 20:13 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	20:04 (5)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	12 20:16 (5)	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	20:01 (5)	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	16 20:17 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:00 (5)	06:50	07:44	07:43	08:33
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	19 20:19 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:57	19:59 (5)	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	21 20:20 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:58 (5)	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	22 20:20 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:57 (5)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	24 20:21 (5)	19:47	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	19:57 (5)	06:58	07:52	07:51	08:37
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	25 20:22 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24	19:59 (5)	04:54	05:14	06:05	19:55 (5)	06:59	07:54	07:53	08:38
	16:36	17:36	18:30	20:28	1 20:00 (5)	21:22	21:59	21:48	20:55	26 20:21 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	05:22	19:56 (5)	04:54	05:16	06:06	19:55 (5)	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30	5 20:01 (5)	21:23	21:59	21:47	20:53	26 20:21 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	05:21	19:54 (5)	04:54	05:17	06:08	19:55 (5)	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31	9 20:03 (5)	21:25	21:59	21:46	20:50	27 20:22 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	05:19	19:53 (5)	04:54	05:18	06:10	19:55 (5)	07:05	07:59	07:59	08:40
	16:41	17:42	18:36	20:33	12 20:05 (5)	21:27	22:00	21:45	20:48	24 20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	05:18	19:52 (5)	04:54	05:20	06:12	19:55 (5)	07:06	08:01	08:00	08:41
	16:43	17:44	18:38	20:35	15 20:07 (5)	21:28	22:00	21:43	20:46	22 20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	19:50 (5)	04:54	05:21	06:13	19:55 (5)	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	18 20:08 (5)	21:30	22:00	21:42	20:44	20 20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	05:15	19:50 (5)	04:55	05:23	06:15	19:55 (5)	07:10	08:05	08:04	08:42
	16:47	17:48	18:41	20:39	20 20:10 (5)	21:31	22:01	21:41	20:42	17 20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	05:13	19:49 (5)	04:55	05:24	06:17	19:56 (5)	07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	23 20:12 (5)	21:33	22:01	21:39	20:39	14 20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	19:49 (5)	04:55	05:26	06:19	19:57 (5)	07:13	08:09	08:07	08:43
	16:51	17:52	18:45	20:42	24 20:13 (5)	21:34	22:01	21:38	20:37	12 20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	05:11	19:49 (5)	04:56	05:27	06:20	19:57 (5)	07:15	07:11	08:09	08:43
	16:52	17:54	18:47	20:44	26 20:15 (5)	21:36	22:01	21:36	20:35	9 20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:09	19:49 (5)	04:56	05:29	06:22	19:59 (5)	07:17	07:13	08:11	08:43
	16:54	17:56	18:49	20:46	26 20:15 (5)	21:37	22:01	21:35	20:32	5 20:04 (5)	19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01	05:08	19:49 (5)	04:56	05:30	06:24	20:01 (5)	07:19	07:14	08:13	08:43
	16:56	17:58	18:51	20:48	25 20:14 (5)	21:39	22:01	21:33	20:30	1 20:02 (5)	19:14	17:04	16:13	16:10
28	08:20	07:18	06:11	05:58	05:07	19:49 (5)	04:57	05:32	06:26		07:21	07:16	08:14	08:44
	16:58	18:00	18:53	20:50	25 20:14 (5)	21:40	22:01	21:32	20:28		19:12	17:02	16:13	16:11
29	08:18		07:08	05:56	05:06	19:50 (5)	04:58	05:34	06:28		07:22	07:18	08:16	08:44
	17:00		19:54	20:52	23 20:13 (5)	21:41	22:00	21:30	20:25		19:09	17:00	16:12	16:11
30	08:17		07:06	05:54	05:05	19:50 (5)	04:58	05:35	06:29		07:24	07:20	08:17	08:44
	17:02		19:56	20:53	22 20:12 (5)	21:43	22:00	21:28	20:23		19:07	16:58	16:11	16:12
31	08:15		07:04		05:04			05:37	06:31			07:22		08:44
	17:04		19:58		21:44			21:26	20:21			16:56		16:13
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case				274	64				348					
Sun reduction				0.35	0.38				0.34					
Oper. time red.				1.00	1.00				1.00					
Wind dir. red.				0.65	0.65				0.65					
Total reduction				0.23	0.25				0.22					
Total, real				63	16				77					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case **Shadow receptor:** LP - H328

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	19:53 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	20:04 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	19:57 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	19:59 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48		05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59		21:48	21:59	21:21	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46		05:00	05:01	05:44	06:38	07:31	07:30	08:23
	16:18	17:12	18:07	20:06	21:01		21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44		04:59	05:02	05:45	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07	21:02		21:50	21:58	21:17	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04		21:51	21:57	21:15	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:13	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38		04:57	05:05	05:51	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:11	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:03 (5)	06:50	07:44	08:33
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	7 20:10 (5)	19:54	18:40	16:36
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:57	20:01 (5)	06:52	07:46	08:34
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	12 20:13 (5)	19:51	18:38	16:34
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:58 (5)	06:54	07:48	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	16 20:14 (5)	19:49	18:36	16:32
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:57 (5)	06:56	07:50	08:36
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	18 20:15 (5)	19:46	18:33	16:31
15	08:36	07:47	06:43	06:28	05:26	19:55 (5)	04:55	05:13	06:03	19:56 (5)	06:58	07:52	08:37
	16:34	17:34	18:28	20:26	3 19:58 (5)	21:20	21:58	21:50	20:57	20 20:16 (5)	19:44	18:31	16:29
16	08:35	07:45	06:40	06:25	05:24	19:53 (5)	04:54	05:14	06:05	19:54 (5)	06:59	07:54	08:37
	16:36	17:36	18:30	20:28	7 20:00 (5)	21:22	21:59	21:48	20:55	22 20:16 (5)	19:42	18:29	16:27
17	08:34	07:43	06:38	06:23	05:22	19:51 (5)	04:54	05:16	06:06	19:54 (5)	07:01	07:55	08:38
	16:38	17:38	18:32	20:30	10 20:01 (5)	21:23	21:59	21:47	20:53	23 20:17 (5)	19:39	18:26	16:26
18	08:33	07:41	06:35	06:21	05:21	19:50 (5)	04:54	05:17	06:08	19:54 (5)	07:03	07:57	08:39
	16:40	17:40	18:34	20:31	13 20:03 (5)	21:25	21:59	21:46	20:50	24 20:18 (5)	19:37	18:24	16:25
19	08:32	07:39	06:33	06:18	05:19	19:49 (5)	04:54	05:18	06:10	19:52 (5)	07:05	07:59	08:40
	16:41	17:42	18:36	20:33	16 20:05 (5)	21:27	22:00	21:45	20:48	25 20:17 (5)	19:34	18:22	16:23
20	08:31	07:36	06:31	06:16	05:18	19:48 (5)	04:54	05:20	06:12	19:52 (5)	07:06	08:01	08:41
	16:43	17:44	18:38	20:35	19 20:07 (5)	21:28	22:00	21:43	20:46	25 20:17 (5)	19:32	18:20	16:22
21	08:30	07:34	06:28	06:14	05:16	19:47 (5)	04:54	05:21	06:13	19:52 (5)	07:08	08:03	08:41
	16:45	17:46	18:40	20:37	21 20:08 (5)	21:30	22:00	21:42	20:44	23 20:15 (5)	19:29	18:17	16:20
22	08:28	07:32	06:26	06:12	05:15	19:47 (5)	04:55	05:23	06:15	19:52 (5)	07:10	08:05	08:42
	16:47	17:48	18:41	20:39	23 20:10 (5)	21:31	22:01	21:41	20:42	20 20:12 (5)	19:27	18:15	16:19
23	08:27	07:30	06:23	06:09	05:13	19:47 (5)	04:55	05:24	06:17	19:52 (5)	07:12	08:07	08:42
	16:49	17:50	18:43	20:41	25 20:12 (5)	21:33	22:01	21:39	20:39	18 20:10 (5)	19:24	18:13	16:18
24	08:26	07:28	06:21	06:07	05:12	19:47 (5)	04:55	05:26	06:19	19:53 (5)	07:13	08:09	08:43
	16:51	17:52	18:45	20:42	24 20:11 (5)	21:34	22:01	21:38	20:37	16 20:09 (5)	19:22	18:11	16:17
25	08:24	07:25	06:18	06:05	05:11	19:47 (5)	04:56	05:27	06:20	19:53 (5)	07:15	07:11	08:09
	16:52	17:54	18:47	20:44	24 20:11 (5)	21:36	22:01	21:36	20:35	13 20:06 (5)	19:19	17:09	16:16
26	08:23	07:23	06:16	06:03	05:09	19:47 (5)	04:56	05:29	06:22	19:54 (5)	07:17	07:13	08:11
	16:54	17:56	18:49	20:46	23 20:10 (5)	21:37	22:01	21:35	20:32	10 20:04 (5)	19:17	17:06	16:15
27	08:21	07:21	06:13	06:01	05:08	19:48 (5)	04:56	05:30	06:24	19:55 (5)	07:19	07:14	08:13
	16:56	17:58	18:51	20:48	22 20:10 (5)	21:39	22:01	21:33	20:30	7 20:02 (5)	19:14	17:04	16:13
28	08:20	07:18	06:11	05:58	05:07	19:49 (5)	04:57	05:32	06:26	19:56 (5)	07:21	07:16	08:14
	16:58	18:00	18:53	20:50	20 20:09 (5)	21:40	22:01	21:32	20:28	3 19:59 (5)	19:12	17:02	16:13
29	08:18		07:08	05:56	05:06	19:50 (5)	04:58	05:34	06:28		07:22	07:18	08:16
	17:00		19:54	20:52	17 20:07 (5)	21:41	22:00	21:30	20:25		19:09	17:00	16:12
30	08:17		07:06	05:54	05:05	19:51 (5)	04:58	05:35	06:29		07:24	07:20	08:17
	17:02		19:56	20:53	15 20:06 (5)	21:43	22:00	21:28	20:23		19:07	16:58	16:11
31	08:15		07:04		05:04			05:37	06:31		07:22		08:14
	17:04		19:58		21:44			21:26	20:21		16:56		16:13
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233
Total, worst case				282	13				302				
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.65	0.65				0.65				
Total reduction				0.23	0.25				0.22				
Total, real				65	3				67				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LQ - H329
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	19:52 (5) 21:15	05:31 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:49 (5) 21:17	05:29 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:47 (5) 21:18	05:27 21:57	05:12 21:51	06:01 20:59	20:00 (5) 19:46	06:56 19:46	07:50 18:33	08:36 16:31
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:46 (5) 21:20	05:26 21:58	05:13 21:50	06:03 20:57	19:56 (5) 20:07 (5)	06:58 19:44	07:52 18:31	08:37 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:45 (5) 21:22	05:24 21:59	06:05 21:48	06:05 20:55	19:53 (5) 20:08 (5)	06:59 19:42	07:54 18:29	08:37 16:27
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:44 (5) 21:23	05:22 21:59	06:06 21:47	06:06 20:53	19:51 (5) 20:09 (5)	07:01 19:39	07:55 18:26	08:38 16:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:43 (5) 21:25	05:21 21:59	05:17 21:46	06:08 20:50	19:50 (5) 20:10 (5)	07:03 19:37	07:57 18:24	08:39 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	19:43 (5) 21:27	05:19 22:00	05:18 21:45	06:10 20:48	19:49 (5) 20:10 (5)	07:05 19:34	07:59 18:22	08:40 16:23
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:43 (5) 21:28	05:18 22:00	06:12 21:43	06:12 20:46	19:48 (5) 20:11 (5)	07:06 19:32	08:01 18:20	08:41 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:42 (5) 21:30	05:16 22:00	06:13 21:42	06:13 20:44	19:48 (5) 20:12 (5)	07:08 19:29	08:03 18:17	08:42 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	19:42 (5) 21:31	05:15 22:01	06:15 21:41	06:15 20:42	19:47 (5) 20:11 (5)	07:10 19:27	08:05 18:15	08:42 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:43 (5) 21:33	05:13 22:01	06:17 21:39	06:17 20:39	19:47 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:43 (5) 21:34	05:12 22:01	06:19 21:38	06:19 20:37	19:47 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:43 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19:44 (5) 21:36	05:11 22:01	06:20 21:36	06:20 20:35	19:46 (5) 20:06 (5)	07:15 19:19	07:11 17:09	08:43 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:45 (5) 21:37	05:09 22:01	06:22 21:35	06:22 20:32	19:46 (5) 20:04 (5)	07:17 19:17	07:13 17:06	08:43 16:15
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:46 (5) 21:39	05:08 22:01	06:24 21:33	06:24 20:30	19:47 (5) 20:02 (5)	07:19 19:14	07:14 17:04	08:43 16:13
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	19:49 (5) 21:40	05:07 22:01	06:26 21:32	06:26 20:28	19:47 (5) 19:59 (5)	07:21 19:12	07:16 17:02	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	19:58 (5) 21:40	05:06 22:01	06:28 21:32	06:28 20:25	19:48 (5) 19:57 (5)	07:22 19:09	07:18 17:00	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53		05:05 22:00	06:29 21:43	06:29 20:23	19:50 (5) 19:55 (5)	07:24 19:07	07:20 16:58	08:44 16:11
31	08:15 17:04		07:04 19:58			05:04 21:44	06:31 21:26	06:31 20:21	19:51 (5) 19:52 (5)	07:22 16:56	07:22 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				278				283				
Sun reduction				0.35				0.34				
Oper. time red.				1.00				1.00				
Wind dir. red.				0.65				0.65				
Total reduction				0.23				0.22				
Total, real				64				63				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LR - H330

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	19:53 (5) 19:54 (5)	04:55 21:17	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	19:51 (5) 19:56 (5)	04:55 21:18	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:49 (5) 19:58 (5)	04:55 21:20	05:13 21:50	06:03 20:57	20:01 (5) 19:57 (5)	06:57 06:59	07:51 07:54	08:37 07:53
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:48 (5) 19:59 (5)	04:54 21:22	05:14 21:48	06:05 20:55	11 20:08 (5)	06:59 19:42	07:54 18:29	08:37 16:27
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:47 (5) 20:01 (5)	04:54 21:23	05:16 21:47	06:06 20:53	15 19:55 (5)	07:01 19:39	07:55 18:26	08:38 16:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:46 (5) 20:03 (5)	04:54 21:25	05:17 21:46	06:08 20:50	17 20:11 (5)	07:03 19:37	07:57 18:24	08:39 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	19:46 (5) 20:05 (5)	04:54 21:26	05:18 21:45	06:10 20:48	19 20:11 (5)	07:05 19:34	07:59 18:22	08:40 16:23
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:46 (5) 20:07 (5)	04:54 21:28	05:20 21:43	06:12 20:46	21 20:12 (5)	07:06 19:32	08:01 18:20	08:40 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:45 (5) 20:07 (5)	04:54 21:30	05:21 21:42	06:13 20:44	21 20:12 (5)	07:08 19:29	08:02 18:17	08:41 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	19:45 (5) 20:07 (5)	04:55 21:31	05:23 21:41	06:15 20:41	22 19:50 (5)	07:10 19:27	08:05 18:15	08:42 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:46 (5) 20:06 (5)	04:55 21:33	05:24 21:39	06:17 20:39	20 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:47 (5) 20:05 (5)	04:55 21:34	05:26 21:38	06:19 20:37	19 20:09 (5)	07:13 19:22	08:09 18:11	08:43 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19:47 (5) 20:04 (5)	04:56 21:36	05:27 21:36	06:20 20:35	17 20:06 (5)	07:15 19:19	08:11 17:09	08:43 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:49 (5) 20:03 (5)	04:56 21:37	05:29 21:35	06:22 20:32	14 20:04 (5)	07:17 19:17	08:13 17:06	08:43 16:15
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:51 (5) 20:01 (5)	04:58 21:39	05:30 21:33	06:24 20:30	12 20:02 (5)	07:19 19:14	08:14 17:04	08:43 16:13
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	20:01 (5) 21:40	04:57 22:01	05:32 21:32	06:26 20:28	9 19:59 (5)	07:21 19:12	08:16 17:02	08:44 16:11
29	08:18 17:00	07:08 18:04	05:56 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:27 20:25	5 19:57 (5)	07:22 19:09	08:17 17:00	08:44 16:11
30	08:17 17:02	07:06 18:06	05:54 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	1 19:55 (5)	07:24 19:07	08:17 16:58	08:44 16:11
31	08:15 17:04	07:04 18:04	05:54 19:58	05:54 20:53	05:04 21:44	04:58 22:00	05:37 21:26	06:31 20:21		07:22 16:56	08:17 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				220		26		228				
Sun reduction				0.35		0.32		0.34				
Oper. time red.				1.00		1.00		1.00				
Wind dir. red.				0.65		0.61		0.65				
Total reduction				0.23		0.19		0.22				
Total, real				50		5		50				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LS - H331

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:20 (4) 21:24 (4)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:21 (4) 21:24 (4)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	21:20 (4) 21:23 (4)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	21:21 (4) 21:23 (4)	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	21:22 (4) 21:23 (4)	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:16 (4) 21:17 (4)	05:05 21:16 (4)	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:15 (4) 21:18 (4)	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:15 (4) 21:19 (4)	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:16 (4) 21:20 (4)	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:16 (4) 21:21 (4)	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:15 (4) 21:21 (4)	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:15 (4) 21:22 (4)	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:16 (4) 21:22 (4)	05:13 21:50	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:16 (4) 21:23 (4)	05:14 21:48	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:16 (4) 21:23 (4)	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:16 (4) 21:24 (4)	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:16 (4) 21:24 (4)	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:16 (4) 21:24 (4)	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:16 (4) 21:24 (4)	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:17 (4) 21:25 (4)	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:17 (4) 21:25 (4)	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:17 (4) 21:25 (4)	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:18 (4) 21:25 (4)	05:27 21:36	06:20 20:35	19:22 19:19	18:11 17:09	08:09 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:18 (4) 21:25 (4)	05:29 21:35	06:22 20:32	07:17 19:17	18:11 17:06	08:43 16:15
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:18 (4) 21:24 (4)	05:30 21:33	06:24 20:30	07:19 19:14	18:13 17:04	08:43 16:13
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:19 (4) 21:25 (4)	05:32 21:32	06:26 20:28	07:21 19:12	18:14 17:02	08:44 16:11
29	08:18 17:00	07:08 17:54	07:08 18:54	05:56 20:52	05:06 21:41	04:58 22:00	21:19 (4) 21:25 (4)	05:34 21:30	06:27 20:25	07:22 19:09	17:18 17:00	08:16 16:12
30	08:17 17:02	07:06 17:56	07:06 18:56	05:54 20:53	05:05 21:43	04:58 22:00	21:19 (4) 21:24 (4)	05:35 21:28	06:29 20:23	07:24 19:07	17:20 16:58	08:17 16:11
31	08:15 17:04	07:04 17:58	07:04 18:58	05:04 21:44	05:04 21:44	05:04 21:44	05:37 21:26	05:37 21:26	06:31 20:21	07:22 16:56	07:22 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case						143						
Sun reduction						0.32						
Oper. time red.						1.00						
Wind dir. red.						0.61						
Total reduction						0.19						
Total, real						28						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LT - H332

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May		June	July		August		September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52		05:03	04:59		05:39	16	20:37 (4)	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55		21:45	22:00		21:25		20:53 (4)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50		05:02	05:00		05:40		20:38 (4)	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57		21:46	21:59		21:23	14	20:52 (4)	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48		05:01	05:00		05:42		20:38 (4)	06:36	07:30	07:28	08:22
	16:17	17:10	18:05	20:04	20:59		21:48	21:59		21:21	12	20:50 (4)	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46		05:00	05:01		05:44		20:38 (4)	06:38	07:31	07:30	08:23
	16:18	17:12	18:07	20:06	21:01		21:49	21:59		21:19	10	20:48 (4)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	20:31 (4)	04:59	05:02		05:45		20:38 (4)	06:40	07:33	07:32	08:25
	16:19	17:14	18:09	20:07	21:02	1	20:32 (4)	21:50	21:58	21:17	8	20:46 (4)	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42		20:30 (4)	04:59	05:03	05:47		20:39 (4)	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	3	20:33 (4)	21:51	21:57	21:15	6	20:45 (4)	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40		20:29 (4)	04:58	05:04	05:49		20:40 (4)	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	7	20:36 (4)	21:52	21:57	21:13	3	20:43 (4)	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38		20:28 (4)	04:57	05:05	05:50		06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	9	20:37 (4)	21:53	21:56	21:11		20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36		20:28 (4)	04:57	05:06	05:52		06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	10	20:38 (4)	21:54	21:55	21:09		19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34		20:27 (4)	04:56	05:07	05:54		06:49	07:42	07:42	08:31	
	16:26	17:24	18:19	20:17	21:11	13	20:40 (4)	21:54	21:54	21:07		19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33		20:27 (4)	04:56	05:08	05:56		06:50	07:44	07:43	08:32	
	16:28	17:26	18:21	20:18	21:13	15	20:42 (4)	21:55	21:54	21:05		19:54	18:40	16:35	16:05	
12	08:39	07:53	06:50	06:35	05:31		20:27 (4)	04:55	05:09	05:57		06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15	16	20:43 (4)	21:56	21:53	21:03		19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29		20:27 (4)	04:55	05:10	05:59		06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17	17	20:44 (4)	21:57	21:52	21:01		19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		20:27 (4)	04:55	05:12	06:01		06:56	07:50	07:49	08:36	
	16:33	17:32	18:26	20:24	21:18	20	20:47 (4)	21:57	21:51	20:59		19:46	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26		20:27 (4)	04:55	05:13	06:03		06:57	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20	21	20:48 (4)	21:58	21:50	20:57		19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24		20:28 (4)	04:54	05:14	06:04		06:59	07:54	07:53	08:37	
	16:36	17:36	18:30	20:28	21:22	21	20:49 (4)	21:59	21:48	20:55		19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22		20:28 (4)	04:54	05:16	06:06		07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23	20	20:48 (4)	21:59	21:47	20:53		19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	05:21		20:29 (4)	04:54	05:17	06:08		07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	21:25	19	20:48 (4)	21:59	21:46	20:50		19:37	18:24	16:24	16:05	
19	08:32	07:39	06:33	06:18	05:19		20:30 (4)	04:54	05:18	06:10		07:05	07:59	07:58	08:40	
	16:41	17:42	18:36	20:33	21:26	18	20:48 (4)	22:00	21:45	20:48		19:34	18:22	16:23	16:05	
20	08:31	07:36	06:31	06:16	05:18		20:30 (4)	04:54	05:20	20:45 (4)	06:12	07:06	08:01	08:00	08:40	
	16:43	17:44	18:38	20:35	21:28	16	20:46 (4)	22:00	21:43	8	20:53 (4)	20:46	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16		20:31 (4)	04:54	05:21	20:43 (4)	06:13	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30	15	20:46 (4)	22:00	21:42	11	20:54 (4)	20:44	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	05:15		20:33 (4)	04:55	05:23	20:41 (4)	06:15	07:10	08:05	08:04	08:42	
	16:47	17:48	18:41	20:39	21:31	12	20:45 (4)	22:01	21:41	14	20:55 (4)	20:41	19:27	18:15	16:19	16:06
23	08:27	07:30	06:23	06:09	05:13		20:33 (4)	04:55	05:24	20:41 (4)	06:17	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	21:33	10	20:43 (4)	22:01	21:39	16	20:57 (4)	20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12		20:36 (4)	04:55	05:26	20:40 (4)	06:19	07:13	08:09	08:07	08:43	
	16:50	17:52	18:45	20:42	21:34	5	20:41 (4)	22:01	21:38	17	20:57 (4)	20:37	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	05:11		04:56	05:27	20:40 (4)	06:20		07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	21:36		22:01	21:36	18	20:58 (4)	20:35	19:19	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:09		04:56	05:29	20:39 (4)	06:22		07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	21:37		22:01	21:35	20	20:59 (4)	20:32	19:17	17:06	16:14	16:09	
27	08:21	07:21	06:13	06:00	05:08		04:56	05:30	20:38 (4)	06:24		07:19	07:14	08:13	08:43	
	16:56	17:58	18:51	20:48	21:39		22:01	21:33	21	20:59 (4)	20:30	19:14	17:04	16:13	16:10	
28	08:20	07:18	06:11	05:58	05:07		04:57	05:32	20:38 (4)	06:26		07:21	07:16	08:14	08:44	
	16:58	18:00	08:53	20:50	21:40		22:01	21:31	21	20:59 (4)	20:28	19:12	17:02	16:12	16:11	
29	08:18		07:08	05:56	05:06		04:57	05:34	20:37 (4)	06:27		07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	21:41		22:00	21:30	20	20:57 (4)	20:25	19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	05:05		04:58	05:35	20:38 (4)	06:29		07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	21:43		22:00	21:28	18	20:56 (4)	20:23	19:07	16:58	16:11	16:12	
31	08:15		07:04	05:04	05:04			05:37	20:38 (4)	06:31			07:22		08:44	
	17:04		19:58	21:44				21:26	17	20:55 (4)	20:21		16:56		16:13	
Potential sun hours	250	273	367	420	494		510	512		460		382	328	259	233	
Total, worst case					268			201		69						
Sun reduction					0.38			0.32		0.34						
Oper. time red.					1.00			1.00		1.00						
Wind dir. red.					0.64			0.64		0.64						
Total reduction					0.24			0.21		0.22						
Total, real					65			41		15						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LU - H333

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LV - H334

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:27 (5)	07:16	17:17 (4)	07:01	05:52	19:57 (2)	05:03		
	16:15	17:06	16:34 (5)	18:02	17:34 (4)	20:00	20:55	20:26 (2)	21:45		
2	08:44	08:12	16:28 (5)	07:14	17:16 (4)	06:59	05:50	19:57 (2)	05:02		
	16:16	17:08	16:37 (5)	18:04	17:36 (4)	20:02	20:57	20:26 (2)	21:46		
3	08:43	08:10	16:27 (5)	07:11	17:15 (4)	06:56	05:48	19:58 (2)	05:01		
	16:17	17:10	16:39 (5)	18:06	17:38 (4)	20:04	20:59	20:26 (2)	21:48		
4	08:43	08:08	16:27 (5)	07:09	17:15 (4)	06:54	05:46	19:58 (2)	05:00		
	16:18	17:12	16:41 (5)	18:07	17:41 (4)	20:06	21:01	20:25 (2)	21:49		
5	08:43	08:07	16:27 (5)	07:07	17:14 (4)	06:51	05:44	19:58 (2)	04:59		
	16:19	17:14	16:43 (5)	18:09	17:42 (4)	20:07	21:03	20:24 (2)	21:50		
6	08:42	08:05	16:27 (5)	07:04	17:14 (4)	06:49	05:42	19:59 (2)	04:59		
	16:21	17:16	16:45 (5)	18:11	17:45 (4)	20:09	21:04	20:23 (2)	21:51		
7	08:42	08:03	16:27 (5)	07:02	17:14 (4)	06:47	05:40	20:00 (2)	04:58		
	16:22	17:18	16:47 (5)	18:13	17:46 (4)	20:11	21:06	20:23 (2)	21:52		
8	08:42	08:01	16:28 (5)	07:00	17:14 (4)	06:44	05:38	20:01 (2)	04:57		
	16:24	17:20	16:50 (5)	18:15	17:48 (4)	20:13	21:08	20:22 (2)	21:53		
9	08:41	07:59	16:29 (5)	06:57	17:14 (4)	06:42	05:36	20:02 (2)	04:57		
	16:25	17:22	16:49 (5)	18:17	17:48 (4)	20:15	21:10	20:21 (2)	21:54		
10	08:40	07:57	16:29 (5)	06:55	17:14 (4)	06:39	05:34	20:03 (2)	04:56		
	16:26	17:24	16:49 (5)	18:19	17:48 (4)	20:17	21:11	20:19 (2)	21:55		
11	08:40	07:55	16:31 (5)	06:52	17:15 (4)	06:37	05:33	20:06 (2)	04:56		
	16:28	17:26	16:48 (5)	18:21	17:47 (4)	20:19	21:13	20:17 (2)	21:55		
12	08:39	07:53	16:31 (5)	06:50	17:15 (4)	06:35	05:31	20:09 (2)	04:55		
	16:30	17:28	16:46 (5)	18:23	17:46 (4)	20:20	21:15	20:13 (2)	21:56		
13	08:38	07:51	16:33 (5)	06:48	17:17 (4)	06:32	05:29		04:55		
	16:31	17:30	16:44 (5)	18:25	17:45 (4)	20:22	21:17		21:57		
14	08:37	07:49		06:45	17:17 (4)	06:30	05:27		04:55		
	16:33	17:32		18:27	18:00 (3)	20:24	21:18		21:57		
15	08:36	07:47		06:43	17:20 (4)	06:28	05:26		04:54		
	16:34	17:34		18:28	18:02 (3)	20:26	21:20		21:58		
16	08:35	07:45		06:40	17:21 (4)	06:25	05:24		04:54		
	16:36	17:36		18:30	18:04 (3)	20:28	21:22		21:59		
17	08:34	07:43		06:38	17:26 (4)	06:23	05:22		04:54		
	16:38	17:38		18:32	18:06 (3)	20:30	21:23		21:59		
18	08:33	07:41		06:35	17:54 (3)	06:21	05:21		04:54		
	16:40	17:40		18:34	18:07 (3)	20:31	21:25		22:00		
19	08:32	07:39		06:33	17:54 (3)	06:18	05:19		04:54		
	16:41	17:42		18:36	18:10 (3)	20:33	21:27		22:00		
20	08:31	07:36		06:31	17:54 (3)	06:16	05:18		04:54		
	16:43	17:44		18:38	18:11 (3)	20:35	21:28		22:00		
21	08:30	07:34		06:28	17:55 (3)	06:14	05:16		04:54		
	16:45	17:46		18:40	18:13 (3)	20:37	20:08 (2)	21:30	22:01		
22	08:28	07:32		06:26	17:55 (3)	06:12	20:02 (2)	05:15	04:55		
	16:47	17:48		18:41	18:14 (3)	20:39	20:10 (2)	21:31	22:01		
23	08:27	07:30		06:23	17:56 (3)	06:09	20:01 (2)	05:13	04:55		
	16:49	17:50		18:43	18:13 (3)	20:41	20:12 (2)	21:33	22:01		
24	08:26	07:28		06:21	17:57 (3)	06:07	20:00 (2)	05:12	04:55		
	16:50	17:52		18:45	18:10 (3)	20:42	20:14 (2)	21:34	22:01		
25	08:24	07:25	17:22 (4)	06:18	18:00 (3)	06:05	19:59 (2)	05:11	04:55		
	16:52	17:54	17:26 (4)	18:47	18:08 (3)	20:44	20:15 (2)	21:36	22:01		
26	08:23	07:23	17:21 (4)	06:16		06:03	19:59 (2)	05:09	04:56		
	16:54	17:56	17:28 (4)	18:49		20:46	20:17 (2)	21:37	22:01		
27	08:22	07:21	17:20 (4)	06:13		06:00	19:58 (2)	05:08	04:56		
	16:56	17:58	17:31 (4)	18:51		20:48	20:19 (2)	21:39	22:01		
28	08:20	07:18	17:18 (4)	06:11		05:58	19:58 (2)	05:07	04:57		
	16:58	18:00	17:32 (4)	18:53		20:50	20:21 (2)	21:40	22:01		
29	08:18			07:08		05:56	19:58 (2)	05:06	04:57		
	17:00			19:54		20:52	20:22 (2)	21:41	22:01		
30	08:17	16:29 (5)		07:06		05:54	19:57 (2)	05:05	04:58		
	17:02	16:30 (5)		19:56		20:53	20:24 (2)	21:43	22:00		
31	08:15	16:28 (5)		07:04				05:04			
	17:04	16:32 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case		5	237	590		166		257			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	1		36	108		38		63			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LV - H334

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:18 (2) 20:26 (2)	06:33 20:18	07:26 19:05	17:55 (4) 16:19 (5)
2	04:59 22:00	05:40 21:23	20:15 (2) 20:29 (2)	06:35 20:16	07:26 19:02	17:54 (4) 16:19 (5)
3	05:00 21:59	05:42 21:21	20:13 (2) 20:30 (2)	06:36 20:13	07:28 19:00	17:53 (4) 16:19 (5)
4	05:01 21:59	05:44 21:19	20:12 (2) 20:31 (2)	06:38 20:11	07:30 18:57	17:52 (4) 16:17 (5)
5	05:02 21:58	05:45 21:17	20:10 (2) 20:32 (2)	06:40 20:09	07:32 18:55	17:51 (4) 16:15 (5)
6	05:03 21:58	05:47 21:15	20:09 (2) 20:33 (2)	06:42 20:06	07:34 18:52	17:51 (4) 16:12 (5)
7	05:04 21:57	05:49 21:13	20:09 (2) 20:34 (2)	06:43 20:04	07:36 18:50	17:50 (4) 16:10 (5)
8	05:05 21:56	05:50 21:11	20:07 (2) 20:34 (2)	06:45 20:01	07:38 18:48	17:49 (4) 16:08 (5)
9	05:06 21:55	05:52 21:09	20:07 (2) 20:35 (2)	06:47 19:59	07:41 18:45	17:49 (4) 16:06 (5)
10	05:07 21:55	05:54 21:07	20:06 (2) 20:34 (2)	06:49 19:56	07:42 18:43	17:49 (4) 16:05 (5)
11	05:08 21:54	05:56 21:05	20:06 (2) 20:35 (2)	06:50 19:54	07:44 18:40	17:50 (4) 16:03 (5)
12	05:09 21:53	05:57 21:03	20:06 (2) 20:34 (2)	06:52 19:51	07:46 18:38	17:50 (4) 16:03 (5)
13	05:10 21:52	05:59 21:01	20:05 (2) 20:31 (2)	06:54 19:49	07:48 18:36	17:51 (4) 16:02 (5)
14	05:12 21:51	06:01 20:59	20:05 (2) 20:29 (2)	06:56 19:47	07:50 18:33	17:51 (4) 16:01 (5)
15	05:13 21:50	06:03 20:57	20:05 (2) 20:28 (2)	06:58 19:44	07:52 18:31	17:52 (4) 16:00 (5)
16	05:14 21:49	06:04 20:55	20:05 (2) 20:25 (2)	06:59 19:42	07:54 18:29	17:53 (4) 16:00 (5)
17	05:16 21:47	06:06 20:53	20:05 (2) 20:23 (2)	07:01 19:39	07:55 18:26	17:55 (4) 16:00 (5)
18	05:17 21:46	06:08 20:50	20:06 (2) 20:22 (2)	07:03 19:37	07:57 18:24	17:57 (4) 16:00 (5)
19	05:18 21:45	06:10 20:48	20:06 (2) 20:19 (2)	07:05 19:34	07:59 18:22	17:59 (4) 16:00 (5)
20	05:20 21:44	06:12 20:46	20:07 (2) 20:17 (2)	07:06 19:32	08:01 18:20	17:59 (4) 16:00 (5)
21	05:21 21:42	06:13 20:44	20:08 (2) 20:15 (2)	07:08 19:29	08:03 18:17	17:59 (4) 16:00 (5)
22	05:23 21:41	06:15 20:42	20:09 (2) 20:12 (2)	07:10 19:27	08:05 18:15	17:59 (4) 16:00 (5)
23	05:24 21:39	06:17 20:39	20:12 (2) 19:24	07:12 19:24	08:07 18:13	17:59 (4) 16:00 (5)
24	05:26 21:38	06:19 20:37	20:13 (2) 19:22	07:13 19:22	08:09 18:11	17:59 (4) 16:00 (5)
25	05:27 21:36	06:20 20:35	20:14 (2) 19:19	07:15 19:19	08:11 18:09	17:59 (4) 16:00 (5)
26	05:29 21:35	06:22 20:32	20:15 (2) 19:17	07:17 19:17	08:13 18:07	17:59 (4) 16:00 (5)
27	05:30 21:33	06:24 20:30	20:16 (2) 19:14	07:19 19:14	08:15 18:04	17:59 (4) 16:00 (5)
28	05:32 21:32	06:26 20:28	20:17 (2) 19:12	07:21 19:12	08:17 18:02	17:59 (4) 16:00 (5)
29	05:34 21:30	06:27 20:25	20:18 (2) 19:09	07:22 19:09	08:19 18:00	17:59 (4) 16:00 (5)
30	05:35 21:28	06:29 20:23	20:19 (2) 19:07	07:24 19:07	08:21 18:00	17:59 (4) 16:00 (5)
31	05:37 21:26	06:31 20:21	20:20 (2) 19:06	07:26 19:06	08:23 18:00	17:59 (4) 16:00 (5)
Potential sun hours	512	460	382	328	259	233
Total, worst case		429	233	444	157	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.68	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		95	50	88	27	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LW - H335

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:24 (5)	07:16	17:12 (4)	07:01	05:52	19:54 (2)	05:03		
	16:15	17:06	10 16:34 (5)	18:02	22 17:34 (4)	20:00	20:55	29 20:23 (2)	21:45		
2	08:44	08:12	16:25 (5)	07:14	17:11 (4)	06:59	05:50	19:55 (2)	05:02		
	16:16	17:08	12 16:37 (5)	18:04	25 17:36 (4)	20:02	20:57	27 20:22 (2)	21:46		
3	08:43	08:10	16:25 (5)	07:11	17:11 (4)	06:56	05:48	19:55 (2)	05:01		
	16:17	17:10	14 16:39 (5)	18:06	27 17:38 (4)	20:04	20:59	26 20:21 (2)	21:48		
4	08:43	08:08	16:25 (5)	07:09	17:11 (4)	06:54	05:46	19:56 (2)	05:00		
	16:18	17:12	16 16:41 (5)	18:07	30 17:41 (4)	20:06	21:01	24 20:20 (2)	21:49		
5	08:43	08:07	16:25 (5)	07:07	17:10 (4)	06:51	05:44	19:56 (2)	04:59		
	16:19	17:14	18 16:43 (5)	18:09	32 17:42 (4)	20:07	21:03	23 20:19 (2)	21:50		
6	08:42	08:05	16:25 (5)	07:04	17:11 (4)	06:49	05:42	19:57 (2)	04:59		
	16:21	17:16	20 16:45 (5)	18:11	34 17:45 (4)	20:09	21:04	20 20:17 (2)	21:51		
7	08:42	08:03	16:26 (5)	07:02	17:10 (4)	06:47	05:40	20:00 (2)	04:58		
	16:22	17:18	21 16:47 (5)	18:13	34 17:44 (4)	20:11	21:06	17 20:17 (2)	21:52		
8	08:42	08:01	16:26 (5)	07:00	17:11 (4)	06:44	05:38	20:01 (2)	04:57		
	16:24	17:20	21 16:47 (5)	18:15	33 17:44 (4)	20:13	21:08	14 20:15 (2)	21:53		
9	08:41	07:59	16:27 (5)	06:57	17:11 (4)	06:42	05:36	20:04 (2)	04:57		
	16:25	17:22	19 16:46 (5)	18:17	31 17:42 (4)	20:15	21:10	7 20:11 (2)	21:54		
10	08:40	07:57	16:29 (5)	06:55	17:12 (4)	06:39	05:34		04:56		
	16:26	17:24	16 16:45 (5)	18:19	30 17:42 (4)	20:17	21:11		21:55		
11	08:40	07:55	16:30 (5)	06:52	17:14 (4)	06:37	05:33		04:56		
	16:28	17:26	13 16:43 (5)	18:21	27 17:41 (4)	20:19	21:13		21:55		
12	08:39	07:53	16:32 (5)	06:50	17:15 (4)	06:35	05:31		04:55		
	16:30	17:28	8 16:40 (5)	18:23	23 17:38 (4)	20:20	21:15		21:56		
13	08:38	07:51		06:48	17:17 (4)	06:32	05:29		04:55		
	16:31	17:30		18:25	23 17:58 (3)	20:22	21:17		21:57		
14	08:37	07:49		06:45	17:19 (4)	06:30	05:27		04:55		
	16:33	17:32		18:27	21 18:00 (3)	20:24	21:18		21:57		
15	08:36	07:47		06:43	17:53 (3)	06:28	05:26		04:54		
	16:34	17:34		18:28	9 18:02 (3)	20:26	21:20		21:58		
16	08:35	07:45		06:40	17:52 (3)	06:25	05:24		04:54		
	16:36	17:36		18:30	12 18:04 (3)	20:28	21:22		21:59		
17	08:34	07:43		06:38	17:52 (3)	06:23	05:22		04:54		
	16:38	17:38		18:32	14 18:06 (3)	20:30	21:23		21:59		
18	08:33	07:41		06:35	17:52 (3)	06:21	05:21		04:54		
	16:40	17:40		18:34	15 18:07 (3)	20:31	21:25		22:00		
19	08:32	07:39		06:33	17:52 (3)	06:18	20:01 (2)	05:19	04:54		
	16:41	17:42		18:36	18 18:10 (3)	20:33	4 20:05 (2)	21:27	22:00		
20	08:31	07:36		06:31	17:52 (3)	06:16	19:59 (2)	05:18	04:54		
	16:43	17:44		18:38	19 18:11 (3)	20:35	8 20:07 (2)	21:28	22:00		
21	08:30	07:34		06:28	17:53 (3)	06:14	19:57 (2)	05:16	04:54		
	16:45	17:46		18:40	18 18:11 (3)	20:37	11 20:08 (2)	21:30	22:01		
22	08:28	07:32		06:26	17:54 (3)	06:12	19:56 (2)	05:15	04:55		
	16:47	17:48		18:41	15 18:09 (3)	20:39	14 20:10 (2)	21:31	22:01		
23	08:27	07:30		06:23	17:56 (3)	06:09	19:56 (2)	05:13	04:55		
	16:49	17:50	4 17:22 (4)	18:43	11 18:07 (3)	20:41	16 20:12 (2)	21:33	22:01		
24	08:26	07:28		06:21		06:07	19:55 (2)	05:12	04:55		
	16:50	17:52	7 17:24 (4)	18:45		20:42	19 20:14 (2)	21:34	22:01		
25	08:24	07:25		06:18		06:05	19:55 (2)	05:11	04:55		
	16:52	17:54	11 17:26 (4)	18:47		20:44	20 20:15 (2)	21:36	22:01		
26	08:23	07:23		06:16		06:03	19:54 (2)	05:09	04:56		
	16:54	17:56	14 17:28 (4)	18:49		20:46	23 20:17 (2)	21:37	22:01		
27	08:22	07:21		06:13		06:00	19:54 (2)	05:08	04:56		
	16:56	17:58	18 17:31 (4)	18:51		20:48	25 20:19 (2)	21:39	22:01		
28	08:20	07:18		06:11		05:58	19:54 (2)	05:07	04:57		
	16:58	18:00	20 17:32 (4)	18:53		20:50	27 20:21 (2)	21:40	22:01		
29	08:18	16:26 (5)		07:08		05:56	19:54 (2)	05:06	04:57		
	17:00	2 16:28 (5)		19:54		20:52	28 20:22 (2)	21:41	22:01		
30	08:17	16:25 (5)		07:06		05:54	19:54 (2)	05:05	04:58		
	17:02	5 16:30 (5)		19:56		20:53	29 20:23 (2)	21:43	22:00		
31	08:15	16:25 (5)		07:04				05:04			
	17:04	7 16:32 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case	14		262	523		224		187			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	2		40	96		51		46			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LW - H335

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December		
1	04:59	05:39	06:33	07:26	17:54 (4)	07:24	15:58 (5)	08:19
	22:00	21:25	20:18	19:05	24 18:36 (3)	16:54	17 16:15 (5)	16:10
2	04:59	05:40	06:35	07:28	17:52 (4)	07:26	15:57 (5)	08:21
	22:00	21:23	20:16	19:02	26 18:18 (4)	16:52	19 16:16 (5)	16:09
3	05:00	05:42	06:36	07:30	17:51 (4)	07:28	15:56 (5)	08:22
	21:59	21:21	20:13	19:00	28 18:19 (4)	16:50	20 16:16 (5)	16:08
4	05:01	05:44	20:13 (2) 06:38	07:31	17:50 (4)	07:30	15:55 (5)	08:24
	21:59	21:19	20:23 (2) 20:11	18:57	30 18:20 (4)	16:48	22 16:17 (5)	16:08
5	05:02	05:45	20:10 (2) 06:40	07:33	17:48 (4)	07:32	15:55 (5)	08:25
	21:58	21:17	20:25 (2) 20:09	18:55	33 18:21 (4)	16:46	20 16:15 (5)	16:07
6	05:03	05:47	20:08 (2) 06:42	07:35	17:48 (4)	07:34	15:55 (5)	08:26
	21:58	21:15	20:27 (2) 20:06	18:52	33 18:21 (4)	16:44	17 16:12 (5)	16:07
7	05:04	05:49	20:07 (2) 06:43	07:37	17:46 (4)	07:36	15:54 (5)	08:28
	21:57	21:13	20:28 (2) 20:04	18:50	34 18:20 (4)	16:43	16 16:10 (5)	16:06
8	05:05	05:50	20:06 (2) 06:45	07:39	17:45 (4)	07:38	15:54 (5)	08:29
	21:56	21:11	20:29 (2) 20:01	18:48	33 18:18 (4)	16:41	14 16:08 (5)	16:06
9	05:06	05:52	20:05 (2) 06:47	07:41	17:45 (4)	07:40	15:55 (5)	08:30
	21:55	21:09	20:30 (2) 19:59	18:45	31 18:16 (4)	16:39	11 16:06 (5)	16:05
10	05:07	05:54	20:03 (2) 06:49	07:42	17:45 (4)	07:42	15:56 (5)	08:31
	21:55	21:07	20:30 (2) 19:56	18:43	29 18:14 (4)	16:37	9 16:05 (5)	16:05
11	05:08	05:56	20:03 (2) 06:50	07:44	17:45 (4)	07:44	15:56 (5)	08:33
	21:54	21:05	20:30 (2) 19:54	18:40	26 18:11 (4)	16:35	7 16:03 (5)	16:05
12	05:09	05:57	20:03 (2) 06:52	07:46	17:45 (4)	07:45	15:57 (5)	08:34
	21:53	21:03	20:31 (2) 19:51	18:38	24 18:09 (4)	16:34	4 16:01 (5)	16:05
13	05:10	05:59	20:02 (2) 06:54	07:48	17:45 (4)	07:47	15:58 (5)	08:35
	21:52	21:01	20:31 (2) 19:49	18:36	22 18:07 (4)	16:32	1 15:59 (5)	16:05
14	05:12	06:01	20:02 (2) 06:56	07:50	17:45 (4)	07:49		08:36
	21:51	20:59	20:29 (2) 19:47	18:33	19 18:04 (4)	16:31		16:04
15	05:13	06:03	20:02 (2) 06:58	07:52	17:46 (4)	07:51		08:37
	21:50	20:57	20:28 (2) 19:44	18:31	16 18:02 (4)	16:29		16:05
16	05:14	06:04	20:01 (2) 06:59	07:54	17:46 (4)	07:53		08:38
	21:49	20:55	20:25 (2) 19:42	18:29	13 17:59 (4)	16:27		16:05
17	05:16	06:06	20:01 (2) 07:01	07:55	17:47 (4)	07:55		08:38
	21:47	20:53	20:23 (2) 19:39	18:26	10 17:57 (4)	16:26		16:05
18	05:17	06:08	20:01 (2) 07:03	07:57	17:48 (4)	07:57		08:39
	21:46	20:50	20:22 (2) 19:37	18:24	7 17:55 (4)	16:24		16:05
19	05:18	06:10	20:01 (2) 07:05	07:59	17:50 (4)	07:59		08:40
	21:45	20:48	20:19 (2) 19:34	18:22	2 17:52 (4)	16:23		16:05
20	05:20	06:12	20:01 (2) 07:06	08:01		16:20		08:41
	21:44	20:46	20:17 (2) 19:32	9 18:53 (3)	18:20	16:22		16:06
21	05:21	06:13	20:02 (2) 07:08	18:40 (3)	08:03	08:02		08:41
	21:42	20:44	20:15 (2) 19:29	14 18:54 (3)	18:17	16:20		16:06
22	05:23	06:15	20:02 (2) 07:10	18:38 (3)	08:05	08:04		08:42
	21:41	20:42	20:12 (2) 19:27	18 18:56 (3)	18:15	16:19		16:06
23	05:24	06:17	20:03 (2) 07:12	18:37 (3)	08:07	08:06		08:42
	21:39	20:39	7 20:10 (2) 19:24	19 18:56 (3)	18:13	16:18		16:07
24	05:26	06:19	20:05 (2) 07:13	18:36 (3)	08:09	08:08		08:43
	21:38	20:37	4 20:09 (2) 19:22	18 18:54 (3)	18:11	16:17		16:08
25	05:27	06:20	07:15	18:34 (3)	07:11	08:09		08:43
	21:36	20:35	19:19	17 18:51 (3)	17:09	16:16		16:08
26	05:29	06:22	07:17	18:34 (3)	07:13	08:11		08:43
	21:35	20:32	19:17	14 18:48 (3)	17:06	16:14		16:09
27	05:30	06:24	07:19	18:34 (3)	07:14	08:13		08:44
	21:33	20:30	19:14	12 18:46 (3)	17:04	16:13		16:10
28	05:32	06:26	07:21	18:34 (3)	07:16	08:14		08:44
	21:32	20:28	19:12	10 18:44 (3)	17:02	16:12		16:11
29	05:34	06:27	07:22	18:01 (4)	07:18	08:16		08:44
	21:30	20:25	19:09	18 18:41 (3)	17:00	16:12		16:11
30	05:35	06:29	07:24	17:57 (4)	07:20	16:01 (5)	08:18	08:44
	21:28	20:23	19:07	22 18:38 (3)	16:58	9 16:10 (5)	16:11	16:12
31	05:37	06:31			07:22	15:59 (5)		08:44
	21:26	20:21			16:56	13 16:12 (5)		16:13
Potential sun hours	512	460	382	328	259	233		
Total, worst case		412	171	462	177			
Sun reduction		0.34	0.32	0.29	0.27			
Oper. time red.		1.00	1.00	1.00	1.00			
Wind dir. red.		0.65	0.67	0.68	0.66			
Total reduction		0.22	0.22	0.20	0.17			
Total, real		91	37	91	31			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

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Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: LX - H336

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June	
1	08:44		08:14	16:24 (5)	07:16		17:09 (4)	07:01	05:52		19:52 (2)	05:03
	16:15		17:06	10 16:34 (5)	18:02	25	17:34 (4)	20:00	20:55	22	20:14 (2)	21:45
2	08:44		08:12	16:24 (5)	07:14		17:08 (4)	06:59	05:50		19:52 (2)	05:02
	16:16		17:08	13 16:37 (5)	18:04	28	17:36 (4)	20:02	20:57	21	20:13 (2)	21:46
3	08:43		08:10	16:24 (5)	07:11		17:08 (4)	06:56	05:48		19:54 (2)	05:01
	16:17		17:10	15 16:39 (5)	18:06	30	17:38 (4)	20:04	20:59	17	20:11 (2)	21:48
4	08:43		08:08	16:24 (5)	07:09		17:09 (4)	06:54	05:46		19:55 (2)	05:00
	16:18		17:12	17 16:41 (5)	18:07	32	17:41 (4)	20:06	21:01	14	20:09 (2)	21:49
5	08:43		08:07	16:25 (5)	07:07		17:08 (4)	06:51	05:44		19:58 (2)	04:59
	16:19		17:14	18 16:43 (5)	18:09	33	17:41 (4)	20:07	21:03	8	20:06 (2)	21:50
6	08:42		08:05	16:25 (5)	07:04		17:09 (4)	06:49	05:42			04:59
	16:21		17:16	20 16:45 (5)	18:11	32	17:41 (4)	20:09	21:04			21:51
7	08:42		08:03	16:26 (5)	07:02		17:09 (4)	06:47	05:40			04:58
	16:22		17:18	20 16:46 (5)	18:13	31	17:40 (4)	20:11	21:06			21:52
8	08:42		08:01	16:26 (5)	07:00		17:10 (4)	06:44	05:38			04:57
	16:24		17:20	19 16:45 (5)	18:15	29	17:39 (4)	20:13	21:08			21:53
9	08:41		07:59	16:28 (5)	06:57		17:11 (4)	06:42	05:36			04:57
	16:25		17:22	16 16:44 (5)	18:17	26	17:37 (4)	20:15	21:10			21:54
10	08:40		07:57	16:29 (5)	06:55		17:12 (4)	06:39	05:34			04:56
	16:26		17:24	14 16:43 (5)	18:19	24	17:36 (4)	20:17	21:11			21:55
11	08:40		07:55	16:31 (5)	06:52		17:15 (4)	06:37	05:33			04:56
	16:28		17:26	10 16:41 (5)	18:21	20	17:55 (3)	20:19	21:13			21:55
12	08:39		07:53		06:50		17:17 (4)	06:35	05:31			04:55
	16:30		17:28		18:23	17	17:56 (3)	20:20	21:15			21:56
13	08:38		07:51		06:48		17:51 (3)	06:32	05:29			04:55
	16:31		17:30		18:25	7	17:58 (3)	20:22	21:17			21:57
14	08:37		07:49		06:45		17:50 (3)	06:30	05:27			04:55
	16:33		17:32		18:27	10	18:00 (3)	20:24	21:18			21:57
15	08:36		07:47		06:43		17:50 (3)	06:28	05:26			04:54
	16:34		17:34		18:28	12	18:02 (3)	20:26	21:20			21:58
16	08:35		07:45		06:40		17:49 (3)	06:25	19:56 (2)	05:24		04:54
	16:36		17:36		18:30	15	18:04 (3)	20:28	3 19:59 (2)	21:22		21:59
17	08:34		07:43		06:38		17:50 (3)	06:23	19:54 (2)	05:22		04:54
	16:38		17:38		18:32	16	18:06 (3)	20:30	7 20:01 (2)	21:23		21:59
18	08:33		07:41		06:35		17:50 (3)	06:21	19:53 (2)	05:21		04:54
	16:40		17:40		18:34	17	18:07 (3)	20:31	10 20:03 (2)	21:25		22:00
19	08:32		07:39		06:33		17:51 (3)	06:18	19:52 (2)	05:19		04:54
	16:41		17:42		18:36	19	18:10 (3)	20:33	13 20:05 (2)	21:27		22:00
20	08:31		07:36		06:31		17:51 (3)	06:16	19:52 (2)	05:18		04:54
	16:43		17:44		18:38	17	18:08 (3)	20:35	15 20:07 (2)	21:28		22:00
21	08:30		07:34		17:17 (4)	06:28	17:53 (3)	06:14	19:50 (2)	05:16		04:54
	16:45		17:46	1	17:18 (4)	18:40	13 18:06 (3)	20:37	18 20:08 (2)	21:30		22:01
22	08:28		07:32		17:15 (4)	06:26	17:55 (3)	06:12	19:50 (2)	05:15		04:55
	16:47		17:48	4	17:19 (4)	18:41	7 18:02 (3)	20:39	20 20:10 (2)	21:31		22:01
23	08:27		07:30		17:13 (4)	06:23		06:09	19:49 (2)	05:13		04:55
	16:49		17:50	9	17:22 (4)	18:43		20:41	23 20:12 (2)	21:33		22:01
24	08:26		07:28		17:13 (4)	06:21		06:07	19:49 (2)	05:12		04:55
	16:50		17:52	11	17:24 (4)	18:45		20:42	25 20:14 (2)	21:34		22:01
25	08:24		07:25		17:11 (4)	06:18		06:05	19:49 (2)	05:11		04:55
	16:52		17:54	15	17:26 (4)	18:47		20:44	26 20:15 (2)	21:36		22:01
26	08:23		07:23		17:10 (4)	06:16		06:03	19:49 (2)	05:09		04:56
	16:54		17:56	18	17:28 (4)	18:49		20:46	28 20:17 (2)	21:37		22:01
27	08:22		07:21		17:10 (4)	06:13		06:00	19:49 (2)	05:08		04:56
	16:56		17:58	21	17:31 (4)	18:51		20:48	28 20:17 (2)	21:39		22:01
28	08:20		07:18		17:09 (4)	06:11		05:58	19:50 (2)	05:07		04:57
	16:58		18:00	23	17:32 (4)	18:53		20:50	27 20:17 (2)	21:40		22:01
29	08:18		16:25 (5)			07:08		05:56	19:50 (2)	05:06		04:57
	17:00	3	16:28 (5)			19:54		20:52	26 20:16 (2)	21:41		22:01
30	08:17		16:25 (5)			07:06		05:54	19:51 (2)	05:05		04:58
	17:02	5	16:30 (5)			19:56		20:53	24 20:15 (2)	21:43		22:00
31	08:15		16:24 (5)			07:04				05:04		
	17:04	8	16:32 (5)			19:58				21:44		
Potential sun hours	250		273		367		420		494		510	
Total, worst case	16		274		460		293		82			
Sun reduction	0.24		0.23		0.27		0.35		0.38			
Oper. time red.	1.00		1.00		1.00		1.00		1.00			
Wind dir. red.	0.66		0.66		0.68		0.65		0.65			
Total reduction	0.16		0.15		0.18		0.23		0.25			
Total, real	3		42		84		67		20			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LX - H336

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:57 (4) 16:54	15:58 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:54 (4) 16:52	15:57 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:51 (4) 16:50	15:56 (5) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:49 (4) 16:48	15:55 (5) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:48 (4) 16:46	15:55 (5) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:47 (4) 16:44	15:54 (5) 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	17:45 (4) 16:43	15:54 (5) 16:06
8	05:05 21:56	05:50 21:11	20:06 (2) 20:01	07:39 18:48	17:44 (4) 16:41	15:54 (5) 16:06
9	05:06 21:55	05:52 21:09	20:04 (2) 19:59	07:41 18:45	17:43 (4) 16:39	15:54 (5) 16:05
10	05:07 21:55	05:54 21:07	20:02 (2) 19:56	07:42 18:43	17:43 (4) 16:37	15:56 (5) 16:05
11	05:08 21:54	05:56 21:05	20:01 (2) 19:54	07:44 18:40	17:42 (4) 16:35	15:56 (5) 16:05
12	05:09 21:53	05:57 21:03	20:00 (2) 19:51	07:46 18:38	17:42 (4) 16:34	15:57 (5) 16:05
13	05:10 21:52	05:59 21:01	19:58 (2) 19:49	07:48 18:36	17:42 (4) 16:32	15:57 (5) 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 19:47	07:50 18:33	17:42 (4) 16:31	15:59 (5) 16:04
15	05:13 21:50	06:03 20:57	19:57 (2) 19:44	07:52 18:31	17:42 (4) 16:29	15:59 (5) 16:05
16	05:14 21:49	06:04 20:55	19:56 (2) 19:42	07:54 18:29	17:43 (4) 16:27	15:59 (5) 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 19:39	07:55 18:26	17:43 (4) 16:26	15:59 (5) 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 19:37	07:57 18:24	17:44 (4) 16:24	15:59 (5) 16:05
19	05:18 21:45	06:10 20:48	19:55 (2) 19:34	07:59 18:22	17:45 (4) 16:23	15:59 (5) 16:05
20	05:20 21:44	06:12 20:46	19:55 (2) 19:32	08:01 18:20	17:46 (4) 16:22	15:59 (5) 16:06
21	05:21 21:42	06:13 20:44	19:55 (2) 19:29	08:03 18:43 (3)	17:50 (4) 16:20	15:59 (5) 16:06
22	05:23 21:41	06:15 20:42	19:55 (2) 19:27	08:05 18:38 (3)	16:20 16:19	15:59 (5) 16:06
23	05:24 21:39	06:17 20:39	19:55 (2) 19:24	08:07 18:36 (3)	16:18 16:17	15:59 (5) 16:07
24	05:26 21:38	06:19 20:37	19:56 (2) 19:22	08:09 18:35 (3)	16:16 16:15	15:59 (5) 16:08
25	05:27 21:36	06:20 20:35	19:56 (2) 19:19	08:11 18:33 (3)	16:14 16:13	15:59 (5) 16:08
26	05:29 21:35	06:22 20:32	19:57 (2) 19:17	08:13 18:32 (3)	16:11 16:10	15:59 (5) 16:09
27	05:30 21:33	06:24 20:30	19:59 (2) 19:14	08:14 18:31 (3)	16:11 16:10	15:59 (5) 16:10
28	05:32 21:32	06:26 20:28	19:59 (2) 19:12	08:16 18:31 (3)	16:11 16:10	15:59 (5) 16:11
29	05:34 21:30	06:27 20:25	19:59 (2) 19:09	08:18 18:30 (3)	16:11 16:10	15:59 (5) 16:11
30	05:35 21:28	06:29 20:23	19:59 (2) 19:07	08:20 18:30 (3)	16:11 16:10	15:59 (5) 16:12
31	05:37 21:26	06:31 20:21	19:59 (2) 19:07	08:22 18:30 (3)	16:11 16:10	15:59 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		379	129	456	174	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		84	28	90	30	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LY - H337

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	17:14 (4)	07:01	05:52
	16:15	17:06	18:02	20	17:34 (4)	20:00
2	08:44	08:12	07:14	17:13 (4)	06:59	21
	16:16	17:08	18:04	23	17:36 (4)	20:02
3	08:43	08:10	07:11	17:13 (4)	06:56	18
	16:17	17:10	18:06	25	17:38 (4)	20:04
4	08:43	08:08	07:09	17:13 (4)	06:54	15
	16:18	17:12	18:07	28	17:41 (4)	20:06
5	08:43	08:07	07:07	17:13 (4)	06:51	9
	16:19	17:14	18:09	29	17:42 (4)	20:07
6	08:42	08:05	07:04	17:13 (4)	06:49	
	16:21	17:16	18:11	32	17:45 (4)	20:09
7	08:42	08:03	07:02	17:13 (4)	06:47	
	16:22	17:18	18:13	31	17:44 (4)	20:11
8	08:42	08:01	07:00	17:14 (4)	06:44	
	16:24	17:20	18:15	29	17:43 (4)	20:13
9	08:41	07:59	06:57	17:14 (4)	06:42	
	16:25	17:22	18:17	28	17:42 (4)	20:15
10	08:40	07:57	06:55	17:15 (4)	06:39	
	16:26	17:24	18:19	26	17:41 (4)	20:17
11	08:40	07:55	06:52	17:17 (4)	06:37	
	16:28	17:26	18:21	23	17:40 (4)	20:19
12	08:39	07:53	06:50	17:18 (4)	06:35	
	16:30	17:28	18:23	20	17:56 (3)	20:20
13	08:38	07:51	06:48	17:21 (4)	06:32	
	16:31	17:30	18:25	18	17:58 (3)	20:22
14	08:37	07:49	06:45	17:26 (4)	06:30	
	16:33	17:32	18:27	10	18:00 (3)	20:24
15	08:36	07:47	06:43	17:52 (3)	06:28	
	16:34	17:34	18:28	10	18:02 (3)	20:26
16	08:35	07:45	06:40	17:51 (3)	06:25	
	16:36	17:36	18:30	13	18:04 (3)	20:28
17	08:34	07:43	06:38	17:52 (3)	06:23	
	16:38	17:38	18:32	14	18:06 (3)	20:30
18	08:33	07:41	06:35	17:51 (3)	06:21	
	16:40	17:40	18:34	16	18:07 (3)	20:31
19	08:32	07:39	06:33	17:52 (3)	06:18	
	16:41	17:42	18:36	18	18:10 (3)	20:33
20	08:31	07:36	06:31	17:52 (3)	06:16	
	16:43	17:44	18:38	18	18:10 (3)	20:35
21	08:30	07:34	06:28	17:54 (3)	06:14	
	16:45	17:46	18:40	15	18:09 (3)	20:37
22	08:28	07:32	06:26	17:55 (3)	06:12	
	16:47	17:48	18:41	11	18:06 (3)	20:39
23	08:27	07:30	17:20 (4)	06:23	06:09	
	16:49	17:50	2	17:22 (4)	18:43	
24	08:26	07:28	17:19 (4)	06:21	06:07	
	16:50	17:52	5	17:24 (4)	18:45	
25	08:24	07:25	17:17 (4)	06:18	06:05	
	16:52	17:54	9	17:26 (4)	18:47	
26	08:23	07:23	17:16 (4)	06:16	06:03	
	16:54	17:56	12	17:28 (4)	18:49	
27	08:22	07:21	17:16 (4)	06:13	06:00	
	16:56	17:58	15	17:31 (4)	18:51	
28	08:20	07:18	17:14 (4)	06:11	05:58	
	16:58	18:00	18	17:32 (4)	18:53	
29	08:18		07:08	05:56	19:51 (2)	05:06
	17:00		19:54	20:52	20:15 (2)	21:41
30	08:17		07:06	05:54	19:52 (2)	05:05
	17:02		19:56	20:53	20:14 (2)	21:43
31	08:15		07:04		05:04	
	17:04		19:58		21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case		61		457	283	63
Sun reduction		0.23		0.27	0.35	0.38
Oper. time red.		1.00		1.00	1.00	1.00
Wind dir. red.		0.68		0.68	0.65	0.65
Total reduction		0.16		0.18	0.23	0.25
Total, real		10		84	65	16

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LY - H337

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:58 (4) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:55 (4) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:54 (4) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:52 (4) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:51 (4) 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:50 (4) 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	17:48 (4) 16:43	08:28 16:06
8	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	17:48 (4) 16:41	08:29 16:06
9	05:06 21:55	05:52 21:09	20:06 (2) 19:59	07:41 18:45	17:47 (4) 16:39	08:30 16:05
10	05:07 21:55	05:54 21:07	20:03 (2) 19:56	07:42 18:43	17:47 (4) 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	20:02 (2) 19:54	07:44 18:40	17:47 (4) 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	20:01 (2) 19:51	07:46 18:38	17:47 (4) 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	19:59 (2) 19:49	07:48 18:36	17:47 (4) 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 19:47	07:50 18:33	17:48 (4) 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	19:58 (2) 19:44	07:52 18:31	17:48 (4) 16:29	08:37 16:04
16	05:14 21:49	06:04 20:55	19:56 (2) 19:42	07:54 18:29	17:49 (4) 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 19:39	07:55 18:26	17:50 (4) 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 19:37	07:57 18:24	17:51 (4) 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	19:55 (2) 19:34	07:59 18:22	17:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	19:55 (2) 19:32	08:01 18:20	16:22 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	19:56 (2) 19:29	08:03 18:20	16:22 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	19:55 (2) 19:27	08:05 18:15	16:20 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	19:56 (2) 19:24	08:07 18:13	16:18 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	19:56 (2) 19:22	08:09 18:11	16:17 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	19:56 (2) 19:19	08:11 18:11	16:16 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	19:57 (2) 19:17	08:13 18:09	16:15 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	19:59 (2) 19:14	08:14 18:04	16:14 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	19:59 (2) 19:12	08:16 18:03	16:13 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	19:59 (2) 19:09	08:18 18:01	16:12 16:11	08:44 16:11
30	05:35 21:28	06:29 20:23	19:59 (2) 19:07	08:20 18:00	16:11 16:11	08:44 16:12
31	05:37 21:26	06:31 20:21	19:59 (2) 19:07	08:22 18:00	16:11 16:11	08:44 16:12
Potential sun hours	512	460	382	328	259	233
Total, worst case		349	137	388		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.67	0.68		
Total reduction		0.22	0.22	0.20		
Total, real		77	30	77		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LZ - H338
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:57 (2) 20:18 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	17:35 (4) 17:36 (4)	06:59 20:02	19:58 (2) 20:17 (2)
3	08:43 16:17	08:10 17:10	07:11 18:05	17:34 (4) 17:38 (4)	06:56 20:04	19:59 (2) 20:16 (2)
4	08:43 16:18	08:08 17:12	07:09 18:07	17:33 (4) 17:41 (4)	06:54 20:06	20:00 (2) 20:14 (2)
5	08:43 16:19	08:07 17:14	07:07 18:09	17:31 (4) 17:42 (4)	06:51 20:07	20:02 (2) 20:12 (2)
6	08:42 16:21	08:05 17:16	07:04 18:11	17:30 (4) 17:45 (4)	06:49 20:09	05:42 21:04
7	08:42 16:22	08:03 17:18	07:02 18:13	17:29 (4) 17:46 (4)	06:47 20:11	05:40 21:06
8	08:41 16:24	08:01 17:20	07:00 18:15	17:29 (4) 17:48 (4)	06:44 20:13	05:38 21:08
9	08:41 16:25	07:59 17:22	06:57 18:17	17:28 (4) 17:50 (4)	06:42 20:15	05:36 21:10
10	08:40 16:26	07:57 17:24	06:55 18:19	17:28 (4) 17:52 (4)	06:39 20:17	05:34 21:11
11	08:40 16:28	07:55 17:26	06:52 18:21	17:28 (4) 17:55 (4)	06:37 20:18	05:33 21:13
12	08:39 16:30	07:53 17:28	06:50 18:23	17:27 (4) 17:56 (4)	06:35 20:20	05:31 21:15
13	08:38 16:31	07:51 17:30	06:48 18:25	17:28 (4) 17:57 (4)	06:32 20:22	05:29 21:17
14	08:37 16:33	07:49 17:32	06:45 18:27	17:28 (4) 17:56 (4)	06:30 20:24	05:27 21:18
15	08:36 16:34	07:47 17:34	06:43 18:28	17:29 (4) 17:55 (4)	06:28 20:26	05:26 21:20
16	08:35 16:36	07:45 17:36	06:40 18:30	17:29 (4) 17:53 (4)	06:25 20:28	05:24 21:22
17	08:34 16:38	07:43 17:38	06:38 18:32	17:31 (4) 17:52 (4)	06:23 20:30	05:22 21:23
18	08:33 16:40	07:41 17:40	06:35 18:34	17:33 (4) 17:49 (4)	06:21 20:31	20:02 (2) 20:03 (2)
19	08:32 16:41	07:39 17:42	06:33 18:36	17:36 (4) 20:33	06:18 20:33	20:01 (2) 20:05 (2)
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 20:35	20:07 (2) 21:28
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 20:37	20:07 (2) 21:30
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 20:39	20:08 (2) 21:31
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 20:41	20:10 (2) 21:33
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 20:42	20:12 (2) 21:34
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 20:44	20:14 (2) 21:36
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 20:46	20:15 (2) 21:37
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 20:48	20:17 (2) 21:39
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 20:50	20:19 (2) 21:40
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 20:52	20:21 (2) 21:41
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 20:53	20:20 (2) 21:43
31	08:15 17:04		07:04 19:58		05:04 21:44	20:19 (2) 21:43
Potential sun hours	250	273	367	420	494	510
Total, worst case			331	208	81	
Sun reduction			0.27	0.35	0.38	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.68	0.65	0.65	
Total reduction			0.18	0.23	0.25	
Total, real			61	48	20	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: LZ - H338

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:07 (4) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:06 (4) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:06 (4) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:05 (4) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:05 (4) 16:46	08:25 16:07
6	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	18:06 (4) 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	20:15 (2) 20:19 (2)	06:43 20:04	07:37 18:50	08:28 16:43
8	05:05 21:56	05:50 21:11	20:11 (2) 20:22 (2)	06:45 20:01	07:39 18:48	08:29 16:41
9	05:06 21:55	05:52 21:09	20:09 (2) 20:24 (2)	06:47 19:59	07:41 18:45	08:30 16:05
10	05:07 21:55	05:54 21:07	20:07 (2) 20:25 (2)	06:49 19:56	07:42 18:43	08:31 16:05
11	05:08 21:54	05:56 21:05	20:06 (2) 20:26 (2)	06:50 19:54	07:44 18:40	08:33 16:05
12	05:09 21:53	05:57 21:03	20:05 (2) 20:27 (2)	06:52 19:51	07:46 18:38	08:34 16:05
13	05:10 21:52	05:59 21:01	20:04 (2) 20:27 (2)	06:54 19:49	07:48 18:36	08:35 16:05
14	05:12 21:51	06:01 20:59	20:03 (2) 20:28 (2)	06:56 19:47	07:50 18:33	08:36 16:04
15	05:13 21:50	06:03 20:57	20:03 (2) 20:28 (2)	06:57 19:44	07:52 18:31	08:37 16:04
16	05:14 21:49	06:04 20:55	20:02 (2) 20:25 (2)	06:59 19:42	07:54 18:29	08:38 16:05
17	05:16 21:47	06:06 20:53	20:02 (2) 20:23 (2)	07:01 19:39	07:55 18:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:02 (2) 20:22 (2)	07:03 19:37	07:57 18:24	08:39 16:05
19	05:18 21:45	06:10 20:48	20:01 (2) 20:19 (2)	07:05 19:34	07:59 18:22	08:40 16:05
20	05:20 21:44	06:12 20:46	20:02 (2) 20:17 (2)	07:06 19:32	08:01 18:20	08:41 16:06
21	05:21 21:42	06:13 20:44	20:02 (2) 20:15 (2)	07:08 19:29	08:03 18:17	08:41 16:06
22	05:23 21:41	06:15 20:42	20:02 (2) 20:12 (2)	07:10 19:27	08:05 18:15	08:42 16:06
23	05:24 21:39	06:17 20:39	20:03 (2) 20:10 (2)	07:12 19:24	08:07 18:13	08:42 16:07
24	05:26 21:38	06:19 20:37	20:04 (2) 20:09 (2)	07:13 19:22	18:21 (4) 18:28 (4)	08:43 16:17
25	05:27 21:36	06:20 20:35	20:05 (2) 20:06 (2)	07:15 19:19	18:16 (4) 18:31 (4)	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	18:14 (4) 18:33 (4)	07:09 17:06	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	18:12 (4) 18:34 (4)	07:14 17:04	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	18:10 (4) 18:35 (4)	07:16 17:02	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	18:09 (4) 18:36 (4)	07:18 17:00	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	18:07 (4) 18:36 (4)	07:20 16:58	08:44 16:12
31	05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		296	144	193		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.68	0.68		
Total reduction		0.22	0.22	0.20		
Total, real		65	31	38		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MA - H339

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	[January	[February	[March	[April	[May	[June	[July	[August	[September	[October	[November	[December	
1	08:44	08:14	07:16	07:01	05:52	19:52 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	20:19 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	19:53 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	20:19 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48	19:53 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	20:18 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	19:53 (5)	05:00	05:01	05:44	20:10 (5)	06:38	07:31	08:24
	16:18	17:12	18:07	20:06	21:01	20:17 (5)	21:49	21:59	21:19	20:20 (5)	20:11	18:57	16:48
5	08:43	08:07	07:07	06:51	05:44	19:54 (5)	04:59	05:02	05:45	20:07 (5)	06:40	07:33	08:25
	16:20	17:14	18:09	20:07	21:03	20:16 (5)	21:50	21:58	21:17	20:22 (5)	20:09	18:55	16:46
6	08:42	08:05	07:04	06:49	05:42	19:55 (5)	04:59	05:03	05:47	20:06 (5)	06:42	07:35	08:26
	16:21	17:16	18:11	20:09	21:04	20:14 (5)	21:51	21:57	21:15	20:24 (5)	20:06	18:52	16:44
7	08:42	08:03	07:02	06:47	05:40	19:57 (5)	04:58	05:04	05:49	20:05 (5)	06:43	07:37	08:28
	16:22	17:18	18:13	20:11	21:06	20:14 (5)	21:52	21:57	21:13	20:25 (5)	20:04	18:50	16:43
8	08:41	08:01	07:00	06:44	05:38	19:59 (5)	04:57	05:05	05:51	20:03 (5)	06:45	07:39	08:29
	16:24	17:20	18:15	20:13	21:08	20:12 (5)	21:53	21:56	21:11	20:26 (5)	20:01	18:48	16:41
9	08:41	07:59	06:57	06:42	05:36	20:01 (5)	04:57	05:06	05:52	20:03 (5)	06:47	07:41	08:30
	16:25	17:22	18:17	20:15	21:10	20:09 (5)	21:54	21:55	21:09	20:27 (5)	19:59	18:45	16:39
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	20:01 (5)	06:49	07:42	08:31
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	20:27 (5)	19:56	18:43	16:37
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:01 (5)	06:50	07:44	08:33
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	20:27 (5)	19:54	18:40	16:36
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:58	20:01 (5)	06:52	07:46	08:34
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	20:28 (5)	19:51	18:38	16:34
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	20:00 (5)	06:54	07:48	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	20:27 (5)	19:49	18:36	16:32
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	20:00 (5)	06:56	07:50	08:36
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	20:28 (5)	19:47	18:33	16:31
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	20:00 (5)	06:58	07:52	08:37
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	20:28 (5)	19:44	18:31	16:29
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	19:59 (5)	06:59	07:54	08:38
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	20:25 (5)	19:42	18:29	16:27
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06	19:59 (5)	07:01	07:55	08:38
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	20:23 (5)	19:39	18:26	16:26
18	08:33	07:41	06:35	06:21	05:21		04:54	05:17	06:08	20:00 (5)	07:03	07:57	08:39
	16:40	17:40	18:34	20:31	21:25		21:59	21:46	20:50	20:22 (5)	19:37	18:24	16:25
19	08:32	07:39	06:33	06:18	20:01 (5)	05:19	04:54	05:18	06:10	19:59 (5)	07:05	07:59	08:40
	16:41	17:42	18:36	20:33	4 20:05 (5)	21:27	22:00	21:45	20:48	20:19 (5)	19:34	18:22	16:23
20	08:31	07:36	06:31	06:16	19:59 (5)	05:18	04:54	05:20	06:12	20:00 (5)	07:06	08:01	08:41
	16:43	17:44	18:38	20:35	8 20:07 (5)	21:28	22:00	21:43	20:46	20:17 (5)	19:32	18:20	16:22
21	08:30	07:34	06:28	06:14	19:56 (5)	05:16	04:54	05:21	06:13	20:01 (5)	07:08	08:03	08:41
	16:45	17:46	18:40	20:37	12 20:08 (5)	21:30	22:00	21:42	20:44	20:15 (5)	19:29	18:17	16:20
22	08:28	07:32	06:26	06:12	19:55 (5)	05:15	04:55	05:23	06:15	20:01 (5)	07:10	08:05	08:42
	16:47	17:48	18:41	20:39	15 20:10 (5)	21:31	22:01	21:41	20:42	20:12 (5)	19:27	18:15	16:19
23	08:27	07:30	06:23	06:09	19:54 (5)	05:13	04:55	05:24	06:17	20:03 (5)	07:12	08:07	08:42
	16:49	17:50	18:43	20:41	18 20:12 (5)	21:33	22:01	21:39	20:39	7 20:10 (5)	19:24	18:13	16:18
24	08:26	07:28	06:21	06:07	19:54 (5)	05:12	04:55	05:26	06:19	20:05 (5)	07:13	08:09	08:43
	16:51	17:52	18:45	20:42	19 20:13 (5)	21:34	22:01	21:38	20:37	4 20:09 (5)	19:22	18:11	16:17
25	08:24	07:25	06:18	06:05	19:53 (5)	05:11	04:56	05:27	06:20		07:15	07:11	08:09
	16:52	17:54	18:47	20:44	22 20:15 (5)	21:36	22:01	21:36	20:35		19:19	17:09	16:16
26	08:23	07:23	06:16	06:03	19:53 (5)	05:09	04:56	05:29	06:22		07:17	07:13	08:11
	16:54	17:56	18:49	20:46	24 20:17 (5)	21:37	22:01	21:35	20:32		19:17	17:06	16:15
27	08:21	07:21	06:13	06:01	19:52 (5)	05:08	04:56	05:30	06:24		07:19	07:14	08:13
	16:56	17:58	18:51	20:48	27 20:19 (5)	21:39	22:01	21:33	20:30		19:14	17:04	16:13
28	08:20	07:18	06:11	05:58	19:52 (5)	05:07	04:57	05:32	06:26		07:21	07:16	08:14
	16:58	18:00	18:53	20:50	28 20:20 (5)	21:40	22:01	21:32	20:28		19:12	17:02	16:13
29	08:18		07:08	05:56	19:52 (5)	05:06	04:58	05:34	06:28		07:22	07:18	08:16
	17:00		19:54	20:52	28 20:20 (5)	21:41	22:00	21:30	20:25		19:09	17:00	16:12
30	08:17		07:06	05:54	19:52 (5)	05:05	04:58	05:35	06:29		07:24	07:20	08:17
	17:02		19:56	20:53	28 20:20 (5)	21:43	22:00	21:28	20:23		19:07	16:58	16:11
31	08:15		07:04		05:04			05:37	06:31			07:22	08:14
	17:04		19:58		21:44			21:26	20:21			16:56	16:13
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233
Total, worst case				233	181				417				
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.65	0.65				0.65				
Total reduction				0.23	0.25				0.22				
Total, real				53	45				92				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MB - H340

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	19:52 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:55	25	20:17 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	19:52 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	24	20:16 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:43	08:10	07:11	06:56	05:48	19:53 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	23	20:16 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08		
4	08:43	08:08	07:09	06:54	05:46	19:53 (5)	05:00	05:01	05:44	06:38	07:31	07:30	08:23			
	16:18	17:12	18:07	20:06	21:01	21	20:14 (5)	21:49	21:59	21:19	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	06:51	05:44	19:54 (5)	04:59	05:02	05:45	20:09 (5)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:03	19	20:13 (5)	21:50	21:58	21:17	8	20:17 (5)	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	19:56 (5)	04:59	05:03	05:47	20:07 (5)	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	15	20:11 (5)	21:51	21:57	21:15	13	20:20 (5)	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	19:58 (5)	04:58	05:04	05:49	20:06 (5)	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	12	20:10 (5)	21:52	21:57	21:13	16	20:22 (5)	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	20:02 (5)	04:57	05:05	05:51	20:03 (5)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	4	20:06 (5)	21:53	21:56	21:11	20	20:23 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36		04:57	05:06	05:52	20:03 (5)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10		21:54	21:55	21:09	21	20:24 (5)	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34		04:56	05:07	05:54	20:01 (5)	06:49	07:42	07:42	08:31		
	16:27	17:24	18:19	20:17	21:11		21:54	21:54	21:07	23	20:24 (5)	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:52	06:37	05:33		04:56	05:08	05:56	20:01 (5)	06:50	07:44	07:43	08:33		
	16:28	17:26	18:21	20:18	21:13		21:55	21:54	21:05	24	20:25 (5)	19:54	18:40	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		04:55	05:09	05:58	20:00 (5)	06:52	07:46	07:45	08:34		
	16:30	17:28	18:23	20:20	21:15		21:56	21:53	21:03	26	20:26 (5)	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29		04:55	05:11	05:59	19:59 (5)	06:54	07:48	07:47	08:35		
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	26	20:25 (5)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	19:59 (5)	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:18		21:57	21:51	20:59	27	20:26 (5)	19:47	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26		04:55	05:13	06:03	19:59 (5)	06:58	07:52	07:51	08:37		
	16:34	17:34	18:28	20:26	21:20		21:58	21:50	20:57	27	20:26 (5)	19:44	18:31	16:29	16:05	
16	08:35	07:45	06:40	06:25	05:24		04:54	05:14	06:05	19:58 (5)	06:59	07:54	07:53	08:38		
	16:36	17:36	18:30	20:28	21:22		21:59	21:48	20:55	27	20:25 (5)	19:42	18:29	16:27	16:05	
17	08:34	07:43	06:38	06:23	05:22		04:54	05:16	06:06	19:58 (5)	07:01	07:55	07:55	08:38		
	16:38	17:38	18:32	20:30	21:23		21:59	21:47	20:53	25	20:23 (5)	19:39	18:26	16:26	16:05	
18	08:33	07:41	06:35	06:21	20:01 (5)	05:21	04:54	05:17	06:08	19:59 (5)	07:03	07:57	07:57	08:39		
	16:40	17:40	18:34	20:31	2	20:03 (5)	21:59	21:46	20:50	23	20:22 (5)	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:18	19:58 (5)	05:19	04:54	05:18	06:10	19:58 (5)	07:05	07:59	07:59	08:40		
	16:41	17:42	18:36	20:33	7	20:05 (5)	21:27	22:00	21:45	20:48	21	20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:57 (5)	05:18	04:54	05:20	06:12	19:59 (5)	07:06	08:01	08:00	08:41		
	16:43	17:44	18:38	20:35	10	20:07 (5)	21:28	22:00	21:43	20:46	18	20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:55 (5)	05:16	04:54	05:21	06:13	19:59 (5)	07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	13	20:08 (5)	21:30	22:00	21:42	20:44	16	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:54 (5)	05:15	04:55	05:23	06:15	19:59 (5)	07:10	08:05	08:04	08:42		
	16:47	17:48	18:41	20:39	16	20:10 (5)	21:31	22:01	21:41	20:42	13	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:53 (5)	05:13	04:55	05:24	06:17	20:01 (5)	07:12	08:07	08:06	08:42		
	16:49	17:50	18:43	20:41	19	20:12 (5)	21:33	22:01	21:39	20:39	9	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:52 (5)	05:12	04:55	05:26	06:19	20:02 (5)	07:13	08:09	08:07	08:43		
	16:51	17:52	18:45	20:42	21	20:13 (5)	21:34	22:01	21:38	20:37	7	20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:52 (5)	05:11	04:56	05:27	06:20	20:04 (5)	07:15	07:11	08:09	08:43		
	16:52	17:54	18:47	20:44	23	20:15 (5)	21:36	22:01	21:36	20:35	2	20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:52 (5)	05:09	04:56	05:29	06:22	20:06 (5)	07:17	07:13	08:11	08:43		
	16:54	17:56	18:49	20:46	25	20:17 (5)	21:37	22:01	21:35	20:32		19:17	17:06	16:15	16:09	
27	08:21	07:21	06:13	06:01	19:51 (5)	05:08	04:56	05:30	06:24	20:01 (5)	07:19	07:14	08:13	08:44		
	16:56	17:58	18:51	20:48	28	20:19 (5)	21:39	22:01	21:33	20:30		19:14	17:04	16:13	16:10	
28	08:20	07:18	06:11	05:58	19:51 (5)	05:07	04:57	05:32	06:26	20:01 (5)	07:21	07:16	08:14	08:44		
	16:58	18:00	18:53	20:50	28	20:19 (5)	21:40	22:01	21:32	20:28		19:12	17:02	16:13	16:11	
29	08:18		07:08	05:56	19:51 (5)	05:06	04:58	05:34	06:28	20:01 (5)	07:22	07:18	08:16	08:44		
	17:00		19:54	20:52	27	20:18 (5)	21:41	22:00	21:30	20:25		19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	19:52 (5)	05:05	04:58	05:35	06:29	20:01 (5)	07:24	07:20	08:17	08:44		
	17:02		19:56	20:53	26	20:18 (5)	21:43	22:00	21:28	20:23		19:07	16:58	16:11	16:12	
31	08:15		07:04			05:04		05:37	06:31			07:22			08:44	
	17:04		19:58			21:44		21:26	20:21			16:56			16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328		259	233	
Total, worst case				245	143				392							
Sun reduction				0.35	0.38				0.34							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.65	0.65				0.65							
Total reduction				0.23	0.25				0.22							
Total, real				56	35				87							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MC - H341

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	[January	[February	[March	[April	[May	[June	[July	[August	[September	[October	[November	[December			
1	08:44	08:14	07:16	07:01	05:52	05:03	21:06 (4)	04:59	21:10 (4)	05:39	06:33	07:26	07:24	08:19	
2	16:15	17:06	18:02	20:00	20:55	21:45	4	21:10 (4)	22:00	21:24 (4)	21:25	20:18	19:05	16:54	16:10
3	08:44	08:12	07:14	06:59	05:50	05:02	21:06 (4)	05:00	21:11 (4)	05:40	06:35	07:28	07:26	08:21	
4	16:16	17:08	18:04	20:02	20:57	21:46	6	21:12 (4)	21:59	21:24 (4)	21:23	20:16	19:02	16:52	16:09
5	08:43	08:10	07:11	06:56	05:48	05:01	21:06 (4)	05:00	21:10 (4)	05:42	06:36	07:30	07:28	08:22	
6	16:17	17:10	18:05	20:04	20:59	21:48	7	21:13 (4)	21:59	21:23 (4)	21:21	20:13	19:00	16:50	16:08
7	08:43	08:08	07:09	06:54	05:46	05:00	21:05 (4)	05:01	21:11 (4)	05:44	06:38	07:31	07:30	08:23	
8	16:18	17:12	18:07	20:06	21:01	21:49	9	21:14 (4)	21:59	21:23 (4)	21:19	20:11	18:57	16:48	16:08
9	08:43	08:07	07:07	06:51	05:44	04:59	21:06 (4)	05:02	21:11 (4)	05:45	06:40	07:33	07:32	08:25	
10	16:20	17:14	18:09	20:07	21:02	21:50	9	21:15 (4)	21:58	21:23 (4)	21:17	20:09	18:55	16:46	16:07
11	08:42	08:05	07:04	06:49	05:42	04:59	21:06 (4)	05:03	21:12 (4)	05:47	06:42	07:35	07:34	08:26	
12	16:21	17:16	18:11	20:09	21:04	21:51	10	21:16 (4)	21:57	21:22 (4)	21:15	20:06	18:52	16:44	16:07
13	08:42	08:03	07:02	06:47	05:40	04:58	21:05 (4)	05:04	21:12 (4)	05:49	06:43	07:37	07:36	08:28	
14	16:22	17:18	18:13	20:11	21:06	21:52	11	21:16 (4)	21:57	21:22 (4)	21:13	20:04	18:50	16:43	16:06
15	08:41	08:01	07:00	06:44	05:38	04:57	21:06 (4)	05:05	21:13 (4)	05:51	06:45	07:39	07:38	08:29	
16	16:24	17:20	18:15	20:13	21:08	21:53	11	21:17 (4)	21:56	21:21 (4)	21:11	20:01	18:48	16:41	16:06
17	08:41	07:59	06:57	06:42	05:36	04:57	21:05 (4)	05:06	21:13 (4)	05:52	06:47	07:41	07:40	08:30	
18	16:25	17:22	18:17	20:15	21:10	21:54	13	21:18 (4)	21:55	21:21 (4)	21:09	19:59	18:45	16:39	16:05
19	08:40	07:57	06:55	06:39	05:34	04:56	21:06 (4)	05:07	21:14 (4)	05:54	06:49	07:42	07:42	08:31	
20	16:27	17:24	18:19	20:17	21:11	21:54	13	21:19 (4)	21:54	21:20 (4)	21:07	19:56	18:43	16:37	16:05
21	08:40	07:55	06:52	06:37	05:33	04:56	21:06 (4)	05:08	21:14 (4)	05:56	06:50	07:44	07:43	08:32	
22	16:28	17:26	18:21	20:18	21:13	21:55	14	21:20 (4)	21:54	21:19 (4)	21:05	19:54	18:40	16:35	16:05
23	08:39	07:53	06:50	06:35	05:31	04:55	21:05 (4)	05:09	21:15 (4)	05:57	06:52	07:46	07:45	08:34	
24	16:30	17:28	18:23	20:20	21:15	21:56	15	21:20 (4)	21:53	21:18 (4)	21:03	19:51	18:38	16:34	16:05
25	08:38	07:51	06:48	06:32	05:29	04:55	21:06 (4)	05:11	21:15 (4)	05:59	06:54	07:48	07:47	08:35	
26	16:31	17:30	18:25	20:22	21:17	21:57	15	21:21 (4)	21:52	21:17 (4)	21:01	19:49	18:36	16:32	16:05
27	08:37	07:49	06:45	06:30	05:27	04:55	21:06 (4)	05:12	21:06	06:01	06:56	07:50	07:49	08:36	
28	16:33	17:32	18:27	20:24	21:18	21:57	16	21:22 (4)	21:51	21:22	20:59	19:46	18:33	16:31	16:05
29	08:36	07:47	06:43	06:28	05:26	04:55	21:07 (4)	05:13	21:07	06:03	06:57	07:52	07:51	08:37	
30	16:34	17:34	18:28	20:26	21:20	21:58	15	21:22 (4)	21:50	21:23	20:57	19:44	18:31	16:29	16:05
31	08:35	07:45	06:40	06:25	05:24	04:54	21:07 (4)	05:14	21:07	06:04	06:59	07:54	07:53	08:37	
32	16:36	17:36	18:30	20:28	21:22	21:59	16	21:23 (4)	21:48	21:23	20:55	19:42	18:29	16:27	16:05
33	08:34	07:43	06:38	06:23	05:22	04:54	21:07 (4)	05:16	21:07	06:06	07:01	07:55	07:55	08:38	
34	16:38	17:38	18:32	20:30	21:23	21:59	16	21:23 (4)	21:47	21:23	20:53	19:39	18:26	16:26	16:05
35	08:33	07:41	06:35	06:21	05:21	04:54	21:07 (4)	05:17	21:07	06:08	07:03	07:57	07:57	08:39	
36	16:40	17:40	18:34	20:31	21:25	21:59	17	21:24 (4)	21:46	21:24	20:50	19:37	18:24	16:25	16:05
37	08:32	07:39	06:33	06:18	05:19	04:54	21:07 (4)	05:18	21:07	06:10	07:05	07:59	07:59	08:40	
38	16:41	17:42	18:36	20:33	21:26	22:00	17	21:24 (4)	21:45	21:24	20:48	19:34	18:22	16:23	16:05
39	08:31	07:36	06:31	06:16	05:18	04:54	21:07 (4)	05:20	21:07	06:12	07:06	08:01	08:00	08:40	
40	16:43	17:44	18:38	20:35	21:28	22:00	17	21:24 (4)	21:43	21:24	20:46	19:32	18:20	16:22	16:06
41	08:30	07:34	06:28	06:14	05:16	04:54	21:07 (4)	05:21	21:07	06:13	07:08	08:03	08:02	08:41	
42	16:45	17:46	18:40	20:37	21:30	22:00	17	21:24 (4)	21:42	21:24	20:44	19:29	18:17	16:20	16:06
43	08:28	07:32	06:26	06:12	05:15	04:55	21:08 (4)	05:23	21:08	06:15	07:10	08:05	08:04	08:42	
44	16:47	17:48	18:41	20:39	21:31	22:01	17	21:25 (4)	21:41	21:24	20:41	19:27	18:15	16:19	16:06
45	08:27	07:30	06:23	06:09	05:13	04:55	21:08 (4)	05:24	21:08	06:17	07:12	08:07	08:06	08:42	
46	16:49	17:50	18:43	20:41	21:33	22:01	17	21:25 (4)	21:39	21:25	20:39	19:24	18:13	16:18	16:07
47	08:26	07:28	06:21	06:07	05:12	04:55	21:08 (4)	05:26	21:08	06:19	07:13	08:09	08:07	08:43	
48	16:50	17:52	18:45	20:42	21:34	22:01	17	21:25 (4)	21:38	21:25	20:37	19:22	18:11	16:17	16:08
49	08:24	07:25	06:18	06:05	05:11	04:56	21:09 (4)	05:27	21:09	06:20	07:15	07:11	08:09	08:43	
50	16:52	17:54	18:47	20:44	21:36	22:01	16	21:25 (4)	21:36	21:25	20:35	19:19	17:09	16:16	16:08
51	08:23	07:23	06:16	06:03	05:09	04:56	21:09 (4)	05:29	21:09	06:22	07:17	07:13	08:11	08:43	
52	16:54	17:56	18:49	20:46	21:37	22:01	16	21:25 (4)	21:35	21:25	20:32	19:17	17:06	16:15	16:09
53	08:21	07:21	06:13	06:01	05:08	04:56	21:09 (4)	05:30	21:09	06:24	07:19	07:14	08:13	08:43	
54	16:56	17:58	18:51	20:48	21:39	22:01	15	21:24 (4)	21:33	21:24	20:30	19:14	17:04	16:13	16:10
55	08:20	07:18	06:11	05:58	05:07	04:57	21:09 (4)	05:32	21:09	06:26	07:21	07:16	08:14	08:44	
56	16:58	18:00	18:53	20:50	21:40	22:01	16	21:25 (4)	21:32	21:25	20:28	19:12	17:02	16:12	16:11
57	08:18		07:08	05:56	05:06	04:57	21:10 (4)	05:34	21:10	06:27	07:22	07:18	08:16	08:44	
58	17:00		19:54	20:52	21:41	22:00	15	21:25 (4)	21:30	21:25	20:25	19:09	17:00	16:12	16:11
59	08:17		07:06	05:54	05:05	04:58	21:10 (4)	05:35	21:10	06:29	07:24	07:20	08:17	08:44	
60	17:02		19:56	20:53	21:43	22:00	14	21:24 (4)	21:28	21:23	19:07	16:58	16:11	16:12	
61	08:15		07:04	05:04	05:04	21:06 (4)		05:37		06:31		07:22		08:44	
62	17:04		19:58	21:44	3	21:09 (4)		21:26		20:21		16:56		16:13	
Potential sun hours	250	273	367	420	494	510		512		460	382	328	259	233	
Total, worst case					4	411		116							
Sun reduction					0.38	0.32		0.32							
Oper. time red.					1.00	1.00		1.00							
Wind dir. red.					0.61	0.61		0.61							
Total reduction					0.23	0.19		0.20							
Total, real					1	80		23							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MD - H342

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: ME - H343

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MF - H344

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MG - H345

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
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SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MH - H346

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MI - H347

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
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31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MJ - H348

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MK - H349

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: ML - H350

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:44 (4) 20:55	05:03 20:31 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	18:45 (4) 20:57	05:02 20:32 (2)
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	18:47 (4) 20:59	05:01 20:33 (2)
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	18:49 (4) 21:01	05:00 20:33 (2)
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	18:52 (4) 21:03	04:59 20:33 (2)
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	19:30 (3) 21:04	21:50 20:52 (2)
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 20:51 (2)
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 20:51 (2)
9	08:41 16:25	07:59 17:22	16:49 (5) 18:17	06:57 20:15	05:36 21:10	20:31 (2) 21:54
10	08:40 16:26	07:57 17:24	16:48 (5) 18:19	06:55 20:17	05:34 21:11	20:29 (2) 21:55
11	08:40 16:28	07:55 17:26	16:47 (5) 18:21	06:52 20:19	05:33 21:13	20:29 (2) 21:55
12	08:39 16:30	07:53 17:28	16:45 (5) 18:23	06:50 20:20	05:31 21:15	20:28 (2) 21:56
13	08:38 16:31	07:51 17:30	16:45 (5) 18:25	17:57 (4) 20:22	05:29 21:17	20:27 (2) 21:57
14	08:37 16:33	07:49 17:32	16:45 (5) 18:27	17:53 (4) 20:24	05:27 21:18	20:27 (2) 21:57
15	08:36 16:34	07:47 17:34	16:45 (5) 18:28	17:51 (4) 20:26	05:26 21:20	20:26 (2) 21:58
16	08:35 16:36	07:45 17:36	16:45 (5) 18:30	17:49 (4) 20:28	05:24 21:22	20:27 (2) 21:59
17	08:34 16:38	07:43 17:38	16:45 (5) 18:32	17:48 (4) 20:30	05:22 21:23	20:26 (2) 21:59
18	08:33 16:40	07:41 17:40	16:44 (5) 18:34	17:46 (4) 20:31	05:21 21:25	20:26 (2) 22:00
19	08:32 16:41	07:39 17:42	16:45 (5) 18:36	17:45 (4) 20:33	05:19 21:27	20:27 (2) 22:00
20	08:31 16:43	07:36 17:44	16:46 (5) 18:38	17:44 (4) 20:35	05:18 21:28	20:26 (2) 22:00
21	08:30 16:45	07:34 17:46	16:47 (5) 18:40	17:43 (4) 20:37	05:16 21:30	20:26 (2) 22:01
22	08:28 16:47	07:32 17:48	16:48 (5) 18:41	17:42 (4) 20:39	05:15 21:31	20:27 (2) 22:01
23	08:27 16:49	07:30 17:50	16:50 (5) 18:43	17:42 (4) 20:41	05:13 21:33	20:26 (2) 22:01
24	08:26 16:50	07:28 17:52	16:53 (5) 18:45	17:41 (4) 20:42	05:12 21:34	20:27 (2) 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	17:41 (4) 20:44	05:11 21:36	20:27 (2) 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	17:41 (4) 20:46	05:09 21:37	20:28 (2) 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:41 (4) 20:48	05:08 21:39	20:28 (2) 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	17:42 (4) 20:50	05:07 21:40	20:29 (2) 22:01
29	08:18 17:00		07:08 19:54	18:41 (4) 20:52	05:06 21:41	20:29 (2) 22:01
30	08:17 17:02		07:06 19:56	18:42 (4) 20:53	05:05 21:43	20:30 (2) 22:00
31	08:15 17:04		07:04 19:58	18:43 (4) 20:53	05:04 21:44	20:30 (2) 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case		256	571	209	541	205
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.67	0.67	0.63	0.63
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		40	105	50	131	42

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: ML - H350

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December	
1	04:59	20:44 (2)	05:39	20:39 (2)	06:33		07:26		07:24	16:18 (5)	08:19	
	22:00	9	20:53 (2)	21:25	14	20:53 (2)	20:18	19:05	16:54	5	16:23 (5)	16:10
2	04:59	20:44 (2)	05:40	20:40 (2)	06:35		07:28		07:26		16:19 (5)	08:21
	22:00	10	20:54 (2)	21:23	12	20:52 (2)	20:16	19:02	16:52	2	16:21 (5)	16:09
3	05:00	20:42 (2)	05:42	20:40 (2)	06:36		07:30		07:28			08:22
	21:59	12	20:54 (2)	21:21	10	20:50 (2)	20:13	19:00	16:50			16:08
4	05:01	20:42 (2)	05:44	20:41 (2)	06:38		07:31		07:30			08:24
	21:59	14	20:56 (2)	21:19	7	20:48 (2)	20:11	18:57	16:48			16:08
5	05:02	20:42 (2)	05:45	20:42 (2)	06:40		07:33		07:32			08:25
	21:58	15	20:57 (2)	21:17	4	20:46 (2)	20:09	18:55	16:46			16:07
6	05:03	20:41 (2)	05:47	20:44 (2)	06:42		19:14 (3)	07:35	07:34			08:26
	21:58	17	20:58 (2)	21:15	1	20:45 (2)	20:06	9	19:23 (3)	18:52		16:07
7	05:04	20:41 (2)	05:49		06:43		18:48 (4)	07:37		07:36		08:28
	21:57	18	20:59 (2)	21:13		20:04	24	19:25 (3)	18:50			16:06
8	05:05	20:41 (2)	05:51		06:45		18:43 (4)	07:39		07:38		08:29
	21:56	18	20:59 (2)	21:11		20:01	35	19:26 (3)	18:48			16:06
9	05:06	20:40 (2)	05:52		06:47		18:41 (4)	07:41		07:40		08:30
	21:55	20	21:00 (2)	21:09		19:59	42	19:27 (3)	18:45			16:05
10	05:07	20:40 (2)	05:54		06:49		18:38 (4)	07:42		07:42		08:31
	21:55	21	21:01 (2)	21:07		19:56	47	19:27 (3)	18:43			16:05
11	05:08	20:39 (2)	05:56		06:50		18:36 (4)	07:44		07:44		08:33
	21:54	22	21:01 (2)	21:05		19:54	50	19:26 (3)	18:40			16:05
12	05:09	20:39 (2)	05:57		06:52		18:35 (4)	07:46		07:45		08:34
	21:53	23	21:02 (2)	21:03		19:51	49	19:24 (3)	18:38			16:05
13	05:10	20:38 (2)	05:59		06:54		18:34 (4)	07:48		07:47		08:35
	21:52	24	21:02 (2)	21:01		19:49	48	19:22 (3)	18:36			16:05
14	05:12	20:38 (2)	06:01		06:56		18:32 (4)	07:50		07:49		08:36
	21:51	25	21:03 (2)	20:59		19:47	46	19:18 (3)	18:33			16:04
15	05:13	20:37 (2)	06:03		06:58		18:31 (4)	07:52		07:51		08:37
	21:50	26	21:03 (2)	20:57		19:44	45	19:16 (3)	18:31			16:05
16	05:14	20:37 (2)	06:04		06:59		18:31 (4)	07:54		07:53		08:38
	21:49	26	21:03 (2)	20:55		19:42	43	19:14 (3)	18:29			16:05
17	05:16	20:37 (2)	06:06		07:01		18:29 (4)	07:55		07:55		08:38
	21:47	28	21:05 (2)	20:53		19:39	42	19:11 (3)	18:26			16:05
18	05:17	20:37 (2)	06:08		07:03		18:29 (4)	07:57		17:23 (5)		08:39
	21:46	28	21:05 (2)	20:50		19:37	39	19:08 (3)	18:24	10	17:33 (5)	16:24
19	05:18	20:37 (2)	06:10		07:05		18:29 (4)	07:59		17:20 (5)		08:40
	21:45	28	21:05 (2)	20:48		19:34	37	19:06 (4)	18:22	15	17:35 (5)	16:23
20	05:20	20:37 (2)	06:12		07:06		18:29 (4)	08:01		17:18 (5)		08:41
	21:44	29	21:06 (2)	20:46		19:32	35	19:04 (4)	18:20	19	17:37 (5)	16:22
21	05:21	20:37 (2)	06:13		07:08		18:28 (4)	08:03		17:17 (5)		08:41
	21:42	29	21:06 (2)	20:44		19:29	33	19:01 (4)	18:17	21	17:38 (5)	16:20
22	05:23	20:36 (2)	06:15		07:10		18:28 (4)	08:05		17:16 (5)		08:42
	21:41	29	21:05 (2)	20:42		19:27	30	18:58 (4)	18:15	22	17:38 (5)	16:19
23	05:24	20:37 (2)	06:17		07:12		18:28 (4)	08:07		17:15 (5)		08:42
	21:39	29	21:06 (2)	20:39		19:24	28	18:56 (4)	18:13	24	17:39 (5)	16:18
24	05:26	20:36 (2)	06:19		07:13		18:29 (4)	08:09		17:15 (5)		08:43
	21:38	29	21:05 (2)	20:37		19:22	25	18:54 (4)	18:11	24	17:39 (5)	16:17
25	05:27	20:37 (2)	06:20		07:15		18:28 (4)	07:11		16:14 (5)		08:43
	21:36	27	21:04 (2)	20:35		19:19	23	18:51 (4)	17:09	24	16:38 (5)	16:16
26	05:29	20:37 (2)	06:22		07:17		18:29 (4)	07:13		16:14 (5)		08:43
	21:35	25	21:02 (2)	20:32		19:17	19	18:48 (4)	17:06	22	16:36 (5)	16:14
27	05:30	20:36 (2)	06:24		07:19		18:30 (4)	07:14		16:14 (5)		08:44
	21:33	24	21:00 (2)	20:30		19:14	16	18:46 (4)	17:04	20	16:34 (5)	16:13
28	05:32	20:37 (2)	06:26		07:21		18:31 (4)	07:16		16:14 (5)		08:44
	21:32	22	20:59 (2)	20:28		19:12	13	18:44 (4)	17:02	17	16:31 (5)	16:12
29	05:34	20:37 (2)	06:27		07:22		18:33 (4)	07:18		16:15 (5)		08:44
	21:30	20	20:57 (2)	20:25		19:09	8	18:41 (4)	17:00	14	16:29 (5)	16:12
30	05:35	20:38 (2)	06:29		07:24		18:34 (4)	07:20		16:15 (5)		08:44
	21:28	18	20:56 (2)	20:23		19:07	4	18:38 (4)	16:58	12	16:27 (5)	16:12
31	05:37	20:39 (2)	06:31					07:22		16:16 (5)		08:44
	21:26	16	20:55 (2)	20:21				16:56	9	16:25 (5)		16:13
Potential sun hours	512		460		382		328		259		233	
Total, worst case	681		48		790		253		7			
Sun reduction	0.32		0.34		0.32		0.29		0.27			
Oper. time red.	1.00		1.00		1.00		1.00		1.00			
Wind dir. red.	0.63		0.63		0.67		0.66		0.66			
Total reduction	0.20		0.22		0.22		0.19		0.18			
Total, real	140		10		171		49		1			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MM - H351

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MN - H352

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MO - H353

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MP - H354

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MQ - H355

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MR - H356

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		
1	08:44		08:14	16:04 (5)	07:16	16:43 (4)	07:01		05:52	19:48 (2)	05:03		
	16:15		17:06	17	16:21 (5)	18:02	33	17:16 (4)	20:00	20:55	35	20:23 (2)	21:45
2	08:44		08:12	16:06 (5)	07:14	16:43 (4)	06:59		05:50	19:48 (2)	05:02		
	16:16		17:08	14	16:20 (5)	18:04	31	17:14 (4)	20:02	20:57	34	20:22 (2)	21:46
3	08:44		08:10	16:08 (5)	07:12	16:45 (4)	06:56		05:48	19:48 (2)	05:01		
	16:17		17:10	9	16:17 (5)	18:06	27	17:12 (4)	20:04	20:59	33	20:21 (2)	21:48
4	08:43		08:08		07:09	16:48 (4)	06:54		05:46	19:48 (2)	05:00		
	16:18		17:12		18:07	23	17:11 (4)	20:06	21:01	33	20:21 (2)	21:49	
5	08:43		08:07		07:07	16:50 (4)	06:51		05:44	19:49 (2)	04:59		
	16:19		17:14		18:09	17	17:07 (4)	20:07	21:03	31	20:20 (2)	21:50	
6	08:42		08:05		07:04	16:55 (4)	06:49		05:42	19:49 (2)	04:59		
	16:21		17:16		18:11	9	17:45 (3)	20:09	21:04	30	20:19 (2)	21:51	
7	08:42		08:03		07:02	17:41 (3)	06:47		05:40	19:51 (2)	04:58		
	16:22		17:18		18:13	5	17:46 (3)	20:11	21:06	28	20:19 (2)	21:52	
8	08:42		08:01	16:48 (4)	07:00	17:41 (3)	06:44		05:38	19:51 (2)	04:57		
	16:24		17:20	2	16:50 (4)	18:15	7	17:48 (3)	20:13	21:08	27	20:18 (2)	21:53
9	08:41		07:59	16:46 (4)	06:57	17:39 (3)	06:42		05:36	19:52 (2)	04:57		
	16:25		17:22	6	16:52 (4)	18:17	11	17:50 (3)	20:15	21:10	24	20:16 (2)	21:54
10	08:40		07:57	16:45 (4)	06:55	17:39 (3)	06:39		05:34	19:53 (2)	04:56		
	16:26		17:24	9	16:54 (4)	18:19	13	17:52 (3)	20:17	21:11	21	20:14 (2)	21:55
11	08:40		07:55	16:44 (4)	06:52	17:39 (3)	06:37		05:33	19:56 (2)	04:56		
	16:28		17:26	12	16:56 (4)	18:21	16	17:55 (3)	20:19	21:13	18	20:14 (2)	21:55
12	08:39		07:53	16:42 (4)	06:50	17:38 (3)	06:35		05:31	19:57 (2)	04:55		
	16:30		17:28	16	16:58 (4)	18:23	18	17:56 (3)	20:20	21:15	14	20:11 (2)	21:56
13	08:38		07:51	16:42 (4)	06:48	17:39 (3)	06:32		05:29	20:00 (2)	04:55		
	16:31		17:30	18	17:00 (4)	18:25	19	17:58 (3)	20:22	21:17	7	20:07 (2)	21:57
14	08:37		07:49	16:41 (4)	06:45	17:38 (3)	06:30		05:27			04:55	
	16:33		17:32	21	17:02 (4)	18:27	22	18:00 (3)	20:24	21:18		21:58	
15	08:36	15:58 (5)	07:47	16:41 (4)	06:43	17:39 (3)	06:28		05:26			04:54	
	16:34	1	15:59 (5)	17:34	18:28	23	18:02 (3)	20:26	21:20			21:58	
16	08:35	15:57 (5)	07:45	16:40 (4)	06:40	17:39 (3)	06:25		05:24			04:54	
	16:36	3	16:00 (5)	17:36	18:30	22	18:01 (3)	20:28	21:22			21:59	
17	08:34	15:57 (5)	07:43	16:40 (4)	06:38	17:41 (3)	06:23		05:22			04:54	
	16:38	6	16:03 (5)	17:38	18:32	19	18:00 (3)	20:30	3	20:01 (2)	21:23	21:59	
18	08:33	15:58 (5)	07:41	16:39 (4)	06:35	17:42 (3)	06:21		19:56 (2)	05:21		04:54	
	16:40	7	16:05 (5)	17:40	18:34	15	17:57 (3)	20:31	7	20:03 (2)	21:25	22:00	
19	08:32	15:58 (5)	07:39	16:39 (4)	06:33	17:45 (3)	06:18		19:54 (2)	05:19		04:54	
	16:41	9	16:07 (5)	17:42	18:36	10	17:55 (3)	20:33	11	20:05 (2)	21:27	22:00	
20	08:31	15:57 (5)	07:36	16:39 (4)	06:31		06:16		19:53 (2)	05:18		04:54	
	16:43	11	16:08 (5)	17:44	18:38		20:35	14	20:07 (2)	21:28		22:00	
21	08:30	15:58 (5)	07:34	16:39 (4)	06:28		06:14		19:51 (2)	05:16		04:54	
	16:45	13	16:11 (5)	17:46	18:40		20:37	17	20:08 (2)	21:30		22:01	
22	08:29	15:57 (5)	07:32	16:39 (4)	06:26		06:12		19:50 (2)	05:15		04:55	
	16:47	15	16:12 (5)	17:48	18:42		20:39	20	20:10 (2)	21:31		22:01	
23	08:27	15:58 (5)	07:30	16:39 (4)	06:23		06:09		19:50 (2)	05:13		04:55	
	16:49	17	16:15 (5)	17:50	18:43		20:41	22	20:12 (2)	21:33		22:01	
24	08:26	15:58 (5)	07:28	16:40 (4)	06:21		06:07		19:49 (2)	05:12		04:55	
	16:50	19	16:17 (5)	17:52	18:45		20:43	25	20:14 (2)	21:34		22:01	
25	08:24	15:59 (5)	07:25	16:39 (4)	06:18		06:05		19:49 (2)	05:11		04:55	
	16:52	20	16:19 (5)	17:54	18:47		20:44	26	20:15 (2)	21:36		22:01	
26	08:23	15:59 (5)	07:23	16:40 (4)	06:16		06:03		19:48 (2)	05:09		04:56	
	16:54	22	16:21 (5)	17:56	18:49		20:46	29	20:17 (2)	21:37		22:01	
27	08:22	15:59 (5)	07:21	16:41 (4)	06:13		06:01		19:48 (2)	05:08		04:56	
	16:56	24	16:23 (5)	17:58	18:51		20:48	31	20:19 (2)	21:39		22:01	
28	08:20	16:00 (5)	07:18	16:41 (4)	06:11		05:58		19:48 (2)	05:07		04:57	
	16:58	23	16:23 (5)	18:00	18:53		20:50	33	20:21 (2)	21:40		22:01	
29	08:18	16:01 (5)			07:08		05:56		19:48 (2)	05:06		04:57	
	17:00	22	16:23 (5)		19:54		20:52	34	20:22 (2)	21:41		22:01	
30	08:17	16:01 (5)			07:06		05:54		19:48 (2)	05:05		04:58	
	17:02	21	16:22 (5)		19:56		20:54	35	20:23 (2)	21:43		22:00	
31	08:15	16:02 (5)			07:04				05:04				
	17:04	19	16:21 (5)		19:58				21:44				
Potential sun hours	250		273		367		420		494			510	
Total, worst case		252		620		340		307		335			
Sun reduction		0.24		0.23		0.27		0.35		0.38			
Oper. time red.		1.00		1.00		1.00		1.00		1.00			
Wind dir. red.		0.66		0.67		0.67		0.65		0.65			
Total reduction		0.16		0.16		0.18		0.23		0.25			
Total, real		41		96		62		70		83			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MR - H356

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December				
1	04:59		05:39		20:07 (2)	06:33		07:26	18:17 (3)	07:24	16:15 (4)	08:19			
	22:00		21:25	15	20:22 (2)	20:18		19:05	19	18:36 (3)	16:54	8	16:23 (4)	16:10	
2	04:59		05:40		20:05 (2)	06:35		07:28		18:17 (3)	07:26		16:16 (4)	08:21	
	22:00		21:23	20	20:25 (2)	20:16		19:02	16	18:33 (3)	16:52	5	16:21 (4)	16:09	
3	05:00		05:42		20:03 (2)	06:36		07:30		18:17 (3)	07:28		16:18 (4)	08:22	
	21:59		21:21	22	20:25 (2)	20:13		19:00	14	18:31 (3)	16:50	1	16:19 (4)	16:08	
4	05:01		05:44		20:02 (2)	06:38		07:31		18:17 (3)	07:30			08:24	
	21:59		21:19	25	20:27 (2)	20:11		18:57	12	18:29 (3)	16:48			16:08	
5	05:02		05:45		20:00 (2)	06:40		07:33		18:18 (3)	07:32			08:25	
	21:58		21:17	27	20:27 (2)	20:09		18:55	8	18:26 (3)	16:46			16:07	
6	05:03		05:47		20:00 (2)	06:42		07:35		18:18 (3)	07:34			08:26	
	21:58		21:15	28	20:28 (2)	20:06		18:52	6	18:24 (3)	16:44			16:07	
7	05:04		05:49		19:59 (2)	06:43		07:37		18:18 (3)	07:36			08:28	
	21:57		21:13	31	20:30 (2)	20:04		18:50	3	18:21 (3)	16:43			16:06	
8	05:05		05:51		19:58 (2)	06:45		07:39		17:27 (4)	07:38		15:38 (5)	08:29	
	21:56		21:12	32	20:30 (2)	20:01		18:48	13	17:40 (4)	16:41	9	15:47 (5)	16:06	
9	05:06		05:52		19:58 (2)	06:47		07:41		17:23 (4)	07:40		15:35 (5)	08:30	
	21:55		21:10	32	20:30 (2)	19:59		18:45	20	17:43 (4)	16:39	15	15:50 (5)	16:05	
10	05:07		05:54		19:56 (2)	06:49		07:42		17:20 (4)	07:42		15:35 (5)	08:31	
	21:55		21:07	34	20:30 (2)	19:56		18:43	26	17:46 (4)	16:37	17	15:52 (5)	16:05	
11	05:08		05:56		19:56 (2)	06:50		07:44		17:18 (4)	07:44		15:34 (5)	08:33	
	21:54		21:05	35	20:31 (2)	19:54		18:40	29	17:47 (4)	16:35	19	15:53 (5)	16:05	
12	05:09		05:57		19:56 (2)	06:52		07:46		17:17 (4)	07:45		15:33 (5)	08:34	
	21:53		21:03	35	20:31 (2)	19:51		18:38	31	17:48 (4)	16:34	21	15:54 (5)	16:05	
13	05:10		05:59		19:55 (2)	06:54		07:48		17:15 (4)	07:47		15:32 (5)	08:35	
	21:52		21:01	36	20:31 (2)	19:49		18:36	34	17:49 (4)	16:32	23	15:55 (5)	16:05	
14	05:12		06:01		19:55 (2)	06:56		07:50		17:14 (4)	07:49		15:32 (5)	08:36	
	21:51		20:59	34	20:29 (2)	19:47		18:33	36	17:50 (4)	16:31	23	15:55 (5)	16:04	
15	05:13		06:03		19:55 (2)	06:58		07:52		17:13 (4)	07:51		15:32 (5)	08:37	
	21:50		20:57	33	20:28 (2)	19:44		18:31	38	17:51 (4)	16:29	24	15:56 (5)	16:05	
16	05:14		06:04		19:54 (2)	06:59		07:54		17:12 (4)	07:53		15:32 (5)	08:38	
	21:49		20:55	31	20:25 (2)	19:42		18:29	39	17:51 (4)	16:27	22	15:54 (5)	16:05	
17	05:16		06:06		19:55 (2)	07:01		07:55		17:11 (4)	07:55		15:32 (5)	08:38	
	21:47		20:53	28	20:23 (2)	19:39		18:26	41	17:52 (4)	16:26	20	15:52 (5)	16:05	
18	05:17		06:08		19:55 (2)	07:03		07:57		17:11 (4)	07:57		15:32 (5)	08:39	
	21:46		20:51	27	20:22 (2)	19:37		18:24	41	17:52 (4)	16:24	19	15:51 (5)	16:05	
19	05:18		06:10		19:55 (2)	07:05		07:59		17:10 (4)	07:59		15:32 (5)	08:40	
	21:45		20:48	24	20:19 (2)	19:34		18:22	42	17:52 (4)	16:23	17	15:49 (5)	16:05	
20	05:20		06:12		19:55 (2)	07:06		08:01		17:10 (4)	08:00		15:32 (5)	08:41	
	21:44		20:46	22	20:17 (2)	19:32		18:20	40	17:50 (4)	16:22	15	15:47 (5)	16:06	
21	05:21		06:13		19:56 (2)	07:08		08:03		17:10 (4)	08:02		15:33 (5)	08:41	
	21:42		20:44	19	20:15 (2)	19:29		18:17	38	17:48 (4)	16:20	13	15:46 (5)	16:06	
22	05:23		06:15		19:56 (2)	07:10		08:05		17:09 (4)	08:04		15:33 (5)	08:42	
	21:41		20:42	16	20:12 (2)	19:27		18:15	36	17:45 (4)	16:19	11	15:44 (5)	16:06	
23	05:24		06:17		19:57 (2)	07:12		08:07		17:09 (4)	08:06		15:34 (5)	08:42	
	21:39		20:39	13	20:10 (2)	19:24		18:13	34	17:43 (4)	16:18	9	15:43 (5)	16:07	
24	05:26		06:19		19:58 (2)	07:13	18:30 (3)	08:09		17:09 (4)	08:08		15:35 (5)	08:43	
	21:38		20:37	11	20:09 (2)	19:22	7	18:37 (3)	32	17:41 (4)	16:17	7	15:42 (5)	16:08	
25	05:27		06:20		19:59 (2)	07:15		18:25 (3)	07:11	16:10 (4)	08:09		15:35 (5)	08:43	
	21:36		20:35	7	20:06 (2)	19:19	14	18:39 (3)	17:09	28	16:38 (4)	16:16	6	15:41 (5)	16:08
26	05:29		06:22		20:01 (2)	07:17		18:23 (3)	07:13		16:10 (4)	08:11		15:36 (5)	08:43
	21:35		20:32	3	20:04 (2)	19:17	18	18:41 (3)	17:06	26	16:36 (4)	16:14	4	15:40 (5)	16:09
27	05:30		06:24			07:19		18:22 (3)	07:15		16:10 (4)	08:13		15:37 (5)	08:44
	21:33		20:30			19:14	20	18:42 (3)	17:04	24	16:34 (4)	16:13	1	15:38 (5)	16:10
28	05:32		06:26			07:21		18:20 (3)	07:16		16:11 (4)	08:14			08:44
	21:32		20:28			19:12	23	18:43 (3)	17:02	20	16:31 (4)	16:12			16:11
29	05:34		06:27			07:22		18:19 (3)	07:18		16:11 (4)	08:16			08:44
	21:30		20:25			19:09	22	18:41 (3)	17:00	18	16:29 (4)	16:12			16:11
30	05:35		06:29			07:24		18:18 (3)	07:20		16:12 (4)	08:18			08:44
	21:28		20:23			19:07	20	18:38 (3)	16:58	15	16:27 (4)	16:11			16:12
31	05:37	20:10 (2)	06:31					07:22			16:13 (4)				08:44
	21:26	10 20:20 (2)	20:21					16:56	12	16:25 (4)					16:13
Potential sun hours	512		460			382		328		259					233
Total, worst case	10		640			124		791		309					
Sun reduction	0.32		0.34			0.32		0.29		0.27					
Oper. time red.	1.00		1.00			1.00		1.00		1.00					
Wind dir. red.	0.65		0.65			0.67		0.67		0.66					
Total reduction	0.21		0.22			0.22		0.20		0.18					
Total, real	2		142			27		155		54					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: MS - H357

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:15 (4) 21:25	05:39 20:18	06:33 19:05	07:26 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:15 (4) 21:24	05:40 20:16	06:35 19:02	07:28 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	21:11 (4) 21:13 (4)	21:15 (4) 21:23	05:42 20:13	06:36 19:00	07:30 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:10 (4) 21:14 (4)	05:01 21:59	05:44 20:11	06:38 18:57	07:31 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	21:11 (4) 21:15 (4)	05:02 21:58	05:45 20:09	06:40 18:55	07:33 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:10 (4) 21:16 (4)	05:03 21:57	05:47 20:06	06:42 18:52	07:35 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:10 (4) 21:16 (4)	05:04 21:57	05:49 20:13	06:43 18:50	07:37 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:10 (4) 21:17 (4)	05:05 21:56	05:51 20:01	06:45 18:48	07:39 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:10 (4) 21:18 (4)	05:06 21:55	05:52 20:09	06:47 18:45	07:41 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:10 (4) 21:19 (4)	05:07 21:54	05:54 20:07	06:49 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:10 (4) 21:20 (4)	05:08 21:54	05:56 20:05	06:50 18:40	07:44 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:10 (4) 21:20 (4)	05:09 21:53	05:57 20:03	06:52 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:10 (4) 21:21 (4)	05:11 21:52	05:59 20:01	06:54 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:10 (4) 21:22 (4)	05:12 21:51	06:01 20:59	06:56 18:33	07:50 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:11 (4) 21:22 (4)	05:13 21:50	06:03 20:57	06:57 18:31	07:52 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:11 (4) 21:23 (4)	05:14 21:48	06:04 20:55	06:59 18:29	07:54 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:11 (4) 21:23 (4)	05:16 21:47	06:06 20:53	07:01 18:39	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:11 (4) 21:24 (4)	05:17 21:46	06:08 20:50	07:03 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:11 (4) 21:24 (4)	05:18 21:45	06:10 20:48	07:05 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:12 (4) 21:24 (4)	05:20 21:43	06:12 20:46	07:06 18:32	08:01 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:12 (4) 21:24 (4)	05:21 21:42	06:13 20:44	07:08 18:29	08:03 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:13 (4) 21:25 (4)	05:23 21:41	06:15 20:41	07:10 18:15	08:05 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:12 (4) 21:25 (4)	05:24 21:39	06:17 20:39	07:12 18:24	08:07 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:12 (4) 21:25 (4)	05:26 21:38	06:19 20:37	07:13 18:22	08:09 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:13 (4) 21:25 (4)	05:27 21:36	06:20 20:35	07:15 18:19	07:11 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:13 (4) 21:25 (4)	05:29 21:35	06:22 20:32	07:17 18:17	07:13 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:13 (4) 21:24 (4)	05:30 21:33	06:24 20:30	07:19 18:14	07:14 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:14 (4) 21:25 (4)	05:32 21:31	06:26 20:28	07:21 18:12	07:16 16:12	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:58 22:00	21:14 (4) 21:25 (4)	05:34 21:30	06:27 20:25	07:22 18:09	07:18 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	21:14 (4) 21:24 (4)	05:35 21:28	06:29 20:23	07:24 18:07	07:20 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26		06:31 20:21	07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case						279						
Sun reduction						0.32						
Oper. time red.						1.00						
Wind dir. red.						0.61						
Total reduction						0.19						
Total, real						54						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MT - H358

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:34 (5)	08:14	16:11 (4)	07:16	17:27 (3)	07:01	05:52	19:33 (2)	05:03	
2	08:44	15:37 (5)	08:12	16:35 (4)	18:02	17:34 (3)	20:00	20:55	20:07 (2)	21:45	
3	08:44	15:35 (5)	08:12	16:10 (4)	07:14	17:25 (3)	06:59	05:50	19:34 (2)	05:02	
4	08:44	15:39 (5)	08:10	16:37 (4)	18:04	17:36 (3)	20:02	20:57	20:06 (2)	21:46	
5	08:44	15:34 (5)	08:10	16:10 (4)	07:12	17:25 (3)	06:56	05:48	19:35 (2)	05:01	
6	08:43	15:39 (5)	08:10	16:39 (4)	18:06	17:38 (3)	20:04	20:59	20:04 (2)	21:48	
7	08:43	15:35 (5)	08:08	16:09 (4)	07:09	17:25 (3)	06:54	05:46	19:36 (2)	05:00	
8	08:43	15:41 (5)	08:07	16:41 (4)	18:07	17:41 (3)	20:06	21:01	20:03 (2)	21:49	
9	08:43	15:35 (5)	08:07	16:09 (4)	07:07	17:24 (3)	06:51	05:44	19:37 (2)	04:59	
10	08:43	15:42 (5)	08:05	16:43 (4)	18:09	17:42 (3)	20:07	21:03	20:02 (2)	21:50	
11	08:43	15:35 (5)	08:05	16:09 (4)	07:04	17:24 (3)	06:49	05:42	19:38 (2)	04:59	
12	08:42	15:44 (5)	08:03	16:45 (4)	18:11	17:45 (3)	20:09	21:04	20:00 (2)	21:51	
13	08:42	15:35 (5)	08:03	16:09 (4)	07:02	17:23 (3)	06:47	05:40	19:41 (2)	04:58	
14	08:42	15:45 (5)	08:03	16:47 (4)	18:13	17:46 (3)	20:11	21:06	19:59 (2)	21:52	
15	08:42	15:35 (5)	08:01	16:09 (4)	07:00	17:24 (3)	06:44	05:38	19:43 (2)	04:57	
16	08:42	15:46 (5)	08:01	16:50 (4)	18:15	17:48 (3)	20:13	21:08	19:56 (2)	21:53	
17	08:41	15:36 (5)	07:59	16:09 (4)	06:57	17:24 (3)	06:42	05:36		04:57	
18	08:41	15:49 (5)	07:57	16:52 (4)	18:17	17:48 (3)	20:15	21:10		21:54	
19	08:40	15:36 (5)	07:57	16:09 (4)	06:55	17:25 (3)	06:39	19:48 (2)	05:34	04:56	
20	08:40	15:50 (5)	07:54	16:53 (4)	18:19	17:48 (3)	20:17	19:49 (2)	21:11	21:55	
21	08:40	15:36 (5)	07:55	16:09 (4)	06:52	17:26 (3)	06:37	19:45 (2)	05:33	04:56	
22	08:39	15:52 (5)	07:56	16:53 (4)	18:21	17:47 (3)	20:19	19:51 (2)	21:13	21:55	
23	08:39	15:37 (5)	07:53	16:09 (4)	06:50	17:27 (3)	06:35	19:42 (2)	05:31	04:55	
24	08:38	15:54 (5)	07:53	16:52 (4)	18:23	17:45 (3)	20:20	19:53 (2)	21:15	21:56	
25	08:38	15:37 (5)	07:51	16:09 (4)	06:48	17:29 (3)	06:32	19:40 (2)	05:29	04:55	
26	08:37	15:55 (5)	07:50	16:52 (4)	18:25	17:43 (3)	20:22	19:54 (2)	21:17	21:57	
27	08:37	15:37 (5)	07:49	16:10 (4)	06:45	17:33 (3)	06:30	19:38 (2)	05:27	04:55	
28	08:36	15:57 (5)	07:47	16:52 (4)	18:27	17:38 (3)	20:24	19:56 (2)	21:18	21:58	
29	08:36	15:38 (5)	07:47	16:10 (4)	06:43		06:28	19:37 (2)	05:26	04:54	
30	08:35	15:59 (5)	07:44	16:51 (4)	18:28		20:26	19:58 (2)	21:20	21:58	
31	08:35	15:37 (5)	07:45	16:11 (4)	06:40		06:25	19:36 (2)	05:24	04:54	
32	08:35	16:00 (5)	07:43	16:51 (4)	18:30		20:28	20:00 (2)	21:22	21:59	
33	08:34	15:38 (5)	07:43	16:12 (4)	06:38		06:23	19:34 (2)	05:22	04:54	
34	08:34	16:03 (5)	07:38	16:50 (4)	18:32		20:30	20:01 (2)	21:23	21:59	
35	08:33	15:39 (5)	07:41	16:12 (4)	06:35		06:21	19:34 (2)	05:21	04:54	
36	08:33	16:03 (5)	07:40	16:49 (4)	18:34		20:31	20:03 (2)	21:25	22:00	
37	08:32	15:40 (5)	07:39	16:14 (4)	06:33		06:18	19:33 (2)	05:19	04:54	
38	08:32	16:04 (5)	07:42	16:48 (4)	18:36		20:33	20:05 (2)	21:27	22:00	
39	08:31	15:40 (5)	07:36	16:15 (4)	06:31		06:16	19:33 (2)	05:18	04:54	
40	08:31	16:03 (5)	07:44	16:47 (4)	18:38		20:35	20:07 (2)	21:28	22:00	
41	08:30	15:41 (5)	07:34	16:17 (4)	06:28		06:14	19:32 (2)	05:16	04:54	
42	08:30	16:03 (5)	07:46	16:46 (4)	18:40		20:37	20:08 (2)	21:30	22:01	
43	08:29	15:41 (5)	07:32	16:18 (4)	06:26		06:12	19:31 (2)	05:15	04:55	
44	08:29	16:02 (5)	07:48	16:43 (4)	18:42		20:39	20:10 (2)	21:31	22:01	
45	08:27	15:43 (5)	07:30	16:21 (4)	06:23		06:09	19:31 (2)	05:13	04:55	
46	08:27	16:03 (5)	07:50	16:41 (4)	18:43		20:41	20:11 (2)	21:33	22:01	
47	08:26	15:43 (5)	07:28	16:25 (4)	06:21		06:07	19:31 (2)	05:12	04:55	
48	08:26	16:02 (5)	07:52	16:37 (4)	18:45		20:43	20:10 (2)	21:34	22:01	
49	08:24	15:45 (5)	07:25		06:18		06:05	19:31 (2)	05:11	04:55	
50	08:24	16:19 (4)	07:54		18:47		20:44	20:10 (2)	21:36	22:01	
51	08:23	15:47 (5)	07:23		06:16		06:03	19:31 (2)	05:09	04:56	
52	08:23	16:21 (4)	07:56		18:49		20:46	20:10 (2)	21:37	22:01	
53	08:22	15:49 (5)	07:21	17:30 (3)	06:13		06:01	19:32 (2)	05:08	04:56	
54	08:22	16:23 (4)	07:58	17:31 (3)	18:51		20:48	20:09 (2)	21:39	22:01	
55	08:20	16:13 (4)	07:18	17:28 (3)	06:11		05:58	19:32 (2)	05:07	04:57	
56	08:20	16:26 (4)	18:00	17:32 (3)	18:53		20:50	20:09 (2)	21:40	22:01	
57	08:18	16:12 (4)			07:08		05:56	19:32 (2)	05:06	04:57	
58	08:18	16:28 (4)			19:54		20:52	20:08 (2)	21:41	22:01	
59	08:17	16:11 (4)			07:06		05:54	19:33 (2)	05:05	04:58	
60	08:17	16:30 (4)			19:56		20:54	20:08 (2)	21:43	22:00	
61	08:15	16:11 (4)			07:04			05:04			
62	08:15	16:31 (4)			19:58			21:44			
Potential sun hours	250		273		367		420		494		510
Total, worst case	500		833		238		594		200		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.66		0.68		0.65		0.65		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	80		128		44		136		50		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: MT - H358

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December				
1	04:59	05:39	06:33	19:44 (2)	07:26	18:06 (3)	07:24	15:39 (4)	08:19	15:18 (5)
	22:00	21:25	20:18	6 19:50 (2)	19:05	17 18:23 (3)	16:54	44 16:23 (4)	16:10	16 15:34 (5)
2	04:59	05:40	06:35		07:28	18:04 (3)	07:26	15:38 (4)	08:21	15:18 (5)
	22:00	21:23	20:16		19:02	20 18:24 (3)	16:52	43 16:21 (4)	16:09	15 15:33 (5)
3	05:00	05:42	06:36		07:30	18:03 (3)	07:28	15:38 (4)	08:22	15:19 (5)
	21:59	21:21	20:13		19:00	22 18:25 (3)	16:50	41 16:19 (4)	16:08	13 15:32 (5)
4	05:01	05:44	19:56 (2)	06:38	07:31	18:02 (3)	07:30	15:38 (4)	08:24	15:20 (5)
	21:59	21:19	7 20:03 (2)	20:11	18:57	24 18:26 (3)	16:48	39 16:17 (4)	16:08	12 15:32 (5)
5	05:02	05:45	19:52 (2)	06:40	07:33	18:01 (3)	07:32	15:39 (4)	08:25	15:20 (5)
	21:58	21:17	14 20:06 (2)	20:09	18:55	25 18:26 (3)	16:46	36 16:15 (4)	16:07	10 15:30 (5)
6	05:03	05:47	19:50 (2)	06:42	07:35	18:00 (3)	07:34	15:39 (4)	08:26	15:21 (5)
	21:58	21:15	19 20:09 (2)	20:06	18:52	24 18:24 (3)	16:44	33 16:12 (4)	16:07	9 15:30 (5)
7	05:04	05:49	19:48 (2)	06:43	07:37	17:59 (3)	07:36	15:39 (4)	08:28	15:22 (5)
	21:57	21:13	23 20:11 (2)	20:04	18:50	22 18:21 (3)	16:43	31 16:10 (4)	16:06	7 15:29 (5)
8	05:05	05:51	19:46 (2)	06:45	07:39	17:59 (3)	07:38	15:40 (4)	08:29	15:22 (5)
	21:56	21:12	26 20:12 (2)	20:01	18:48	19 18:18 (3)	16:41	28 16:08 (4)	16:06	6 15:28 (5)
9	05:06	05:52	19:45 (2)	06:47	07:41	17:59 (3)	07:40	15:40 (4)	08:30	15:23 (5)
	21:55	21:10	28 20:13 (2)	19:59	18:45	17 18:16 (3)	16:39	26 16:06 (4)	16:05	5 15:28 (5)
10	05:07	05:54	19:43 (2)	06:49	07:42	17:59 (3)	07:42	15:42 (4)	08:31	15:24 (5)
	21:55	21:07	30 20:13 (2)	19:56	18:43	15 18:14 (3)	16:37	23 16:05 (4)	16:05	4 15:28 (5)
11	05:08	05:56	19:42 (2)	06:50	07:44	17:59 (3)	07:44	15:42 (4)	08:33	15:24 (5)
	21:54	21:05	32 20:14 (2)	19:54	18:40	12 18:11 (3)	16:35	21 16:03 (4)	16:05	3 15:27 (5)
12	05:09	05:57	19:42 (2)	06:52	07:46	17:59 (3)	07:45	15:43 (4)	08:34	15:25 (5)
	21:53	21:03	33 20:15 (2)	19:51	18:38	10 18:09 (3)	16:34	18 16:01 (4)	16:05	2 15:27 (5)
13	05:10	05:59	19:40 (2)	06:54	07:48	18:00 (3)	07:47	15:44 (4)	08:35	15:25 (5)
	21:52	21:01	35 20:15 (2)	19:49	18:36	7 18:07 (3)	16:32	15 15:59 (4)	16:05	2 15:27 (5)
14	05:12	06:01	19:40 (2)	06:56	07:50	18:01 (3)	07:49	15:45 (4)	08:36	
	21:51	20:59	36 20:16 (2)	19:47	18:33	3 18:04 (3)	16:31	13 15:58 (4)	16:04	
15	05:13	06:03	19:39 (2)	06:58	07:52		07:51	15:52 (5)	08:37	
	21:50	20:57	38 20:17 (2)	19:44	18:31		16:29	19 15:56 (4)	16:05	
16	05:14	06:04	19:38 (2)	06:59	07:54		07:53	15:20 (5)	08:38	
	21:49	20:55	38 20:16 (2)	19:42	18:29		16:27	19 15:54 (4)	16:05	
17	05:16	06:06	19:38 (2)	07:01	07:55		07:55	15:18 (5)	08:38	
	21:47	20:53	39 20:17 (2)	19:39	18:26		16:26	19 15:52 (4)	16:05	
18	05:17	06:08	19:38 (2)	07:03	07:57	16:55 (4)	07:57	15:17 (5)	08:39	
	21:46	20:51	39 20:17 (2)	19:37	18:24	15 17:10 (4)	16:24	19 15:36 (5)	16:05	
19	05:18	06:10	19:37 (2)	07:05	07:59	16:51 (4)	07:59	15:17 (5)	08:40	
	21:45	20:48	39 20:16 (2)	19:34	18:22	22 17:13 (4)	16:23	20 15:37 (5)	16:05	
20	05:20	06:12	19:37 (2)	07:06	08:01	16:49 (4)	08:00	15:16 (5)	08:41	
	21:44	20:46	39 20:16 (2)	19:32	18:20	26 17:15 (4)	16:22	21 15:37 (5)	16:06	
21	05:21	06:13	19:37 (2)	07:08	08:03	16:47 (4)	08:02	15:16 (5)	08:41	
	21:42	20:44	38 20:15 (2)	19:29	18:17	29 17:16 (4)	16:20	22 15:38 (5)	16:06	
22	05:23	06:15	19:36 (2)	07:10	08:05	16:45 (4)	08:04	15:16 (5)	08:42	
	21:41	20:42	36 20:12 (2)	19:27	18:15	33 17:18 (4)	16:19	23 15:39 (5)	16:06	
23	05:24	06:17	19:37 (2)	07:12	08:07	16:44 (4)	08:06	15:16 (5)	08:42	
	21:39	20:39	33 20:10 (2)	19:24	18:13	35 17:19 (4)	16:18	24 15:40 (5)	16:07	
24	05:26	06:19	19:37 (2)	07:13	08:09	16:42 (4)	08:08	15:16 (5)	08:43	
	21:38	20:37	32 20:09 (2)	19:22	18:11	37 17:19 (4)	16:17	24 15:40 (5)	16:08	
25	05:27	06:20	19:37 (2)	07:15	07:11	15:41 (4)	08:09	15:16 (5)	08:43	
	21:36	20:35	29 20:06 (2)	19:19	17:09	39 16:20 (4)	16:16	25 15:41 (5)	16:08	
26	05:29	06:22	19:37 (2)	07:17	07:13	15:40 (4)	08:11	15:16 (5)	08:43	
	21:35	20:32	27 20:04 (2)	19:17	17:06	41 16:21 (4)	16:14	24 15:40 (5)	16:09	
27	05:30	06:24	19:38 (2)	07:19	07:15	15:40 (4)	08:13	15:17 (5)	08:44	
	21:33	20:30	24 20:02 (2)	19:14	17:04	41 16:21 (4)	16:13	21 15:38 (5)	16:10	
28	05:32	06:26	19:38 (2)	07:21	07:16	15:39 (4)	08:14	15:17 (5)	08:44	
	21:32	20:28	21 19:59 (2)	19:12	17:02	42 16:21 (4)	16:12	20 15:37 (5)	16:11	
29	05:34	06:27	19:39 (2)	07:22	07:18	15:39 (4)	08:16	15:17 (5)	08:44	
	21:30	20:25	18 19:57 (2)	19:09	17:00	43 16:22 (4)	16:12	19 15:36 (5)	16:11	
30	05:35	06:29	19:41 (2)	07:24		18:09 (3)	07:20	15:38 (4)	08:18	
	21:28	20:23	14 19:55 (2)	19:07	11 18:20 (3)	16:58	16:58	44 16:22 (4)	16:11	17 15:35 (5)
31	05:37	06:31	19:41 (2)		07:22	15:38 (4)			08:44	1 15:34 (5)
	21:27	20:21	11 19:52 (2)		16:56	44 16:22 (4)			16:13	1 15:35 (5)
Potential sun hours	512	460	382		328	259			233	
Total, worst case		798	17		728	747			106	
Sun reduction		0.34	0.32		0.29	0.27			0.21	
Oper. time red.		1.00	1.00		1.00	1.00			1.00	
Wind dir. red.		0.65	0.67		0.66	0.66			0.66	
Total reduction		0.22	0.21		0.19	0.17			0.14	
Total, real		177	4		142	131			15	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MU - H359

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MV - H360

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MW - H361

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
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29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MX - H362

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: MY - H363

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case **Shadow receptor:** MZ - H364

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	08:14	07:16				07:01	05:52	05:03	04:59	05:39	06:33		07:26	18:23 (4)	07:24	08:19							
	16:15	17:06	18:02				20:00	20:55	21:45	22:00	21:25	20:18		19:05	13	18:36 (4)	16:54	16:10						
2	08:44	08:12	07:14				06:59	05:50	05:02	04:59	05:40	06:35		07:28		18:24 (4)	07:26	08:21						
	16:16	17:08	18:04				20:02	20:57	21:46	22:00	21:23	20:16		19:02	9	18:33 (4)	16:52	16:09						
3	08:43	08:10	07:11				06:56	05:48	05:01	05:00	05:42	06:36		07:30		18:24 (4)	07:28	08:22						
	16:17	17:10	18:05				20:04	20:59	21:48	21:59	21:21	20:13		19:00	7	18:31 (4)	16:50	16:08						
4	08:43	08:08	07:09				06:54	05:46	05:00	05:01	05:44	06:38		07:31		18:25 (4)	07:30	08:24						
	16:18	17:12	18:07				20:06	21:01	21:49	21:59	21:19	20:11		18:57	4	18:29 (4)	16:48	16:08						
5	08:43	08:07	07:07				06:51	05:44	04:59	05:02	05:45	06:40		07:33			16:46	16:07						
	16:19	17:14	18:09				20:07	21:03	21:50	21:58	21:17	20:09		18:55			16:46	16:07						
6	08:42	08:05	07:04				06:49	05:42	04:58	05:03	05:47	06:42		07:35			16:44	16:07						
	16:21	17:16	18:11				20:09	21:04	21:51	21:57	21:15	20:06		18:52			16:44	16:07						
7	08:42	08:03	07:02				06:47	05:40	04:58	05:04	05:49	06:43		07:37			16:43	16:06						
	16:22	17:18	18:13				20:11	21:06	21:52	21:57	21:13	20:04		18:50			16:43	16:06						
8	08:41	08:01	07:00				06:44	05:38	04:57	05:05	05:50	06:45		07:39			16:43	16:06						
	16:24	17:20	18:15				20:13	21:08	21:53	21:56	21:11	20:01		18:48			16:41	16:06						
9	08:41	07:59	06:57				06:42	05:36	04:57	05:06	05:52	06:47		07:41			16:40	16:06						
	16:25	17:22	18:17	2	17:50 (4)	20:15	21:10	21:54	21:55	21:09	19:59			18:45			16:39	16:05						
10	08:40	07:57	06:55				17:47 (4)	06:39	05:34	04:56	05:07	05:54	06:49		07:42			16:39	16:05					
	16:26	17:24	18:19	5	17:52 (4)	20:17	21:11	21:55	21:55	21:07	19:56			18:43			16:37	16:05						
11	08:40	07:55	06:52				17:45 (4)	06:37	05:32	04:56	05:08	05:56	06:50		07:44			16:37	16:05					
	16:28	17:26	18:21	9	17:54 (4)	20:18	21:13	21:55	21:54	21:05	19:54			18:40			16:35	16:05						
12	08:39	07:53	06:50				17:45 (4)	06:35	05:31	04:55	05:09	05:57	06:52		07:46			16:35	16:05					
	16:30	17:28	18:23	11	17:56 (4)	20:20	21:15	21:56	21:53	21:03	19:51			18:38			16:34	16:05						
13	08:38	07:51	06:48				17:44 (4)	06:32	05:29	04:55	05:10	05:59	06:54		07:48			16:34	16:05					
	16:31	17:30	18:25	14	17:58 (4)	20:22	21:17	21:57	21:52	21:01	19:49			18:36			16:32	16:04						
14	08:37	07:49	06:45				17:44 (4)	06:30	05:27	04:55	05:12	06:01	06:56		07:50			16:32	16:04					
	16:33	17:32	18:26	16	18:00 (4)	20:24	21:18	21:57	21:51	20:59	19:46			18:33			16:30	16:04						
15	08:36	07:47	06:43				17:44 (4)	06:28	05:25	04:54	05:13	06:03	06:57		07:52			16:30	16:04					
	16:34	17:34	18:28	18	18:02 (4)	20:26	21:20	21:58	21:50	20:57	19:44			18:31			16:29	16:04						
16	08:35	07:45	06:40				17:43 (4)	06:25	05:24	04:54	05:14	06:04	06:59		07:54			16:29	16:04					
	16:36	17:36	18:30	21	18:04 (4)	20:28	21:22	21:59	21:48	20:55	19:42			18:29			16:27	16:05						
17	08:34	07:43	06:38				17:44 (4)	06:23	05:22	04:54	05:16	06:06	07:01		07:55			16:27	16:05					
	16:38	17:38	18:32	22	18:06 (4)	20:30	21:23	21:59	21:47	20:53	19:39			18:26			16:26	16:05						
18	08:33	07:41	06:35				17:44 (4)	06:21	05:21	04:54	05:17	06:08	07:03		07:57			16:26	16:05					
	16:40	17:40	18:34	20	18:04 (4)	20:31	21:25	22:00	21:46	20:50	19:37			18:24			16:24	16:05						
19	08:32	07:39	06:33				17:46 (4)	06:18	05:19	04:54	05:18	06:10	07:05		07:59			16:24	16:05					
	16:41	17:42	18:36	17	18:03 (4)	20:33	21:27	22:00	21:45	20:48	19:34			18:22			16:23	16:05						
20	08:31	07:36	06:31				17:47 (4)	06:16	05:18	04:54	05:20	06:12	07:06		08:01			16:23	16:05					
	16:43	17:44	18:38	13	18:00 (4)	20:35	21:28	22:00	21:44	20:46	19:32			18:20			16:22	16:06						
21	08:30	07:34	06:28				17:50 (4)	06:14	05:16	04:54	05:21	06:13	07:08		08:03			16:22	16:06					
	16:45	17:46	18:40	8	17:58 (4)	20:37	21:30	22:00	21:42	20:44	19:29			18:17			16:20	16:06						
22	08:28	07:32	06:26				06:11	05:15	04:55	05:23	06:15	07:10		08:05			16:20	16:06						
	16:47	17:48	18:41				20:39	21:31	22:01	21:41	20:42	19:27	5	18:41 (4)	18:15		16:19	16:06						
23	08:27	07:30	06:23				06:09	05:13	04:55	05:24	06:17	07:12		18:32 (4)	18:07		16:18	16:07						
	16:49	17:50	18:43				20:41	21:33	22:01	21:39	20:39	19:24	12	18:44 (4)	18:13		16:18	16:07						
24	08:26	07:28	06:21				06:07	05:12	04:55	05:26	06:19	07:13		18:30 (4)	18:09		16:17	16:08						
	16:50	17:52	18:45				20:42	21:34	22:01	21:38	20:37	19:22	16	18:46 (4)	18:11		16:17	16:08						
25	08:24	07:25	06:18				06:05	05:11	04:55	05:27	06:20	07:15		18:27 (4)	17:11		16:16	16:08						
	16:52	17:54	18:47				20:44	21:36	22:01	21:36	20:35	19:19	19	18:46 (4)	17:09		16:16	16:08						
26	08:23	07:23	06:16				06:03	05:09	04:56	05:29	06:22	07:17		18:26 (4)	17:13		16:16	16:08						
	16:54	17:56	18:49				20:46	21:37	22:01	21:35	20:32	19:17	21	18:47 (4)	17:06		16:14	16:09						
27	08:21	07:21	06:13				06:00	05:08	04:56	05:30	06:24	07:19		18:25 (4)	17:14		16:14	16:09						
	16:56	17:58	18:51				20:48	21:39	22:01	21:33	20:30	19:14	21	18:46 (4)	17:04		16:13	16:10						
28	08:20	07:18	06:11				05:58	05:07	04:57	05:32	06:26	07:21		18:25 (4)	17:16		16:13	16:10						
	16:58	18:00	18:53				20:50	21:40	22:01	21:32	20:28	19:12	19	18:44 (4)	17:02		16:12	16:10						
29	08:18		07:08				05:56	05:06	04:57	05:34	06:27	07:22		18:24 (4)	17:18		16:12	16:10						
	17:00		19:54				20:52	21:41	22:01	21:30	20:25	19:09	17	18:41 (4)	17:00		16:11	16:11						
30	08:17		07:06				05:54	05:05	04:58	05:35	06:29	07:24		18:23 (4)	17:20		16:11	16:11						
	17:02		19:56				20:53	21:43	22:00	21:28	20:23	19:07	15	18:38 (4)	16:58		16:11	16:12						
31	08:15		07:04					05:04		05:37	06:31			07:22			16:11	16:12						
	17:04		19:58					21:44		21:26	20:21			16:56			16:11	16:13						
Potential sun hours	250	273	367				420	494	510	512	460	382		328			259	233						
Total, worst case				176									145		33									
Sun reduction				0.27									0.32		0.29									
Oper. time red.				1.00									1.00		1.00									
Wind dir. red.				0.67									0.67		0.67									
Total reduction				0.18									0.22		0.20									
Total, real				32									31		6									

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NA - H365

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	[January	[February	[March	[April	[May	[June	[July	[August	[September	[October	[November	[December		
1	08:44	08:14	07:16	07:01	05:52	05:03	21:08 (4)	04:59	21:11 (4)	05:39	06:33	07:26	07:24	08:19
2	16:15	17:06	18:02	20:00	20:55	21:45	21:10 (4)	22:00	21:24 (4)	21:25	20:18	19:05	16:54	16:10
3	08:44	08:12	07:14	06:59	05:50	05:02	21:08 (4)	05:00	21:12 (4)	05:40	06:35	07:28	07:26	08:21
4	16:16	17:08	18:04	20:02	20:57	21:46	21:12 (4)	21:59	21:24 (4)	21:23	20:16	19:02	16:52	16:09
5	08:43	08:10	07:11	06:56	05:48	05:01	21:08 (4)	05:00	21:12 (4)	05:42	06:36	07:30	07:28	08:22
6	16:17	17:10	18:06	20:04	20:59	21:48	21:13 (4)	21:51	21:23 (4)	21:21	20:13	19:00	16:50	16:08
7	08:43	08:08	07:09	06:54	05:46	05:00	21:07 (4)	05:01	21:12 (4)	05:44	06:38	07:31	07:30	08:23
8	16:18	17:12	18:07	20:06	21:01	21:49	21:14 (4)	21:59	21:23 (4)	21:19	20:11	18:57	16:48	16:08
9	08:43	08:07	07:07	06:51	05:44	04:59	21:08 (4)	05:02	21:13 (4)	05:45	06:40	07:33	07:32	08:25
10	16:20	17:14	18:09	20:07	21:02	21:50	21:15 (4)	21:58	21:23 (4)	21:17	20:09	18:55	16:46	16:07
11	08:42	08:05	07:04	06:49	05:42	04:59	21:07 (4)	05:03	21:13 (4)	05:47	06:42	07:35	07:34	08:26
12	16:21	17:16	18:11	20:09	21:04	21:51	21:16 (4)	21:57	21:22 (4)	21:15	20:06	18:52	16:44	16:07
13	08:42	08:03	07:02	06:47	05:40	04:58	21:07 (4)	05:04	21:14 (4)	05:49	06:43	07:37	07:36	08:28
14	16:22	17:18	18:13	20:11	21:06	21:52	21:16 (4)	21:57	21:22 (4)	21:13	20:04	18:50	16:43	16:06
15	08:41	08:01	07:00	06:44	05:38	04:57	21:07 (4)	05:05	21:14 (4)	05:51	06:45	07:39	07:38	08:29
16	16:24	17:20	18:15	20:13	21:08	21:53	21:17 (4)	21:56	21:21 (4)	21:11	20:01	18:48	16:41	16:06
17	08:41	07:59	06:57	06:42	05:36	04:57	21:06 (4)	05:06	21:15 (4)	05:52	06:47	07:41	07:40	08:30
18	16:25	17:22	18:17	20:15	21:10	21:54	21:18 (4)	21:55	21:21 (4)	21:09	19:59	18:45	16:39	16:05
19	08:40	07:57	06:55	06:39	05:34	04:56	21:07 (4)	05:07	21:15 (4)	05:54	06:49	07:42	07:42	08:31
20	16:27	17:24	18:19	20:17	21:11	21:54	21:19 (4)	21:54	21:20 (4)	21:07	19:56	18:43	16:37	16:05
21	08:40	07:55	06:52	06:37	05:33	04:56	21:07 (4)	05:08	21:16 (4)	05:56	06:50	07:44	07:43	08:32
22	16:28	17:26	18:21	20:18	21:13	21:55	21:20 (4)	21:54	21:19 (4)	21:05	19:54	18:40	16:35	16:05
23	08:39	07:53	06:50	06:35	05:31	04:55	21:07 (4)	05:09	21:16 (4)	05:57	06:52	07:46	07:45	08:34
24	16:30	17:28	18:23	20:20	21:15	21:56	21:20 (4)	21:53	21:18 (4)	21:03	19:51	18:38	16:34	16:05
25	08:38	07:51	06:48	06:32	05:29	04:55	21:07 (4)	05:11	05:59	06:54	07:48	07:47	08:35	16:05
26	16:31	17:30	18:25	20:22	21:17	21:57	21:21 (4)	21:52	21:01	19:49	18:36	16:32	16:05	16:05
27	08:37	07:49	06:45	06:30	05:27	04:55	21:07 (4)	05:12	06:01	06:56	07:50	07:49	08:36	16:05
28	16:33	17:32	18:27	20:24	21:18	21:57	21:22 (4)	21:51	20:59	19:46	18:33	16:31	16:05	16:05
29	08:36	07:47	06:43	06:28	05:26	04:55	21:08 (4)	05:13	06:03	06:57	07:52	07:51	08:37	16:05
30	16:34	17:34	18:28	20:26	21:20	21:58	21:22 (4)	21:50	20:57	19:44	18:31	16:29	16:05	16:05
31	08:35	07:45	06:40	06:25	05:24	04:54	21:08 (4)	05:14	06:04	06:59	07:54	07:53	08:37	16:05
32	16:36	17:36	18:30	20:28	21:22	21:59	21:23 (4)	21:48	20:55	19:42	18:29	16:27	16:05	16:05
33	08:34	07:43	06:38	06:23	05:22	04:54	21:08 (4)	05:16	06:06	07:01	07:55	07:55	08:38	16:05
34	16:38	17:38	18:32	20:30	21:23	21:59	21:23 (4)	21:47	20:53	19:39	18:26	16:26	16:05	16:05
35	08:33	07:41	06:35	06:21	05:21	04:54	21:08 (4)	05:17	06:08	07:03	07:57	07:57	08:39	16:05
36	16:40	17:40	18:34	20:31	21:25	21:59	21:24 (4)	21:46	20:50	19:37	18:24	16:25	16:05	16:05
37	08:32	07:39	06:33	06:18	05:19	04:54	21:08 (4)	05:18	06:10	07:05	07:59	07:59	08:40	16:05
38	16:41	17:42	18:36	20:33	21:26	22:00	21:24 (4)	21:45	20:48	19:34	18:22	16:23	16:05	16:05
39	08:31	07:36	06:31	06:16	05:18	04:54	21:08 (4)	05:20	06:12	07:06	08:01	08:00	08:40	16:05
40	16:43	17:44	18:38	20:35	21:28	22:00	21:24 (4)	21:43	20:46	19:32	18:20	16:22	16:06	16:06
41	08:30	07:34	06:28	06:14	05:16	04:54	21:09 (4)	05:21	06:13	07:08	08:03	08:02	08:41	16:06
42	16:45	17:46	18:40	20:37	21:30	22:00	21:24 (4)	21:42	20:44	19:29	18:17	16:20	16:06	16:06
43	08:28	07:32	06:26	06:12	05:15	04:55	21:09 (4)	05:23	06:15	07:10	08:05	08:04	08:42	16:06
44	16:47	17:48	18:41	20:39	21:31	22:01	21:25 (4)	21:41	20:41	19:27	18:15	16:19	16:06	16:06
45	08:27	07:30	06:23	06:09	05:13	04:55	21:09 (4)	05:24	06:17	07:12	08:07	08:06	08:42	16:07
46	16:49	17:50	18:43	20:41	21:33	22:01	21:25 (4)	21:39	20:39	19:24	18:13	16:18	16:07	16:07
47	08:26	07:28	06:21	06:07	05:12	04:55	21:09 (4)	05:26	06:19	07:13	08:09	08:07	08:43	16:08
48	16:51	17:52	18:45	20:42	21:34	22:01	21:25 (4)	21:38	20:37	19:22	18:11	16:17	16:08	16:08
49	08:24	07:25	06:18	06:05	05:11	04:56	21:10 (4)	05:27	06:20	07:15	08:11	08:09	08:43	16:09
50	16:52	17:54	18:47	20:44	21:36	22:01	21:25 (4)	21:36	20:35	19:19	18:09	16:16	16:08	16:08
51	08:23	07:23	06:16	06:03	05:09	04:56	21:10 (4)	05:29	06:22	07:17	08:13	08:11	08:43	16:10
52	16:54	17:56	18:49	20:46	21:37	22:01	21:25 (4)	21:35	20:32	19:17	18:06	16:15	16:09	16:09
53	08:21	07:21	06:13	06:01	05:08	04:56	21:10 (4)	05:30	06:24	07:19	08:14	08:13	08:43	16:10
54	16:56	17:58	18:51	20:48	21:39	22:01	21:24 (4)	21:33	20:30	19:14	18:04	16:13	16:10	16:10
55	08:20	07:18	06:11	05:58	05:07	04:57	21:11 (4)	05:32	06:26	07:21	08:16	08:14	08:44	16:11
56	16:58	18:00	18:53	20:50	21:40	22:01	21:25 (4)	21:32	20:28	19:12	18:02	16:12	16:11	16:11
57	08:18		07:08	05:56	05:06	04:58	21:11 (4)	05:34	06:27	07:22	08:18	08:16	08:44	16:12
58	17:00		19:54	20:52	21:41	22:00	21:25 (4)	21:30	20:25	19:09	18:00	16:12	16:11	16:11
59	08:17		07:06	05:54	05:05	04:58	21:11 (4)	05:35	06:29	07:24	08:20	08:17	08:44	16:12
60	17:02		19:56	20:53	21:43	22:00	21:24 (4)	21:28	20:23	19:07	18:00	16:11	16:12	16:12
61	08:15		07:04		05:04	21:08 (4)		05:37	06:31		07:22		08:44	16:13
62	17:04		19:58		21:44	1	21:09 (4)	21:26	20:21		16:56		16:13	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case					1	372			97					
Sun reduction					0.38	0.32			0.32					
Oper. time red.					1.00	1.00			1.00					
Wind dir. red.					0.61	0.61			0.61					
Total reduction					0.23	0.19			0.20					
Total, real					0	72			19					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NB - H366

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	08:18 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NC - H367

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		15:40 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19		15:20 (2)						
	16:15		17:06	29	16:09 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54								14	15:34 (2)	
2	08:44		08:12		15:41 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26		08:21		15:21 (2)						
	16:16		17:08	28	16:09 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52								11	15:32 (2)	
3	08:44		08:10		15:42 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28				15:23 (2)						
	16:17		17:10	26	16:08 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	5	15:28 (2)		15:32 (2)				10	15:32 (2)	
4	08:43		08:08		15:43 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30		08:24		15:19 (2)						
	16:18		17:12	24	16:07 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	13	15:32 (2)		15:32 (2)				8	15:32 (2)	
5	08:43		08:07		15:45 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25		15:16 (2)						
	16:19		17:14	21	16:06 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	18	15:34 (2)		15:36 (2)				5	15:30 (2)	
6	08:43		15:41 (2)	08:05	15:47 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34		08:26		15:14 (2)						
	16:21	3	15:44 (2)	17:16	16:04 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	22	15:36 (2)		15:32 (2)				3	15:30 (2)	
7	08:42		15:40 (2)	08:03	15:49 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36		08:28		15:13 (2)						
	16:22	5	15:45 (2)	17:18	16:02 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	24	15:37 (2)		15:32 (2)						
8	08:42		15:39 (2)	08:01		07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38		08:29		15:12 (2)						
	16:24	7	15:46 (2)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	26	15:38 (2)		15:32 (2)						
9	08:41		15:39 (2)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:30		15:12 (2)						
	16:25	10	15:49 (2)	17:22		18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	28	15:40 (2)		15:32 (2)						
10	08:40		15:39 (2)	07:57		06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42		08:32		15:11 (2)						
	16:26	11	15:50 (2)	17:24		18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:42	16:37	29	15:40 (2)		15:32 (2)						
11	08:40		15:38 (2)	07:55		06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44		08:33		15:11 (2)						
	16:28	14	15:52 (2)	17:26		18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	30	15:41 (2)		15:32 (2)						
12	08:39		15:38 (2)	07:53		06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46		08:34		15:10 (2)						
	16:29	16	15:54 (2)	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	31	15:41 (2)		15:32 (2)						
13	08:38		15:37 (2)	07:51		06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47		08:35		15:10 (2)						
	16:31	18	15:55 (2)	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	32	15:42 (2)		15:32 (2)						
14	08:37		15:37 (2)	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49		08:36		15:10 (2)						
	16:33	20	15:57 (2)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	32	15:42 (2)		15:32 (2)						
15	08:36		15:37 (2)	07:47		06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51		08:37		15:10 (2)						
	16:34	22	15:59 (2)	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	32	15:42 (2)		15:32 (2)						
16	08:35		15:36 (2)	07:45		06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53		08:38		15:10 (2)						
	16:36	24	16:00 (2)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	32	15:42 (2)		15:32 (2)						
17	08:34		15:36 (2)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55		08:38		15:10 (2)						
	16:38	26	16:02 (2)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	33	15:43 (2)		15:32 (2)						
18	08:33		15:36 (2)	07:41		06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57		08:39		15:10 (2)						
	16:40	29	16:05 (2)	17:40		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	33	15:43 (2)		15:32 (2)						
19	08:32		15:37 (2)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59		08:40		15:10 (2)						
	16:41	30	16:07 (2)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	33	15:43 (2)		15:32 (2)						
20	08:31		15:36 (2)	07:36		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00		08:41		15:11 (2)						
	16:43	31	16:07 (2)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	32	15:43 (2)		15:32 (2)						
21	08:30		15:36 (2)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02		08:41		15:11 (2)						
	16:45	32	16:08 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	32	15:43 (2)		15:32 (2)						
22	08:29		15:36 (2)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		08:42		15:12 (2)						
	16:47	32	16:08 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	31	15:43 (2)		15:32 (2)						
23	08:27		15:36 (2)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		08:42		15:13 (2)						
	16:49	33	16:09 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	30	15:43 (2)		15:32 (2)						
24	08:26		15:36 (2)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08		08:43		15:13 (2)						
	16:50	33	16:09 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	29	15:42 (2)		15:32 (2)						
25	08:25		15:37 (2)	07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:09	08:09		08:43		15:14 (2)						
	16:52	33	16:10 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	27	15:41 (2)		15:32 (2)						
26	08:23		15:37 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:11	08:11		08:43		15:15 (2)						
	16:54	32	16:09 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	24	15:39 (2)		15:32 (2)						
27	08:22		15:37 (2)	07:21		06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:13	08:13		08:44		15:16 (2)						
	16:56	32	16:09 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:16		08:44		15:16 (2)						
28	08:20		15:38 (2)	07:18		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:14	08:14	22	15:38 (2)		15:32 (2)						
	16:58	32	16:10 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	20	15:37 (2)		15:32 (2)						
29	08:19		15:38 (2)			07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:16	08:16		08:44		15:17 (2)						
	17:00	32	16:10 (2)			19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	18	15:35 (2)		15:32 (2)						
30	08:17		15:38 (2)			07:06	05:54	05:05	04:58	05:35	06													

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: ND - H368

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NE - H369

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:08 (5)	07:16	16:49 (4)	07:01	05:52	19:50 (2)	05:03		
	16:15	17:06	21 16:29 (5)	18:02	37 17:26 (4)	20:00	20:55	33 20:23 (2)	21:45		
2	08:44	08:12	16:09 (5)	07:14	16:49 (4)	06:59	05:50	19:50 (2)	05:02		
	16:16	17:08	19 16:28 (5)	18:04	35 17:24 (4)	20:02	20:57	33 20:23 (2)	21:46		
3	08:44	08:10	16:10 (5)	07:12	16:50 (4)	06:56	05:48	19:50 (2)	05:01		
	16:17	17:10	17 16:27 (5)	18:06	34 17:24 (4)	20:04	20:59	32 20:22 (2)	21:48		
4	08:43	08:08	16:11 (5)	07:09	16:52 (4)	06:54	05:46	19:51 (2)	05:00		
	16:18	17:12	15 16:26 (5)	18:07	31 17:23 (4)	20:06	21:01	30 20:21 (2)	21:49		
5	08:43	08:07	16:14 (5)	07:07	16:52 (4)	06:51	05:44	19:51 (2)	04:59		
	16:19	17:14	10 16:24 (5)	18:09	29 17:21 (4)	20:07	21:03	29 20:20 (2)	21:50		
6	08:42	08:05	16:15 (5)	07:04	16:55 (4)	06:49	05:42	19:52 (2)	04:59		
	16:21	17:16	18:11	24 17:19 (4)	20:09	21:04	27 20:19 (2)	21:51			
7	08:42	08:03	16:16 (5)	07:02	16:56 (4)	06:47	05:40	19:53 (2)	04:58		
	16:22	17:18	18:13	20 17:16 (4)	20:11	21:06	26 20:19 (2)	21:52			
8	08:42	08:01	16:17 (5)	07:00	17:00 (4)	06:44	05:38	19:54 (2)	04:57		
	16:24	17:20	18:15	15 17:48 (3)	20:13	21:08	24 20:18 (2)	21:53			
9	08:41	07:59	16:18 (5)	06:57	17:45 (3)	06:42	05:36	19:55 (2)	04:57		
	16:25	17:22	18:17	5 17:50 (3)	20:15	21:10	21 20:16 (2)	21:54			
10	08:40	07:57	16:19 (5)	06:55	17:44 (3)	06:39	05:34	19:56 (2)	04:56		
	16:26	17:24	18:19	8 17:52 (3)	20:17	21:11	19 20:15 (2)	21:55			
11	08:40	07:55	16:20 (5)	06:52	17:44 (3)	06:37	05:33	19:59 (2)	04:56		
	16:28	17:26	18:21	11 17:55 (3)	20:19	21:13	14 20:13 (2)	21:55			
12	08:39	07:53	16:21 (5)	06:50	17:43 (3)	06:35	05:31	20:01 (2)	04:55		
	16:30	17:28	2 16:56 (4)	18:23	13 17:56 (3)	20:20	21:15	9 20:10 (2)	21:56		
13	08:38	07:51	16:55 (4)	06:48	17:43 (3)	06:32	05:29		04:55		
	16:31	17:30	5 17:00 (4)	18:25	15 17:58 (3)	20:22	21:17		21:57		
14	08:37	07:49	16:54 (4)	06:45	17:42 (3)	06:30	05:27		04:55		
	16:33	17:32	8 17:02 (4)	18:27	18 18:00 (3)	20:24	21:18		21:58		
15	08:36	07:47	16:53 (4)	06:43	17:43 (3)	06:28	05:26		04:54		
	16:34	17:34	12 17:05 (4)	18:28	19 18:02 (3)	20:26	21:20		21:58		
16	08:35	07:45	16:52 (4)	06:40	17:42 (3)	06:25	05:24		04:54		
	16:36	17:36	15 17:07 (4)	18:30	22 18:04 (3)	20:28	21:22		21:59		
17	08:34	07:43	16:51 (4)	06:38	17:43 (3)	06:23	05:22		04:54		
	16:38	17:38	18 17:09 (4)	18:32	22 18:05 (3)	20:30	21:23		21:59		
18	08:33	07:41	16:50 (4)	06:35	17:44 (3)	06:21	19:59 (2)	05:21	04:54		
	16:40	17:40	21 17:11 (4)	18:34	19 18:03 (3)	20:31	4 20:03 (2)	21:25	22:00		
19	08:32	16:06 (5)	07:39	16:49 (4)	06:33	17:46 (3)	06:18	19:57 (2)	05:19	04:54	
	16:41	16:07 (5)	24 17:42	17:13 (4)	18:36	15 18:01 (3)	20:33	8 20:05 (2)	21:27	22:00	
20	08:31	16:05 (5)	07:36	16:49 (4)	06:31	17:47 (3)	06:16	19:56 (2)	05:18	04:54	
	16:43	3 16:08 (5)	17:44	27 17:16 (4)	18:38	11 17:58 (3)	20:35	11 20:07 (2)	21:28	22:00	
21	08:30	16:05 (5)	07:34	16:49 (4)	06:28		06:14	19:54 (2)	05:16	04:54	
	16:45	6 16:11 (5)	17:46	29 17:18 (4)	18:40		20:37	14 20:08 (2)	21:30	22:01	
22	08:29	16:04 (5)	07:32	16:48 (4)	06:26		06:12	19:53 (2)	05:15	04:55	
	16:47	8 16:12 (5)	17:48	31 17:19 (4)	18:42		20:39	17 20:10 (2)	21:31	22:01	
23	08:27	16:05 (5)	07:30	16:48 (4)	06:23		06:09	19:52 (2)	05:13	04:55	
	16:49	10 16:15 (5)	17:50	34 17:22 (4)	18:43		20:41	20 20:12 (2)	21:33	22:01	
24	08:26	16:04 (5)	07:28	16:48 (4)	06:21		06:07	19:51 (2)	05:12	04:55	
	16:50	13 16:17 (5)	17:52	36 17:24 (4)	18:45		20:42	23 20:14 (2)	21:34	22:01	
25	08:24	16:05 (5)	07:25	16:47 (4)	06:18		06:05	19:51 (2)	05:11	04:55	
	16:52	14 16:19 (5)	17:54	39 17:26 (4)	18:47		20:44	24 20:15 (2)	21:36	22:01	
26	08:23	16:05 (5)	07:23	16:48 (4)	06:16		06:03	19:50 (2)	05:09	04:56	
	16:54	16 16:21 (5)	17:56	40 17:28 (4)	18:49		20:46	27 20:17 (2)	21:37	22:01	
27	08:22	16:05 (5)	07:21	16:49 (4)	06:13		06:01	19:50 (2)	05:08	04:56	
	16:56	18 16:23 (5)	17:58	39 17:28 (4)	18:51		20:48	29 20:19 (2)	21:39	22:01	
28	08:20	16:06 (5)	07:18	16:48 (4)	06:11		05:58	19:50 (2)	05:07	04:57	
	16:58	20 16:26 (5)	18:00	38 17:26 (4)	18:53		20:50	31 20:21 (2)	21:40	22:01	
29	08:18	16:06 (5)		07:08			05:56	19:50 (2)	05:06	04:57	
	17:00	22 16:28 (5)		19:54			20:52	32 20:22 (2)	21:41	22:01	
30	08:17	16:06 (5)		07:06			05:54	19:50 (2)	05:05	04:58	
	17:02	23 16:29 (5)		19:56			20:53	34 20:24 (2)	21:43	22:00	
31	08:15	16:06 (5)		07:04					05:04		
	17:04	23 16:29 (5)		19:58					21:44		
Potential sun hours	250		273	367		420		494		510	
Total, worst case	177		500	403		274		297			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.67	0.67		0.65		0.65			
Total reduction	0.16		0.16	0.18		0.23		0.25			
Total, real	28		78	73		63		73			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case Shadow receptor: NE - H369

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December	
1	04:59	05:39		20:10 (2)	06:33		07:26	18:21 (3)	07:24		08:19	
	22:00	21:25	12	20:22 (2)	20:18		19:05	15 18:36 (3)	16:54		16:10	
2	04:59	05:40		20:08 (2)	06:35		07:28	18:21 (3)	07:26		08:21	
	22:00	21:23	17	20:25 (2)	20:16		19:02	12 18:33 (3)	16:52		16:09	
3	05:00	05:42		20:06 (2)	06:36		07:30	18:22 (3)	07:28		08:22	
	21:59	21:21	20	20:26 (2)	20:13		19:00	9 18:31 (3)	16:50		16:08	
4	05:01	05:44		20:05 (2)	06:38		07:31	18:22 (3)	07:30		08:24	
	21:59	21:19	22	20:27 (2)	20:11		18:57	7 18:29 (3)	16:48		16:08	
5	05:02	05:45		20:03 (2)	06:40		07:33	17:40 (4)	07:32	15:47 (5)	08:25	
	21:58	21:17	25	20:28 (2)	20:09		18:55	10 18:26 (3)	16:46	4 15:51 (5)	16:07	
6	05:03	05:47		20:02 (2)	06:42		07:35	17:35 (4)	07:34	15:43 (5)	08:26	
	21:58	21:15	27	20:29 (2)	20:06		18:52	17 17:52 (4)	16:44	11 15:54 (5)	16:07	
7	05:04	05:49		20:02 (2)	06:43		07:37	17:31 (4)	07:36	15:41 (5)	08:28	
	21:57	21:13	28	20:30 (2)	20:04		18:50	22 17:53 (4)	16:43	15 15:56 (5)	16:06	
8	05:05	05:50		20:00 (2)	06:45		07:39	17:29 (4)	07:38	15:40 (5)	08:29	
	21:56	21:12	30	20:30 (2)	20:01		18:48	26 17:55 (4)	16:41	17 15:57 (5)	16:06	
9	05:06	05:52		20:00 (2)	06:47		07:41	17:27 (4)	07:40	15:39 (5)	08:30	
	21:55	21:10	31	20:31 (2)	19:59		18:45	29 17:56 (4)	16:39	19 15:58 (5)	16:05	
10	05:07	05:54		19:59 (2)	06:49		07:42	17:25 (4)	07:42	15:39 (5)	08:31	
	21:55	21:07	32	20:31 (2)	19:56		18:43	32 17:57 (4)	16:37	21 16:00 (5)	16:05	
11	05:08	05:56		19:58 (2)	06:50		07:44	17:24 (4)	07:44	15:38 (5)	08:33	
	21:54	21:05	33	20:31 (2)	19:54		18:40	34 17:58 (4)	16:35	23 16:01 (5)	16:05	
12	05:09	05:57		19:58 (2)	06:52		07:46	17:23 (4)	07:45	15:38 (5)	08:34	
	21:53	21:03	34	20:32 (2)	19:51		18:38	36 17:59 (4)	16:34	23 16:01 (5)	16:05	
13	05:10	05:59		19:57 (2)	06:54		07:48	17:22 (4)	07:47	15:38 (5)	08:35	
	21:52	21:01	34	20:31 (2)	19:49		18:36	37 17:59 (4)	16:32	21 15:59 (5)	16:05	
14	05:12	06:01		19:57 (2)	06:56		07:50	17:21 (4)	07:49	15:37 (5)	08:36	
	21:51	20:59	32	20:29 (2)	19:47		18:33	39 18:00 (4)	16:31	21 15:58 (5)	16:04	
15	05:13	06:03		19:58 (2)	06:58		07:52	17:20 (4)	07:51	15:37 (5)	08:37	
	21:50	20:57	30	20:28 (2)	19:44		18:31	40 18:00 (4)	16:29	19 15:56 (5)	16:05	
16	05:14	06:04		19:57 (2)	06:59		07:54	17:20 (4)	07:53	15:38 (5)	08:38	
	21:49	20:55	28	20:25 (2)	19:42		18:29	39 17:59 (4)	16:27	16 15:54 (5)	16:05	
17	05:16	06:06		19:57 (2)	07:01		07:55	17:20 (4)	07:55	15:38 (5)	08:38	
	21:47	20:53	26	20:23 (2)	19:39		18:26	37 17:57 (4)	16:26	14 15:52 (5)	16:05	
18	05:17	06:08		19:58 (2)	07:03		07:57	17:19 (4)	07:57	15:38 (5)	08:39	
	21:46	20:51	24	20:22 (2)	19:37		18:24	36 17:55 (4)	16:24	13 15:51 (5)	16:05	
19	05:18	06:10		19:57 (2)	07:05		07:59	17:19 (4)	07:59	15:39 (5)	08:40	
	21:45	20:48	22	20:19 (2)	19:34		18:22	33 17:52 (4)	16:23	10 15:49 (5)	16:05	
20	05:20	06:12		19:58 (2)	07:06		08:01	17:19 (4)	08:00	15:39 (5)	08:41	
	21:44	20:46	19	20:17 (2)	19:32		18:20	31 17:50 (4)	16:22	8 15:47 (5)	16:06	
21	05:21	06:13		19:59 (2)	07:08		08:03	17:19 (4)	08:02	15:40 (5)	08:41	
	21:42	20:44	16	20:15 (2)	19:29		18:17	29 17:48 (4)	16:20	6 15:46 (5)	16:06	
22	05:23	06:15		19:58 (2)	07:10		08:05	17:19 (4)	08:04	15:41 (5)	08:42	
	21:41	20:42	14	20:12 (2)	19:27		18:15	26 17:45 (4)	16:19	3 15:44 (5)	16:06	
23	05:24	06:17		20:00 (2)	07:12	18:33 (3)	08:07	17:20 (4)	08:06	15:42 (5)	08:42	
	21:39	20:39	10	20:10 (2)	19:24	9 18:42 (3)	18:13	23 17:43 (4)	16:18	1 15:43 (5)	16:07	
24	05:26	06:19		20:01 (2)	07:13	18:30 (3)	08:09	17:20 (4)	08:08		08:43	
	21:38	20:37	8	20:09 (2)	19:22	14 18:44 (3)	18:11	21 17:41 (4)	16:17		16:08	
25	05:27	06:20		20:02 (2)	07:15	18:27 (3)	07:11		16:21 (4)	08:09	08:43	
	21:36	20:35	4	20:06 (2)	19:19	18 18:45 (3)	17:09	17 16:38 (4)	16:16		16:08	
26	05:29	06:22			07:17	18:25 (3)	07:13		16:21 (4)	08:11	08:43	
	21:35	20:32			19:17	21 18:46 (3)	17:06	15 16:36 (4)	16:14		16:09	
27	05:30	06:24			07:19	18:24 (3)	07:15		16:22 (4)	08:13	08:44	
	21:33	20:30			19:14	22 18:46 (3)	17:04	12 16:34 (4)	16:13		16:10	
28	05:32	06:26			07:21	18:24 (3)	07:16		16:23 (4)	08:14	08:44	
	21:32	20:28			19:12	20 18:44 (3)	17:02	8 16:31 (4)	16:12		16:11	
29	05:34	06:27			07:22	18:23 (3)	07:18		16:25 (4)	08:16	08:44	
	21:30	20:25			19:09	18 18:41 (3)	17:00	4 16:29 (4)	16:12		16:11	
30	05:35	06:29			07:24	18:22 (3)	07:20		16:26 (4)	08:18	08:44	
	21:28	20:23			19:07	16 18:38 (3)	16:58	1 16:27 (4)	16:11		16:12	
31	05:37	06:31					07:22				08:44	
	21:26	20:21					16:56				16:13	
Potential sun hours	512	460			382		328		259		233	
Total, worst case			578		138		697		265			
Sun reduction			0.34		0.32		0.29		0.27			
Oper. time red.			1.00		1.00		1.00		1.00			
Wind dir. red.			0.65		0.67		0.67		0.66			
Total reduction			0.22		0.22		0.20		0.18			
Total, real			128		30		137		47			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NF - H370

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NG - H371

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NH - H372

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NI - H373

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NJ - SAINT PATRICK'S NATIONAL SCHOOL

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NK - H374

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	20:01 (5) 04:59	20:06 (5) 05:39	20:24 (5) 06:33	07:26 07:24	07:24 08:19	08:19
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	20:01 (5) 05:00	20:06 (5) 05:40	20:26 (5) 06:35	07:28 07:26	07:26 08:21	08:21
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	20:01 (5) 05:00	20:06 (5) 05:42	20:27 (5) 06:36	07:30 07:28	07:28 08:22	08:22
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	20:01 (5) 05:01	20:06 (5) 05:44	20:30 (5) 06:38	07:31 07:30	07:30 08:24	08:24
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	20:01 (5) 05:02	20:07 (5) 05:45	20:32 (5) 06:40	07:33 07:32	07:32 08:25	08:25
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	20:01 (5) 05:03	20:07 (5) 05:47	20:37 (5) 06:42	07:35 07:34	07:34 08:26	08:26
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:26 (5) 04:58	20:00 (5) 05:04	20:08 (5) 05:49	20:43 06:43	07:37 07:36	07:36 08:28	08:28
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:22 (5) 04:57	20:01 (5) 05:05	20:08 (5) 05:51	20:45 06:45	07:39 07:38	07:38 08:29	08:29
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:19 (5) 04:57	20:02 (5) 05:06	20:08 (5) 05:52	20:47 06:47	07:41 07:40	07:40 08:30	08:30
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:16 (5) 04:56	20:01 (5) 05:07	20:09 (5) 05:54	20:49 06:49	07:42 07:42	07:42 08:31	08:31
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	20:15 (5) 04:56	20:01 (5) 05:08	20:09 (5) 05:56	20:51 06:51	07:44 07:44	07:44 08:33	08:33
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:13 (5) 04:55	20:02 (5) 05:09	20:09 (5) 05:58	20:52 06:52	07:46 07:45	07:45 08:34	08:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:12 (5) 04:55	20:01 (5) 05:11	20:09 (5) 05:59	20:54 06:54	07:48 07:47	07:47 08:35	08:35
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:10 (5) 04:55	20:02 (5) 05:12	20:10 (5) 06:01	20:56 06:56	07:50 07:49	07:49 08:36	08:36
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:09 (5) 04:55	20:02 (5) 05:13	20:10 (5) 06:03	20:58 06:58	07:52 07:51	07:51 08:37	08:37
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:08 (5) 04:54	20:02 (5) 05:14	20:11 (5) 06:05	20:59 06:59	07:54 07:53	07:53 08:38	08:38
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:07 (5) 04:54	20:02 (5) 05:16	20:11 (5) 06:06	20:58 06:58	07:55 07:55	07:55 08:38	08:38
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	20:06 (5) 04:54	20:03 (5) 05:17	20:12 (5) 06:08	20:57 06:57	07:57 07:57	07:57 08:39	08:39
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:06 (5) 04:54	20:03 (5) 05:19	20:12 (5) 06:10	20:56 06:56	07:59 07:59	07:59 08:40	08:40
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:05 (5) 04:54	20:03 (5) 05:20	20:13 (5) 06:12	20:55 06:55	08:01 08:00	08:00 08:41	08:41
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:04 (5) 04:55	20:03 (5) 05:21	20:13 (5) 06:13	20:54 06:54	08:03 08:02	08:02 08:41	08:41
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	20:04 (5) 04:55	20:04 (5) 05:23	20:14 (5) 06:15	20:52 06:52	08:05 08:04	08:04 08:42	08:42
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:03 (5) 04:55	20:04 (5) 05:24	20:15 (5) 06:17	20:50 06:50	08:07 08:06	08:06 08:42	08:42
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	20:03 (5) 04:55	20:04 (5) 05:26	20:16 (5) 06:19	20:49 06:49	08:09 08:08	08:08 08:43	08:43
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:02 (5) 04:56	20:04 (5) 05:27	20:17 (5) 06:20	20:47 06:47	08:11 08:10	08:10 08:43	08:43
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	20:02 (5) 04:56	20:04 (5) 05:29	20:17 (5) 06:22	20:46 06:46	08:13 08:12	08:12 08:44	08:44
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:02 (5) 04:56	20:05 (5) 05:31	20:19 (5) 06:24	20:45 06:45	08:15 08:14	08:14 08:44	08:44
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	20:02 (5) 04:57	20:05 (5) 05:32	20:19 (5) 06:26	20:43 06:43	08:16 08:15	08:15 08:44	08:44
29	08:18 17:00	07:09 19:55	05:56 20:52	05:06 21:41	05:06 21:41	20:01 (5) 04:58	20:05 (5) 05:34	20:21 (5) 06:28	20:41 06:41	08:18 08:16	08:16 08:44	08:44
30	08:17 17:02	07:06 19:56	05:54 20:54	05:05 21:43	05:05 21:43	20:01 (5) 04:58	20:05 (5) 05:35	20:21 (5) 06:29	20:41 06:41	08:19 08:18	08:18 08:44	08:44
31	08:15 17:04	07:04 19:58	05:54 20:58	05:04 21:44	05:04 21:44	20:01 (5) 04:58	20:05 (5) 05:37	20:23 (5) 06:31	20:41 06:41	08:20 08:19	08:19 08:44	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					1135	2144		1835				
Sun reduction					0.38	0.32		0.32				
Oper. time red.					1.00	1.00		1.00				
Wind dir. red.					0.63	0.63		0.63				
Total reduction					0.24	0.20		0.21				
Total, real					272	431		373				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NL - Main Office

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	09:18 (2)	08:14	09:01 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	16:15	15:34 (1)	17:06	15:43 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05
3	08:44	09:18 (2)	08:12	09:02 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28
4	16:16	15:35 (1)	17:08	15:42 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
5	08:44	09:17 (2)	08:10	09:02 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
6	16:17	15:35 (1)	17:10	15:41 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
7	08:43	09:17 (2)	08:09	09:02 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32
8	16:18	15:36 (1)	17:12	15:40 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
9	08:43	09:16 (2)	08:07	09:03 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33
10	16:20	15:37 (1)	17:14	15:39 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55
11	08:43	09:16 (2)	08:05	09:03 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35
12	16:21	15:38 (1)	17:16	15:37 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52
13	08:42	09:15 (2)	08:03	09:04 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37
14	16:22	15:38 (1)	17:18	15:34 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
15	08:42	09:14 (2)	08:01	09:05 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
16	16:24	15:38 (1)	17:20	15:30 (1)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48
17	08:41	09:14 (2)	07:59	09:06 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
18	16:25	15:40 (1)	17:22	09:47 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45
19	08:40	09:13 (2)	07:57	09:07 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43
20	16:27	15:40 (1)	17:24	09:46 (2)	18:19	20:17	21:12	21:55	21:58	21:08	19:56	18:43
21	08:40	09:12 (2)	07:55	09:08 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
22	16:28	15:41 (1)	17:26	09:45 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41
23	08:39	09:11 (2)	07:53	09:09 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46
24	16:30	15:41 (1)	17:28	09:44 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38
25	08:38	09:10 (2)	07:51	09:10 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48
26	16:31	15:42 (1)	17:30	09:42 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36
27	08:37	09:09 (2)	07:49	09:12 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
28	16:33	15:42 (1)	17:32	09:40 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33
29	08:36	09:08 (2)	07:47	09:14 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52
30	16:34	15:43 (1)	17:34	09:38 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31
31	08:35	09:07 (2)	07:45	09:17 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54
32	16:36	15:44 (1)	17:36	09:35 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29
33	08:34	09:05 (2)	07:43	09:22 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56
34	16:38	15:43 (1)	17:38	09:30 (2)	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27
35	08:33	09:04 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:52
36	16:40	15:44 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	17:10
37	08:32	09:03 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:54
38	16:41	15:45 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	17:08
39	08:31	09:01 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:56
40	16:43	15:44 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	17:06
41	08:30	09:00 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:58
42	16:45	15:45 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	17:02
43	08:29	09:00 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:59
44	16:47	15:45 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	17:00
45	08:27	09:00 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:51
46	16:49	15:45 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	17:00
47	08:26	09:00 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:53
48	16:51	15:45 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	17:00
49	08:25	09:00 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:10	08:54
50	16:52	15:45 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09	17:00
51	08:23	09:00 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:57
52	16:54	15:45 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:07	17:00
53	08:22	09:01 (2)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:59
54	16:56	15:45 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	17:00
55	08:20	09:00 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:51
56	16:58	15:45 (1)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	17:00
57	08:19	09:00 (2)		07:09	05:56	05:06	04:57	05:34	06:28	07:23	08:18	08:52
58	17:00	15:44 (1)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	17:00
59	08:17	09:00 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:19	08:53
60	17:02	15:44 (1)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	17:00
61	08:15	09:00 (2)		07:04		05:04		05:37	06:31		07:22	08:17
62	17:04	15:43 (1)		19:58		21:44		21:27	20:21		16:56	15:52
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259
Total, worst case	2411		849									2432
Sun reduction	0.24		0.23									0.21
Oper. time red.	1.00		1.00									1.00
Wind dir. red.	0.63		0.62									0.64
Total reduction	0.15		0.14									0.13
Total, real	370		122									200

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NM - Small Hut

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:18 (2)	08:14		09:16 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		08:55 (2)	08:19		08:54 (2)			
	16:15	68	15:36 (1)	17:06	81	15:45 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	29	09:24 (2)	16:10	87	15:25 (1)			
2	08:44		09:18 (2)	08:12		09:17 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		08:53 (2)	08:21		08:56 (2)			
	16:16	70	15:37 (1)	17:08	77	15:44 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	33	09:26 (2)	16:09	85	15:26 (1)			
3	08:44		09:17 (2)	08:10		09:17 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		08:52 (2)	08:22		08:57 (2)			
	16:17	71	15:37 (1)	17:10	75	15:43 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	35	09:27 (2)	16:08	82	15:25 (1)			
4	08:43		09:17 (2)	08:09		09:18 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		08:50 (2)	08:24		08:59 (2)			
	16:18	73	15:39 (1)	17:12	70	15:42 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	51	15:05 (1)	16:08	81	15:26 (1)			
5	08:43		09:16 (2)	08:07		09:19 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32		08:49 (2)	08:25		09:00 (2)			
	16:20	75	15:39 (1)	17:14	64	15:40 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55		16:46	59	15:08 (1)	16:07	78	15:25 (1)			
6	08:43		09:16 (2)	08:05		09:20 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34		08:48 (2)	08:27		09:02 (2)			
	16:21	77	15:40 (1)	17:16	59	15:38 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52		16:44	66	15:10 (1)	16:07	77	15:26 (1)			
7	08:42		09:15 (2)	08:03		09:21 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37		07:36		08:48 (2)	08:28		09:03 (2)			
	16:22	78	15:40 (1)	17:18	49	15:34 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	71	15:12 (1)	16:06	76	15:26 (1)			
8	08:42		09:14 (2)	08:01		09:22 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38		08:47 (2)	08:29		09:05 (2)			
	16:24	81	15:41 (1)	17:20	35	09:57 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	75	15:13 (1)	16:06	73	15:27 (1)			
9	08:41		09:14 (2)	07:59		09:24 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		08:47 (2)	08:30		09:06 (2)			
	16:25	82	15:42 (1)	17:22	32	09:56 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	79	15:15 (1)	16:05	72	15:27 (1)			
10	08:40		09:13 (2)	07:57		09:25 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43		07:42		08:47 (2)	08:32		09:07 (2)			
	16:27	85	15:43 (1)	17:24	29	09:54 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43		16:37	82	15:16 (1)	16:05	70	15:26 (1)			
11	08:40		09:12 (2)	07:55		09:28 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44		08:47 (2)	08:33		09:08 (2)			
	16:28	87	15:43 (1)	17:26	24	09:52 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	84	15:17 (1)	16:05	68	15:26 (1)			
12	08:39		09:11 (2)	07:53		09:31 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46		08:46 (2)	08:34		09:09 (2)			
	16:30	89	15:44 (1)	17:28	18	09:49 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38		16:34	87	15:18 (1)	16:05	68	15:27 (1)			
13	08:38		09:11 (2)	07:51		09:34 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:47		08:46 (2)	08:35		09:11 (2)			
	16:31	90	15:44 (1)	17:30	10	09:44 (2)	18:24	20:22	21:17	21:57	21:54	21:01	19:49	18:35		16:32	88	15:18 (1)	16:04	65	15:27 (1)			
14	08:37		09:11 (2)	07:49		09:35 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49		08:46 (2)	08:36		09:12 (2)			
	16:33	91	15:45 (1)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31	89	15:19 (1)	16:05	64	15:27 (1)				
15	08:36		09:11 (2)	07:47		09:36 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51		08:46 (2)	08:37		09:13 (2)			
	16:34	91	15:45 (1)	17:34		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	91	15:20 (1)	16:05	62	15:27 (1)				
16	08:35		09:12 (2)	07:45		09:37 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54		07:53		08:46 (2)	08:38		09:13 (2)			
	16:36	92	15:46 (1)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:27	92	15:20 (1)	16:05	61	15:26 (1)				
17	08:34		09:11 (2)	07:43		09:38 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55		08:46 (2)	08:39		09:14 (2)			
	16:38	93	15:46 (1)	17:38		18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27		16:26	93	15:21 (1)	16:05	60	15:27 (1)				
18	08:33		09:11 (2)	07:41		09:39 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57		08:46 (2)	08:39		09:15 (2)			
	16:40	93	15:46 (1)	17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25	93	15:21 (1)	16:05	60	15:27 (1)				
19	08:32		09:12 (2)	07:39		09:40 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		07:59		08:46 (2)	08:40		09:16 (2)			
	16:41	94	15:47 (1)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22		16:23	93	15:21 (1)	16:05	59	15:28 (1)				
20	08:31		09:11 (2)	07:37		09:41 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		08:01		08:47 (2)	08:39		09:17 (2)			
	16:43	95	15:47 (1)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20		16:22	93	15:22 (1)	16:06	58	15:27 (1)				
21	08:30		09:12 (2)	07:34		09:42 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		08:02		08:47 (2)	08:41		09:17 (2)			
	16:45	94	15:47 (1)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17		16:20	94	15:22 (1)	16:06	58	15:28 (1)				
22	08:29		09:12 (2)	07:32		09:43 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:04		08:47 (2)	08:42		09:17 (2)			
	16:47	93	15:47 (1)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15		16:19	95	15:23 (1)	16:06	58	15:28 (1)				
23	08:27		09:12 (2)	07:30		09:43 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:06		08:48 (2)	08:42		09:18 (2)			
	16:49	93	15:47 (1)	17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13		16:18	94	15:23 (1)	16:07	58	15:29 (1)				
24	08:26		09:12 (2)	07:28		09:44 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:08		08:48 (2)	08:43		09:19 (2)			
	16:51	93	15:47 (1)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11		16:17	93	15:23 (1)	16:08	58	15:29 (1)				
25	08:25		09:13 (2)	07:25		09:45 (2)	06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11		08:09		08:49 (2)	08:43		09:18 (2)			
	16:52	93	15:48 (1)	17:54		18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09		16:16	93	15:24 (1)	16:08	59	15:30 (1)				
26	08:23		09:13 (2)	07:23		09:46 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		08:11		08:50 (2)	08:43		09:19 (2)			
	16:54	92	15:47 (1)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:07		16:15	91	15:24 (1)	16:09	60	15:31 (1)				
27	08:22		09:14 (2)	07:21		09:47 (2)	06:14	06:01	05:08	04:56	05:30	06:24	07:19	08:15		08:13		08:50 (2)	08:44		09:19 (2)			
	16:56	92	15:48 (1)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04		16:13	92	15:24 (1)	16:10	60	15:32 (1)				
28	08:20		8																					

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NN - Welfare Facilities

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	09:18 (2)	08:14	09:25 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	16:15	15:37 (1)	17:06	15:57 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05
3	08:44	09:18 (2)	08:12	09:26 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28
4	16:16	15:39 (1)	17:08	15:56 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
5	08:44	09:17 (2)	08:10	09:26 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
6	16:17	15:39 (1)	17:10	15:55 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
7	08:43	09:17 (2)	08:09	09:27 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32
8	16:18	15:41 (1)	17:12	15:54 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
9	08:43	09:16 (2)	08:07	09:28 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33
10	16:20	15:42 (1)	17:14	15:53 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55
11	08:43	09:17 (2)	08:05	09:29 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35
12	16:21	15:44 (1)	17:16	15:52 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52
13	08:42	09:17 (2)	08:03	09:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37
14	16:22	15:45 (1)	17:18	15:50 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
15	08:42	09:17 (2)	08:01	09:32 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
16	16:24	15:46 (1)	17:20	15:48 (1)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48
17	08:41	09:18 (2)	07:59	09:34 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
18	16:25	15:49 (1)	17:22	15:45 (1)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45
19	08:40	09:18 (2)	07:57	09:36 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43
20	16:27	15:50 (1)	17:24	15:47 (1)	18:19	20:17	21:12	21:55	21:58	21:08	19:56	18:43
21	08:40	09:18 (2)	07:55	09:39 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
22	16:28	15:51 (1)	17:26	15:48 (1)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41
23	08:39	09:18 (2)	07:53	09:44 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46
24	16:30	15:51 (1)	17:28	15:49 (1)	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38
25	08:38	09:18 (2)	07:51	09:46 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48
26	16:31	15:52 (1)	17:30	15:50 (1)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36
27	08:37	09:18 (2)	07:49	09:47 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
28	16:33	15:53 (1)	17:32	15:51 (1)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33
29	08:36	09:18 (2)	07:47	09:48 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52
30	16:34	15:54 (1)	17:34	15:52 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31
31	08:35	09:19 (2)	07:45	09:49 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54
1	16:36	15:54 (1)	17:36	15:54 (1)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29
2	08:34	09:18 (2)	07:43	09:50 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56
3	16:38	15:54 (1)	17:38	15:56 (1)	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27
4	08:33	09:19 (2)	07:41	09:51 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57
5	16:40	15:55 (1)	17:40	15:57 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24
6	08:32	09:19 (2)	07:39	09:52 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
7	16:41	15:56 (1)	17:42	15:58 (1)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22
8	08:31	09:19 (2)	07:37	09:53 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
9	16:43	15:56 (1)	17:44	15:59 (1)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20
10	08:30	09:20 (2)	07:34	09:54 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03
11	16:45	15:56 (1)	17:46	15:59 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17
12	08:29	09:19 (2)	07:32	09:55 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05
13	16:47	15:56 (1)	17:48	15:59 (1)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15
14	08:27	09:20 (2)	07:30	09:56 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07
15	16:49	15:57 (1)	17:50	15:59 (1)	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13
16	08:26	09:20 (2)	07:28	09:57 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09
17	16:51	15:57 (1)	17:52	15:59 (1)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11
18	08:25	09:21 (2)	07:25	09:58 (2)	06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11
19	16:52	15:58 (1)	17:54	15:59 (1)	18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09
20	08:23	09:21 (2)	07:23	09:59 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13
21	16:54	15:57 (1)	17:56	15:59 (1)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:07
22	08:22	09:22 (2)	07:21	09:59 (2)	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15
23	16:56	15:58 (1)	17:58	15:59 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04
24	08:20	09:22 (2)	07:19	09:59 (2)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17
25	16:58	15:58 (1)	18:00	15:59 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02
26	08:19	09:23 (2)		09:59 (2)	07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18
27	17:00	15:57 (1)		09:59 (2)	17:00	15:55	20:52	21:42	22:01	21:30	20:25	19:10
28	08:17	09:23 (2)		09:59 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20
29	17:02	15:57 (1)		09:59 (2)	17:02	15:56	20:54	21:43	22:00	21:28	20:23	19:07
30	08:15	09:23 (2)		09:59 (2)	07:04	05:54	05:04	04:57	05:37	06:31	07:22	08:18
31	17:04	15:56 (1)		09:59 (2)	17:04	15:58	21:44	21:44	21:27	20:21	16:56	16:13
Potential sun hours	250	273	273	367	420	494	510	512	460	382	328	259
Total, worst case	2723	671	671	671	671	671	671	671	671	671	671	671
Sun reduction	0.24	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
Total reduction	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Total, real	413	97	97	97	97	97	97	97	97	97	97	97

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar

Calculation: Kellystown N163 Worst Case
Assumptions for shadow calculations

Shadow receptor: NO - Shipping Office

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

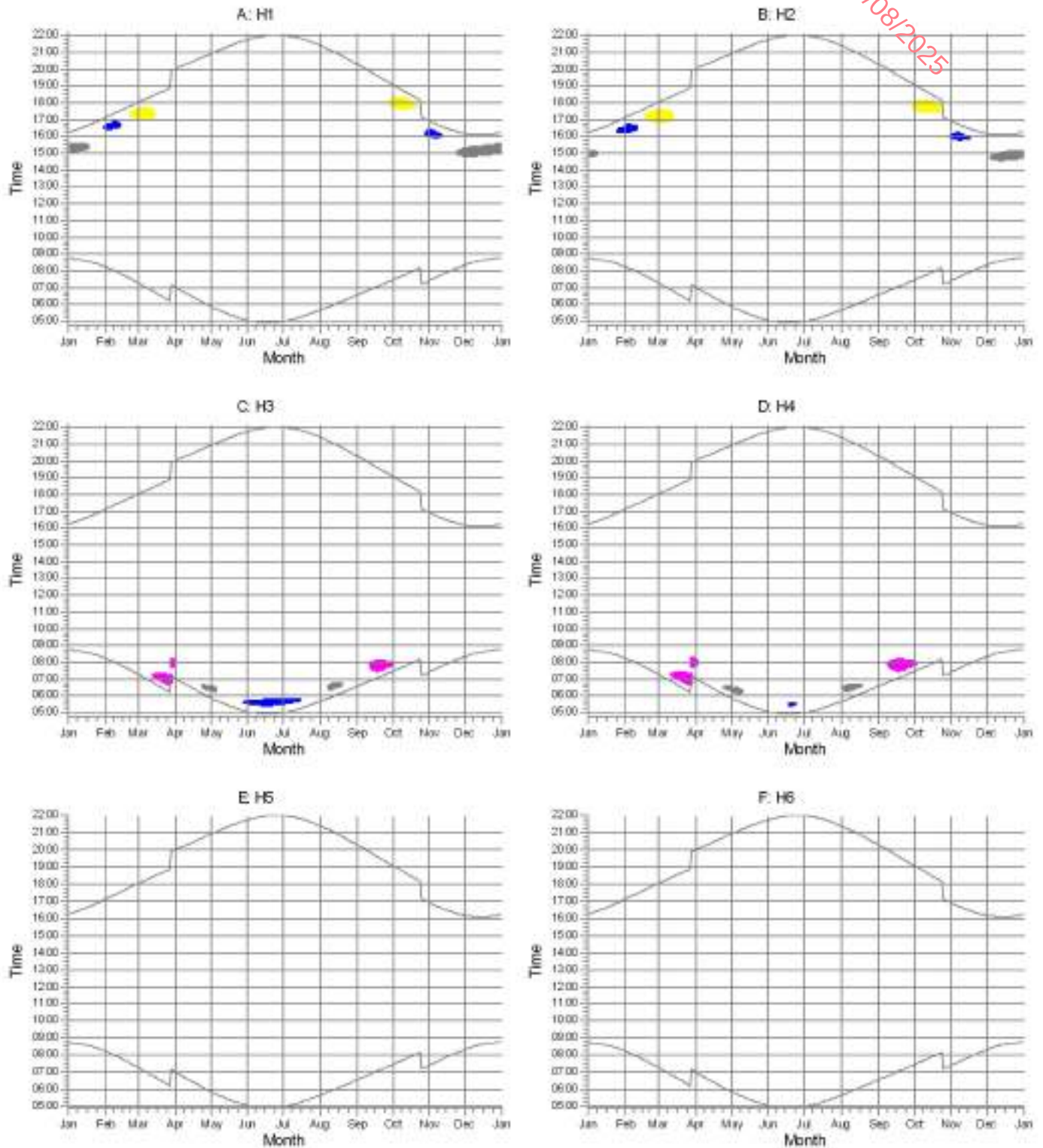
	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	09:18 (2) 15:37 (1)	08:14 17:06	09:21 (2) 15:54 (1)	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05
2	08:44 16:16	09:18 (2) 15:39 (1)	08:12 17:08	09:22 (2) 15:53 (1)	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02
3	08:44 16:17	09:17 (2) 15:39 (1)	08:10 17:10	09:22 (2) 15:52 (1)	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00
4	08:43 16:18	09:17 (2) 15:41 (1)	08:09 17:12	09:23 (2) 15:51 (1)	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57
5	08:43 16:20	09:16 (2) 15:42 (1)	08:07 17:14	09:24 (2) 15:50 (1)	07:07 18:09	06:52 20:08	05:44 21:03	05:02 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55
6	08:43 16:21	09:16 (2) 15:44 (1)	08:05 17:16	09:25 (2) 15:49 (1)	07:05 18:11	06:49 20:09	05:42 21:04	05:03 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52
7	08:42 16:22	09:15 (2) 15:45 (1)	08:03 17:18	09:26 (2) 15:47 (1)	07:02 18:13	06:47 20:11	05:40 21:06	05:04 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50
8	08:42 16:24	09:14 (2) 15:46 (1)	08:01 17:20	09:28 (2) 15:44 (1)	07:00 18:15	06:44 20:13	05:38 21:08	05:05 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48
9	08:41 16:25	09:15 (2) 15:48 (1)	07:59 17:22	09:29 (2) 15:40 (1)	06:57 18:17	06:42 20:15	05:36 21:10	05:06 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45
10	08:40 16:27	09:15 (2) 15:48 (1)	07:57 17:24	09:31 (2) 15:39 (1)	06:55 18:19	06:39 20:17	05:34 21:12	05:07 21:55	05:07 21:58	05:54 21:08	06:49 19:56	07:43 18:43
11	08:40 16:28	09:15 (2) 15:49 (1)	07:55 17:26	09:34 (2) 15:37 (1)	06:53 18:21	06:37 20:19	05:33 21:13	05:08 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41
12	08:39 16:30	09:15 (2) 15:49 (1)	07:53 17:28	09:37 (2) 15:35 (1)	06:50 18:23	06:35 20:20	05:31 21:15	05:09 21:53	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38
13	08:38 16:31	09:15 (2) 15:50 (1)	07:51 17:30	09:40 (2) 15:30 (1)	06:48 18:25	06:32 20:22	05:29 21:17	05:11 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36
14	08:37 16:33	09:15 (2) 15:51 (1)	07:49 17:32	09:43 (2) 15:28 (1)	06:45 18:27	06:30 20:24	05:27 21:18	05:12 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33
15	08:36 16:34	09:15 (2) 15:51 (1)	07:47 17:34	09:44 (2) 15:27 (1)	06:43 18:29	06:28 20:26	05:26 21:20	05:13 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31
16	08:35 16:36	09:16 (2) 15:52 (1)	07:45 17:36	09:46 (2) 15:25 (1)	06:40 18:30	06:25 20:28	05:24 21:22	05:14 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29
17	08:34 16:38	09:15 (2) 15:52 (1)	07:43 17:38	09:47 (2) 15:23 (1)	06:38 18:32	06:23 20:30	05:22 21:23	05:16 21:59	05:16 21:48	06:06 20:53	06:59 19:39	07:56 18:27
18	08:33 16:40	09:16 (2) 15:53 (1)	07:41 17:40	09:48 (2) 15:21 (1)	06:36 18:34	06:21 20:32	05:21 21:25	05:17 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24
19	08:32 16:41	09:16 (2) 15:53 (1)	07:39 17:42	09:49 (2) 15:19 (1)	06:33 18:36	06:18 20:33	05:19 21:27	05:18 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22
20	08:31 16:43	09:16 (2) 15:53 (1)	07:37 17:44	09:51 (2) 15:17 (1)	06:31 18:38	06:16 20:35	05:18 21:28	05:20 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20
21	08:30 16:45	09:16 (2) 15:54 (1)	07:34 17:46	09:52 (2) 15:15 (1)	06:28 18:40	06:14 20:37	05:16 21:30	05:21 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17
22	08:29 16:47	09:16 (2) 15:54 (1)	07:32 17:48	09:53 (2) 15:14 (1)	06:26 18:42	06:12 20:39	05:15 21:31	05:23 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15
23	08:27 16:49	09:17 (2) 15:55 (1)	07:30 17:50	09:54 (2) 15:13 (1)	06:23 18:43	06:09 20:41	05:13 21:33	05:25 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13
24	08:26 16:51	09:17 (2) 15:54 (1)	07:28 17:52	09:55 (2) 15:12 (1)	06:21 18:45	06:07 20:43	05:12 21:34	05:26 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11
25	08:25 16:52	09:18 (2) 15:55 (1)	07:25 17:54	09:56 (2) 15:11 (1)	06:18 18:47	06:05 20:44	05:11 21:36	05:27 22:01	05:27 21:37	06:20 20:35	07:15 19:19	07:11 17:09
26	08:23 16:54	09:18 (2) 15:55 (1)	07:23 17:56	09:57 (2) 15:10 (1)	06:16 18:49	06:03 20:46	05:09 21:37	05:29 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07
27	08:22 16:56	09:19 (2) 15:55 (1)	07:21 17:58	09:58 (2) 15:09 (1)	06:13 18:51	06:01 20:48	05:08 21:39	05:30 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04
28	08:20 16:58	09:19 (2) 15:55 (1)	07:19 18:00	09:59 (2) 15:08 (1)	06:11 18:53	05:58 20:50	05:07 21:40	05:32 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02
29	08:19 17:00	09:19 (2) 15:54 (1)		09:59 (2) 15:07 (1)	07:09 19:55	05:56 20:52	05:06 21:42	05:34 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00
30	08:17 17:02	09:19 (2) 15:54 (1)		09:59 (2) 15:07 (1)	07:06 19:56	05:54 20:54	05:05 21:43	05:35 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58
31	08:15 17:04	09:20 (2) 15:53 (1)		09:59 (2) 15:07 (1)	07:04 19:58	05:54 21:44	05:04 21:44	05:37 21:27	05:37 20:21	06:31 20:21	07:22 16:56	07:22 24
Potential sun hours	250	273	273	367	420	494	510	512	460	382	328	259
Total, worst case	2716	680	680									
Sun reduction	0.24	0.23	0.23									
Oper. time red.	1.00	1.00	1.00									
Wind dir. red.	0.63	0.62	0.62									
Total reduction	0.15	0.14	0.14									
Total, real	413	98	98									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

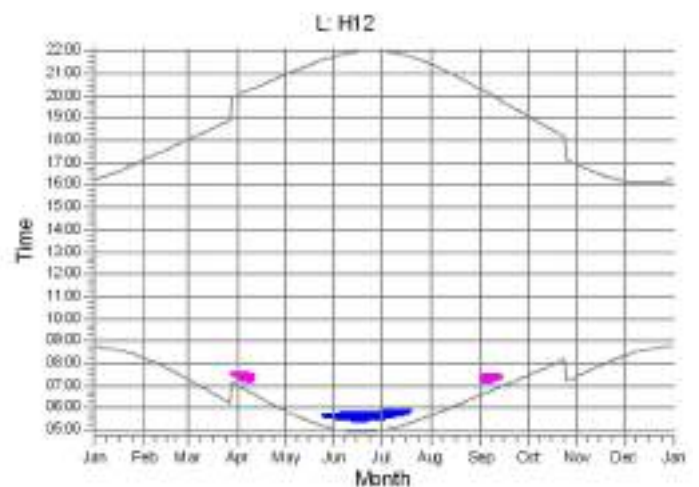
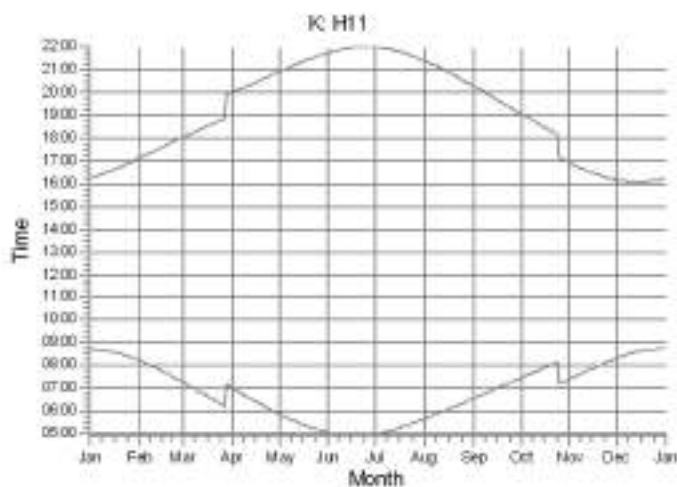
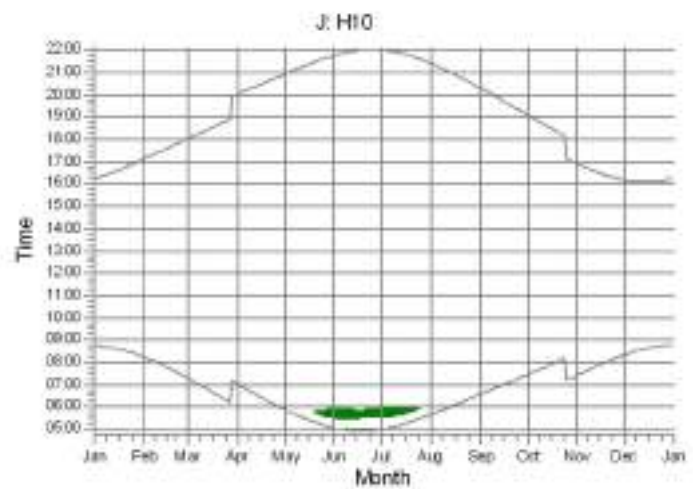
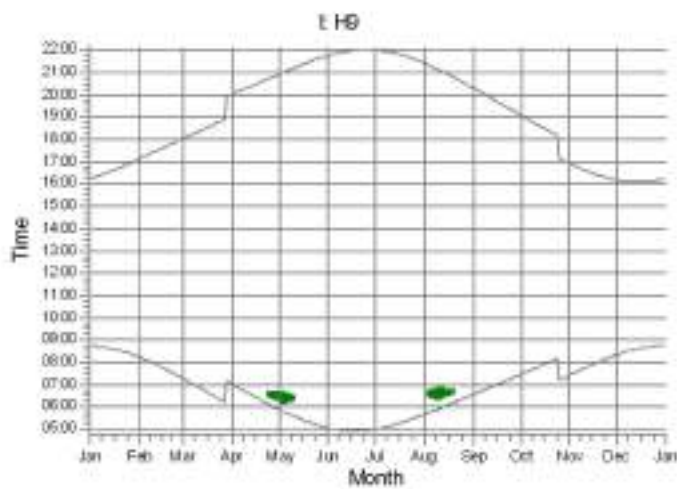
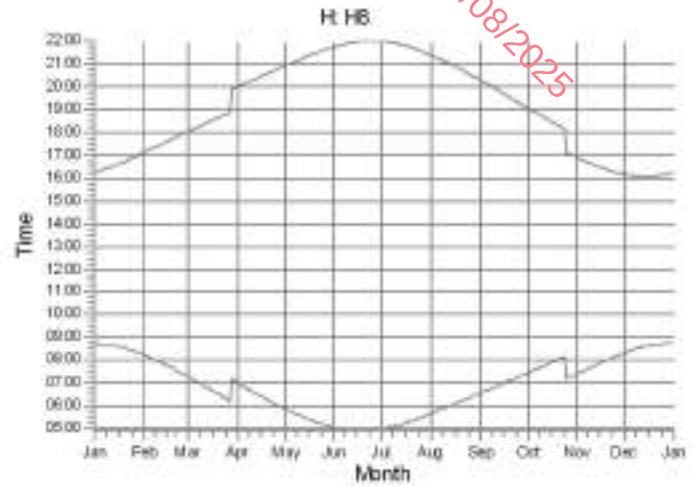
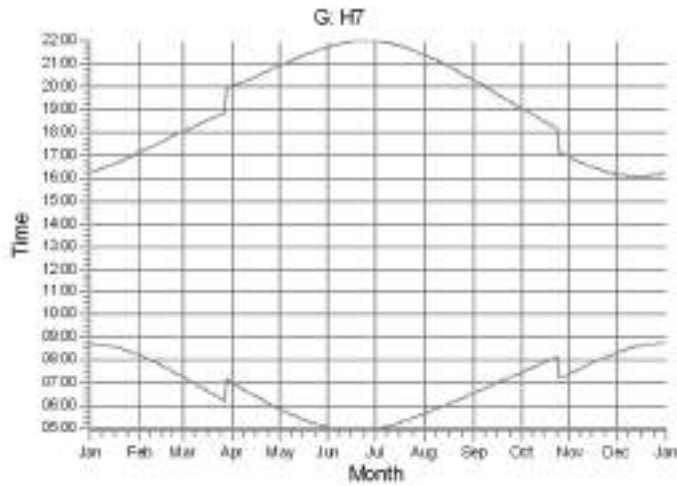


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

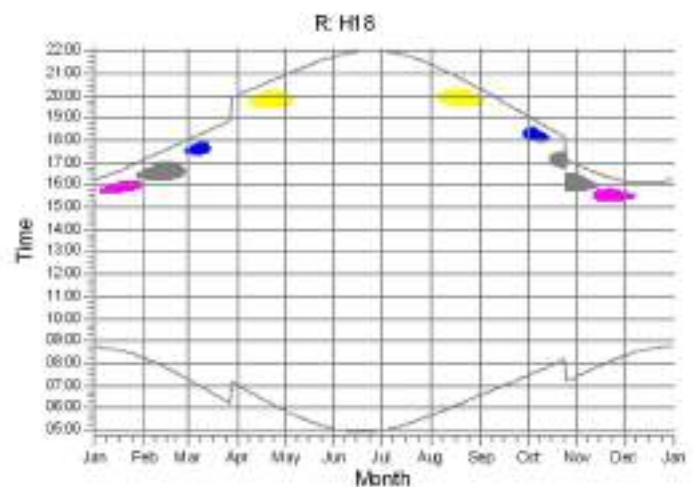
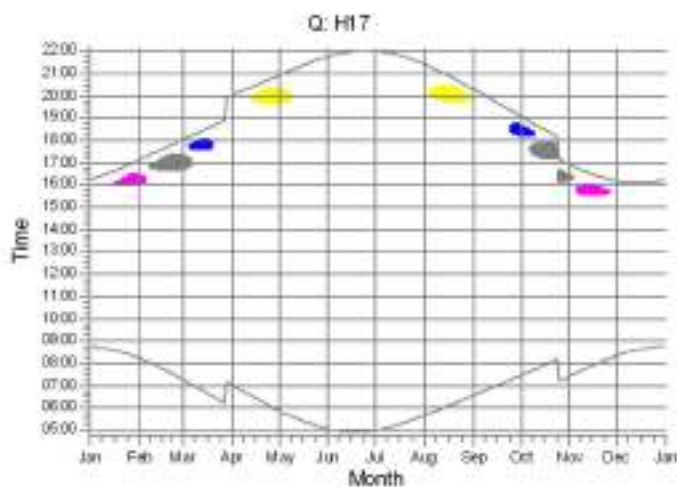
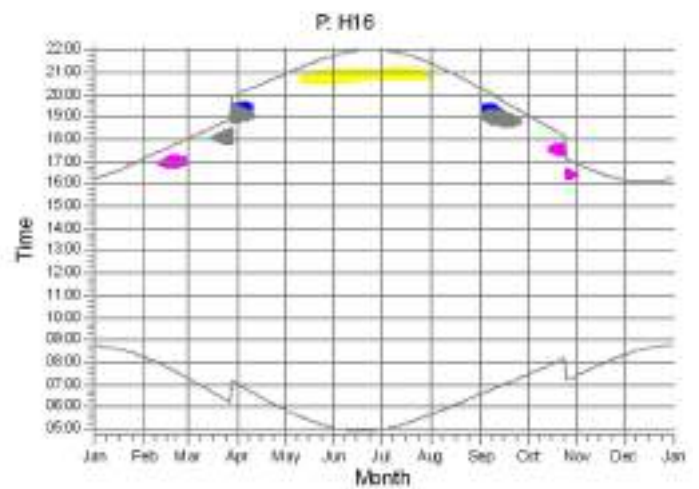
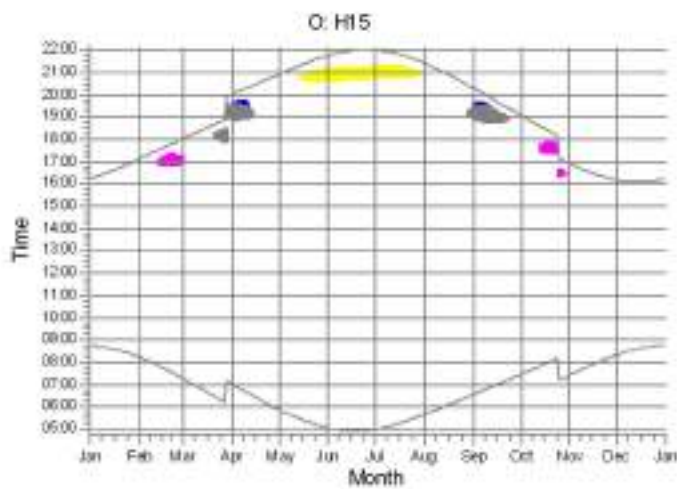
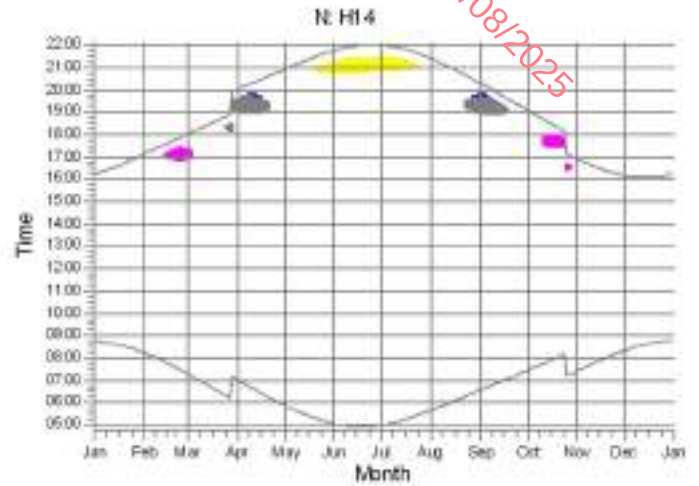
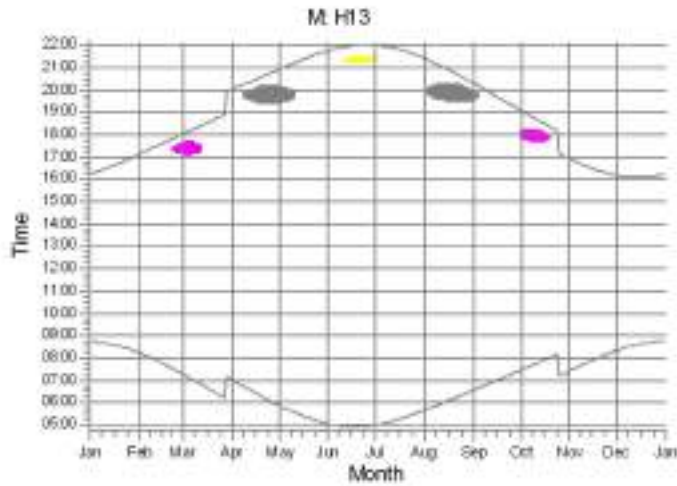


WTGs

1: T01 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

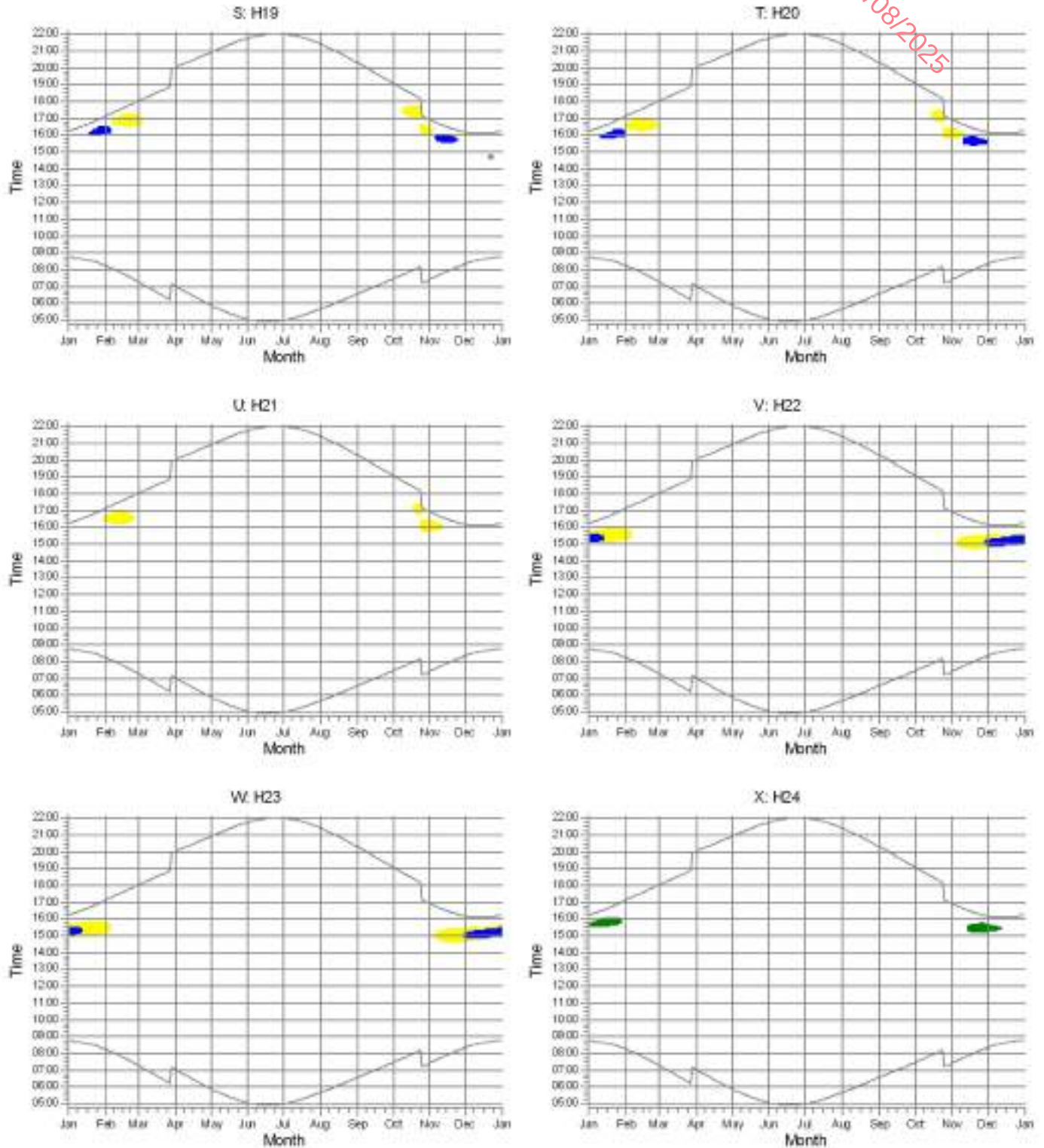


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

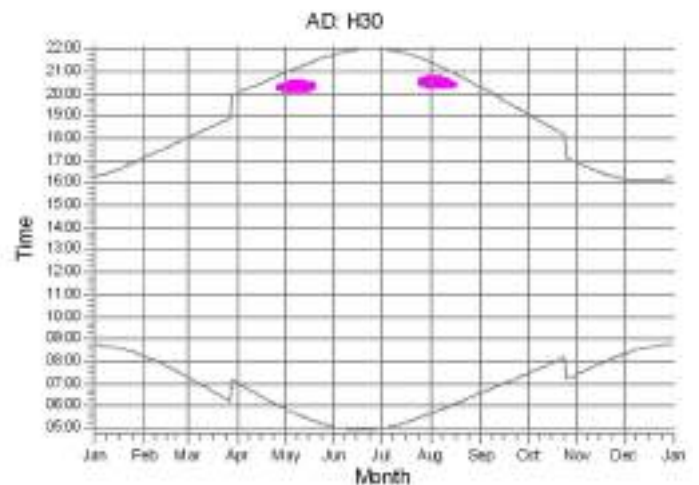
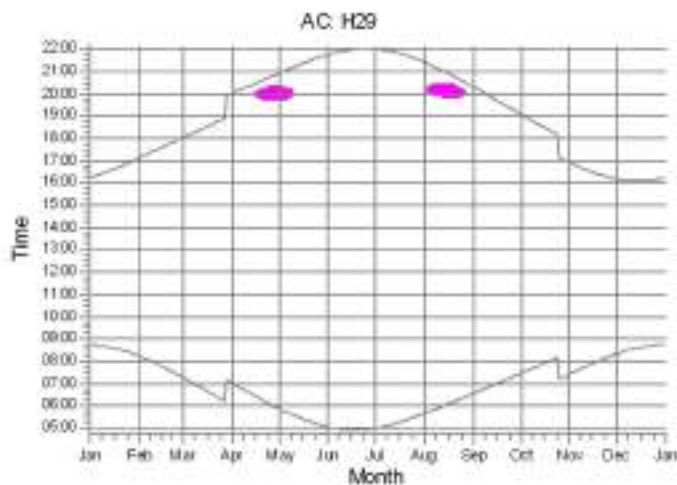
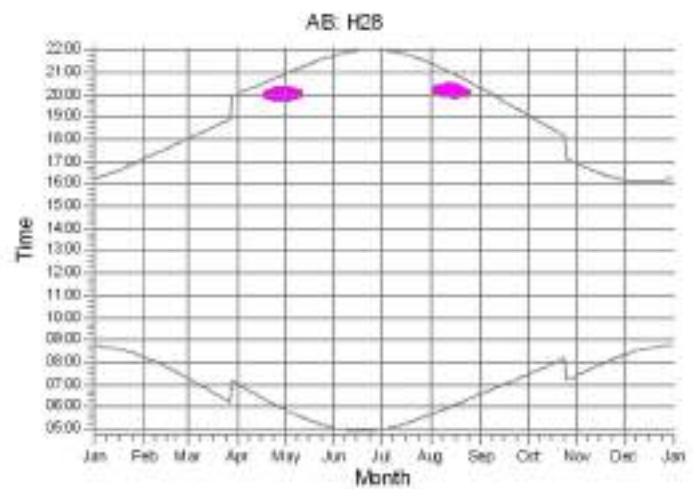
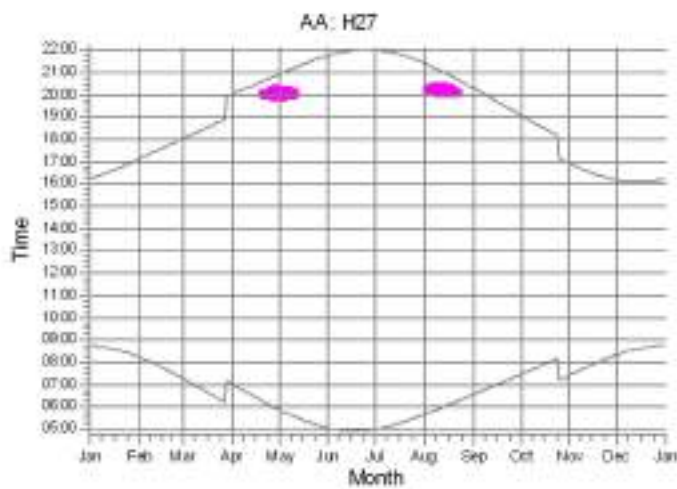
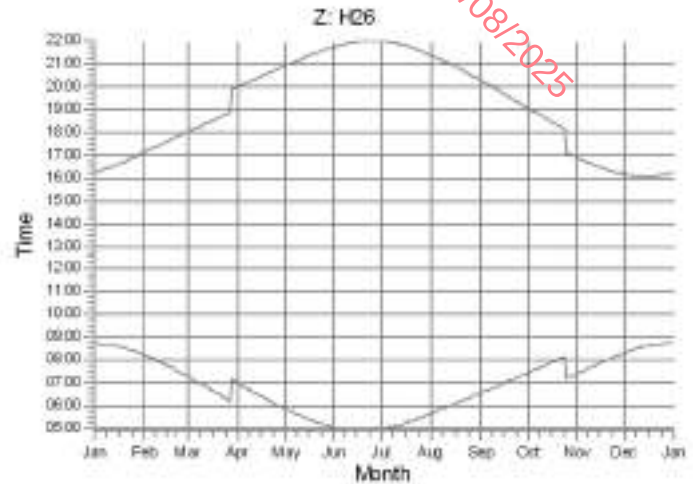
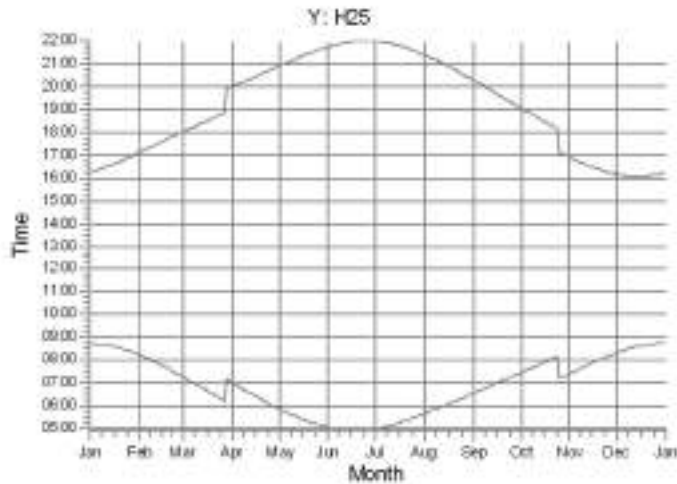


WTGs

1: T01 2: T02 3: T03 4: T04

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

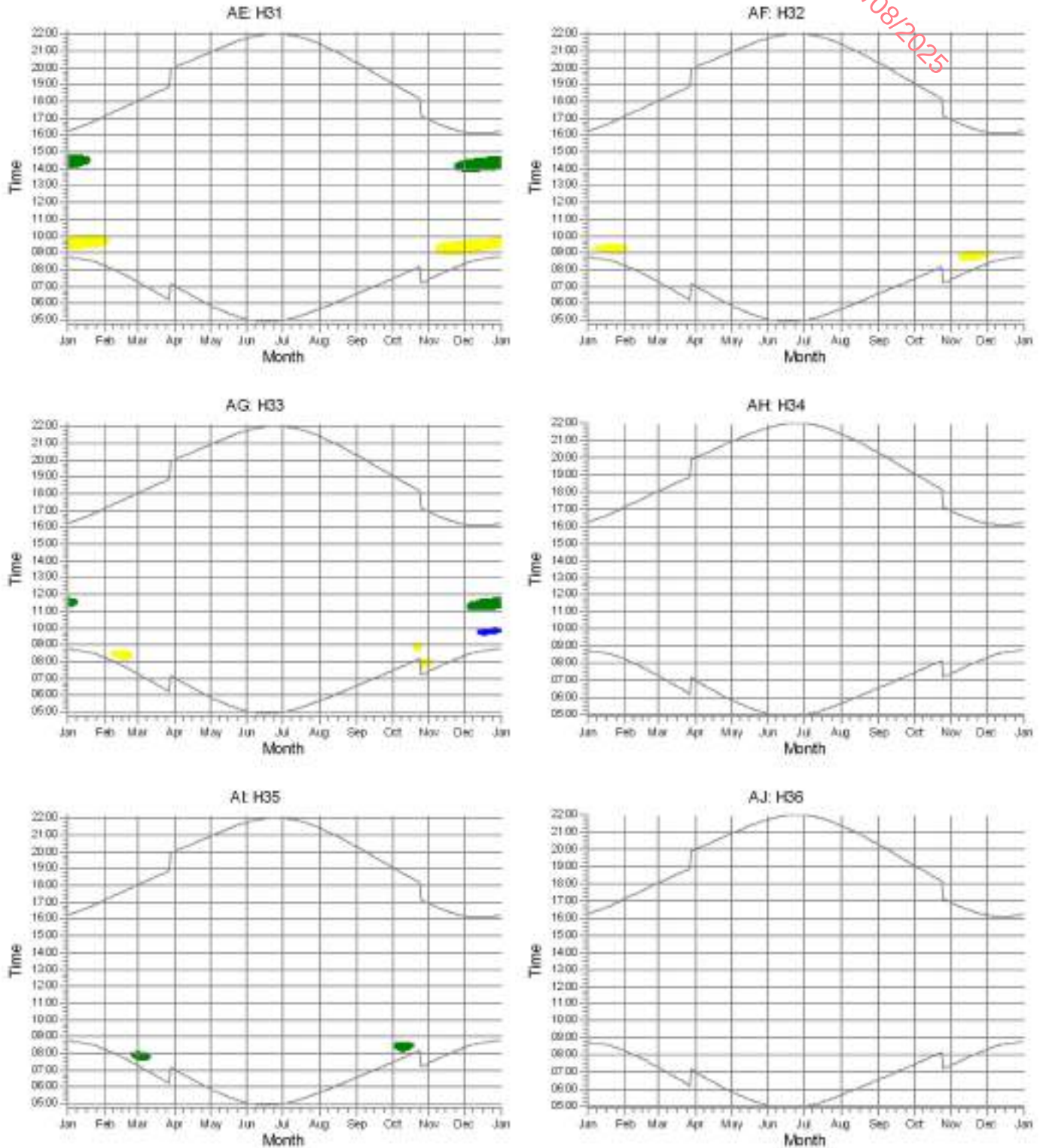


WTGs

5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

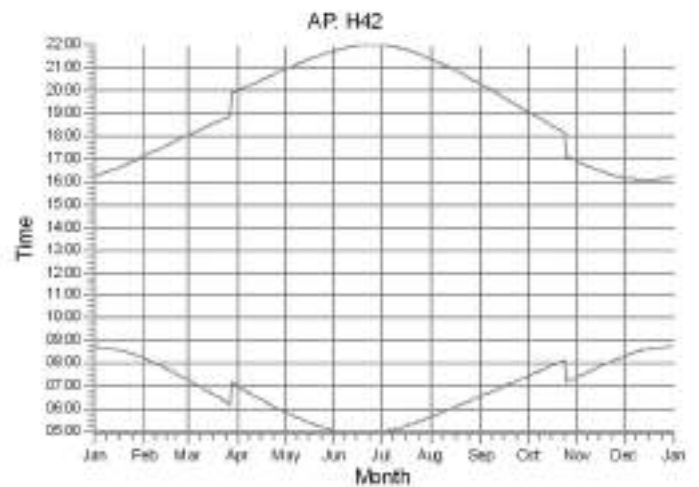
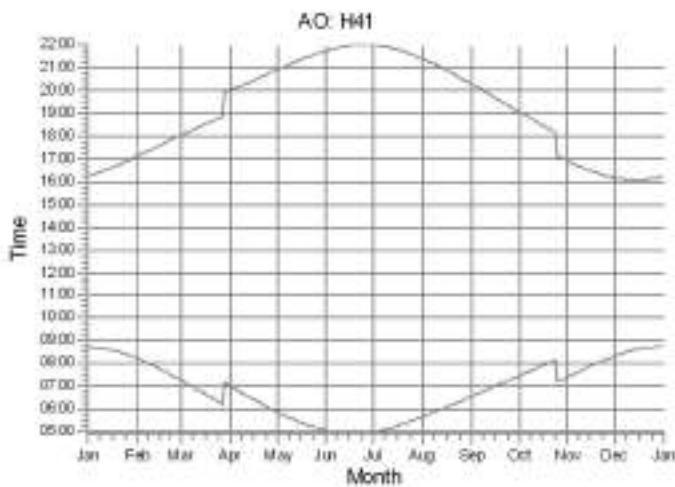
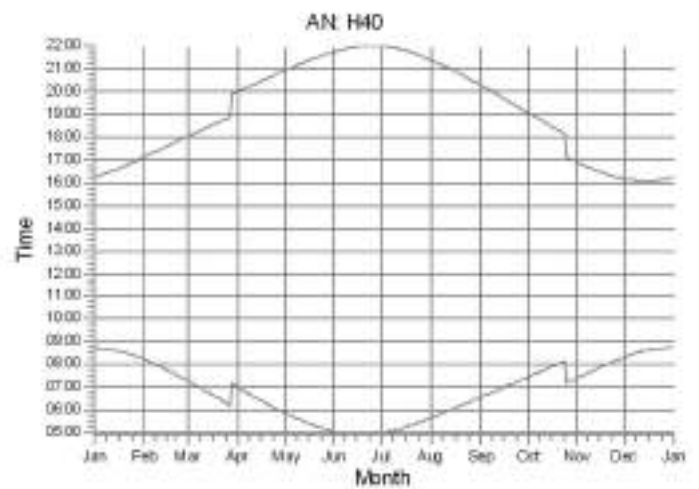
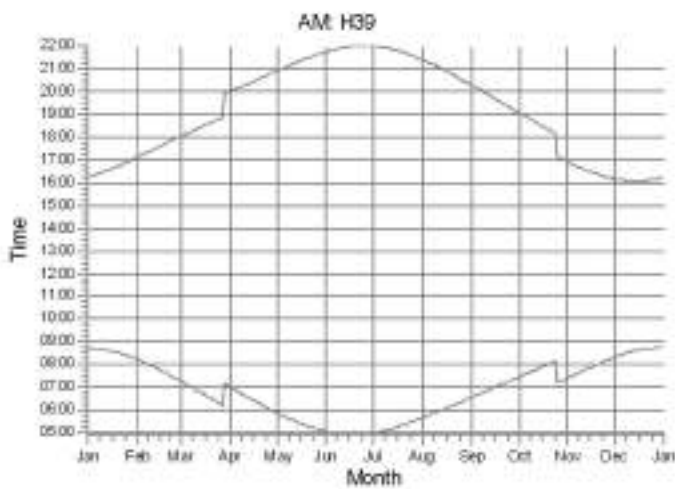
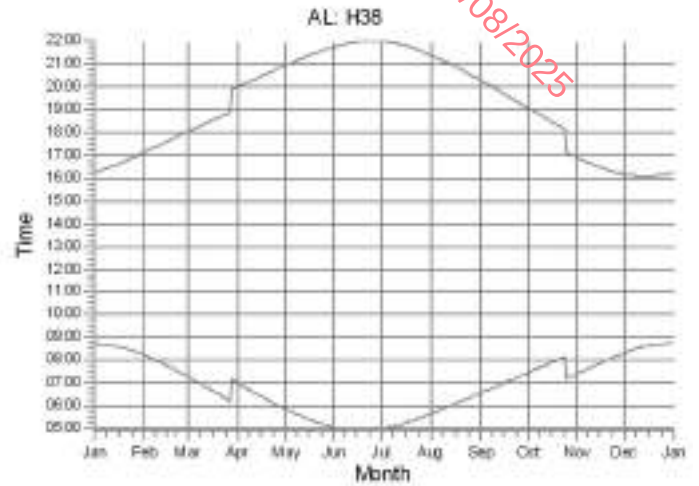
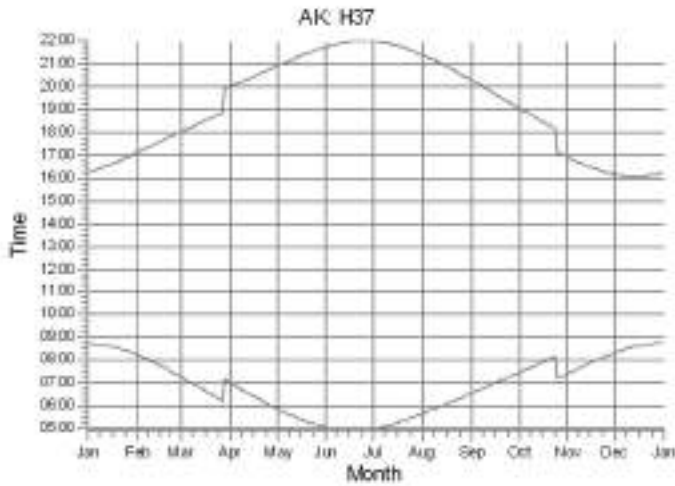


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case



WTGs

6918 Kellystown

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

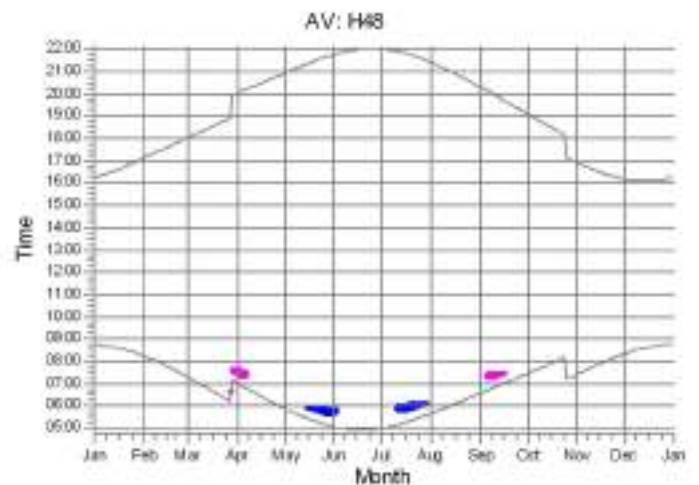
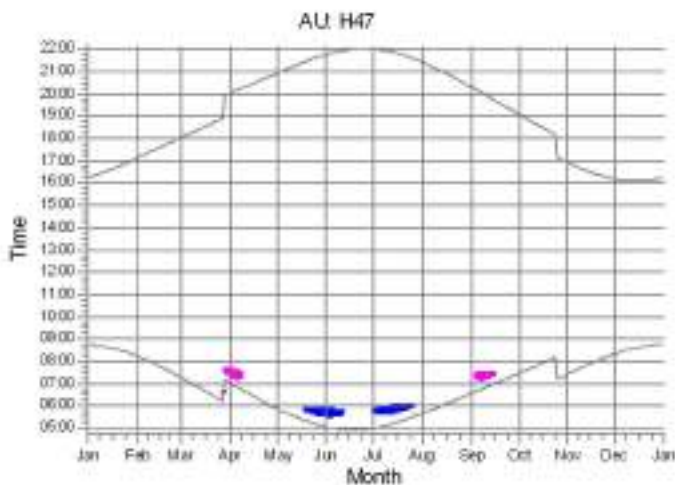
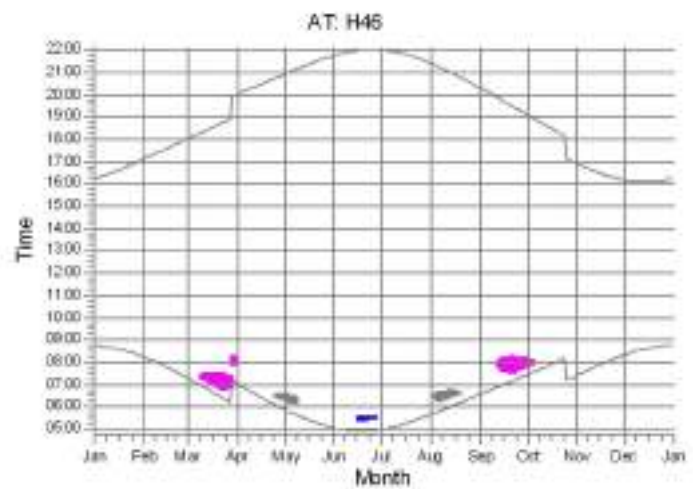
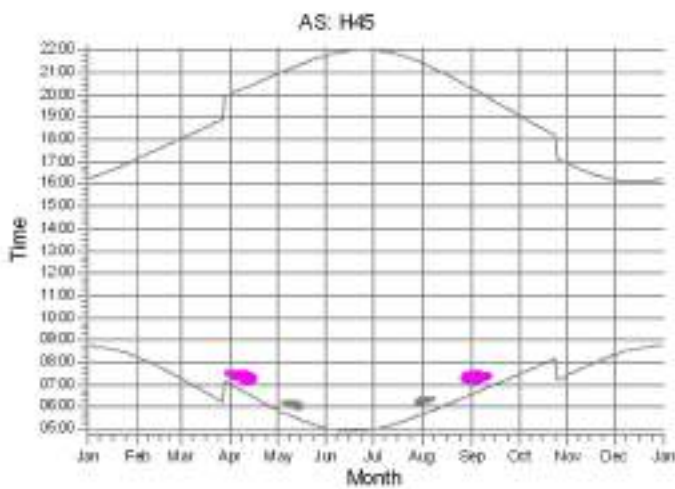
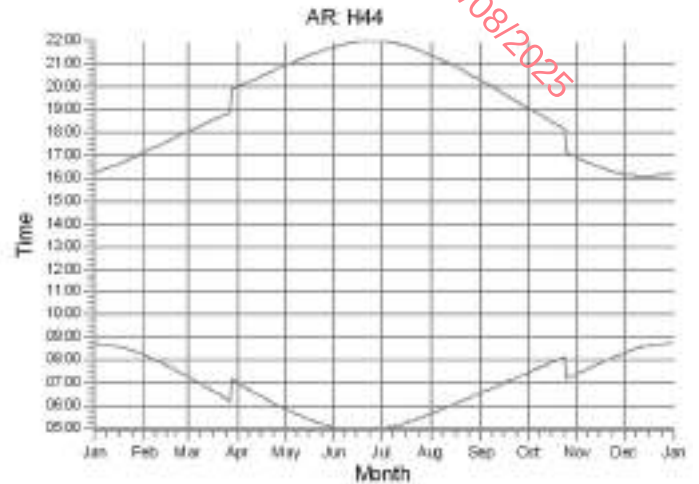
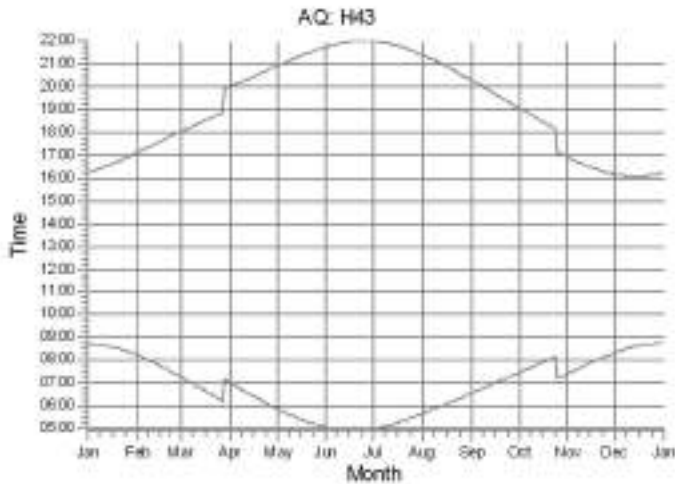
Kathryn Feeney / kfeeney@jodireland.com

Calculated:

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SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

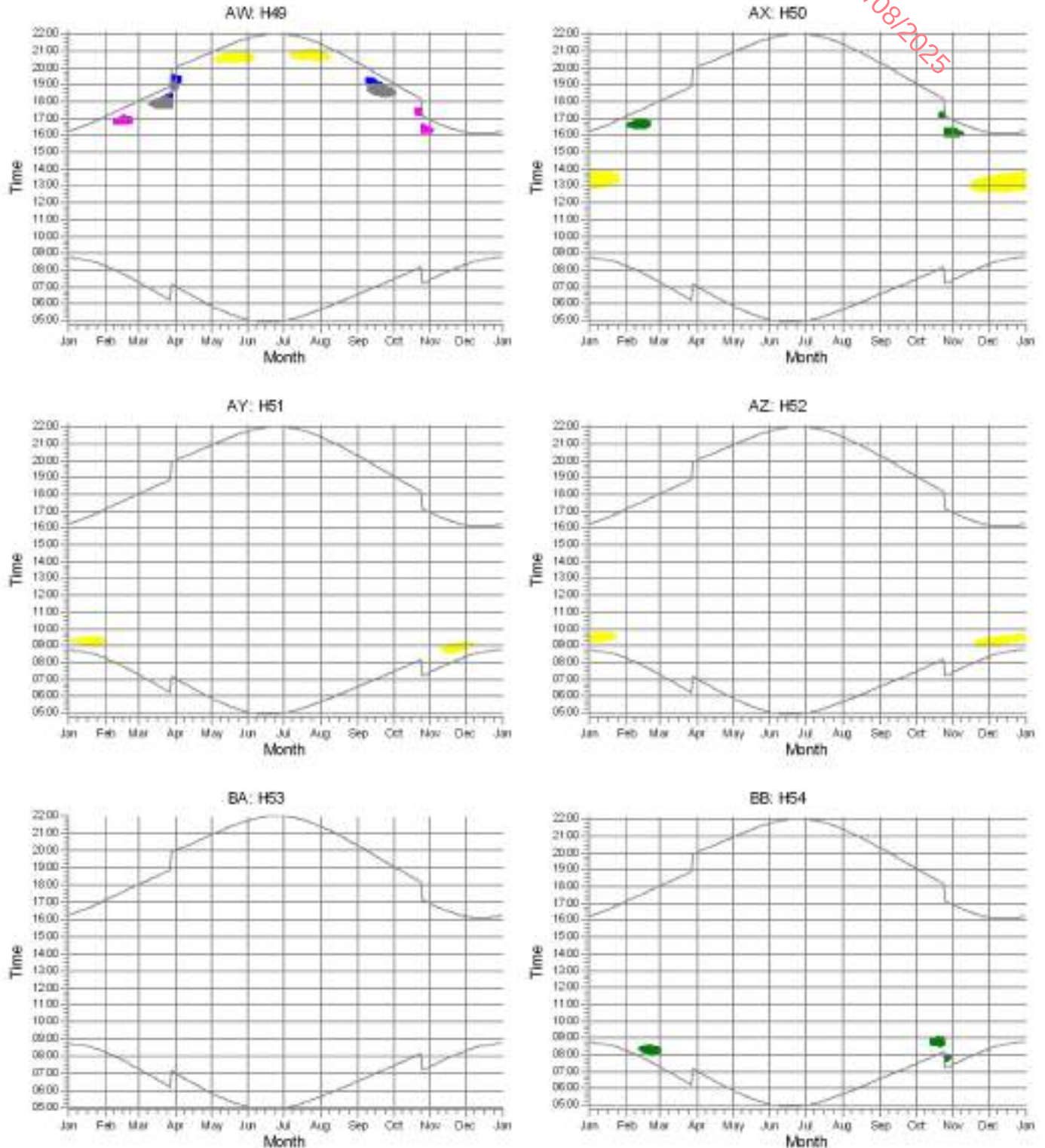


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

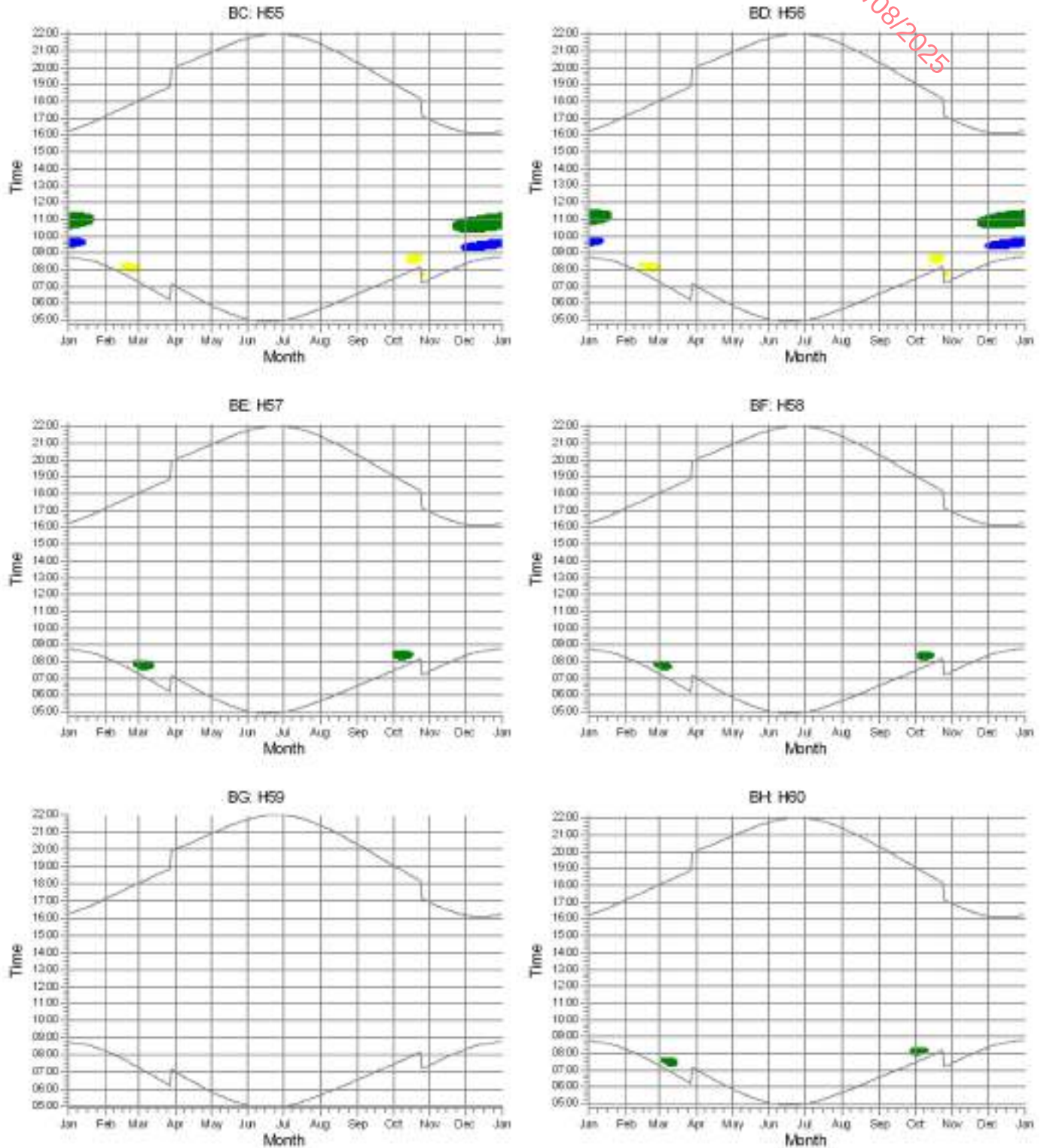


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

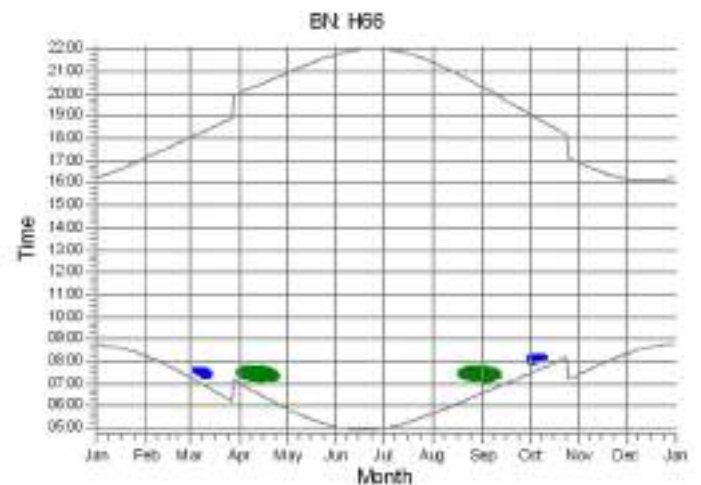
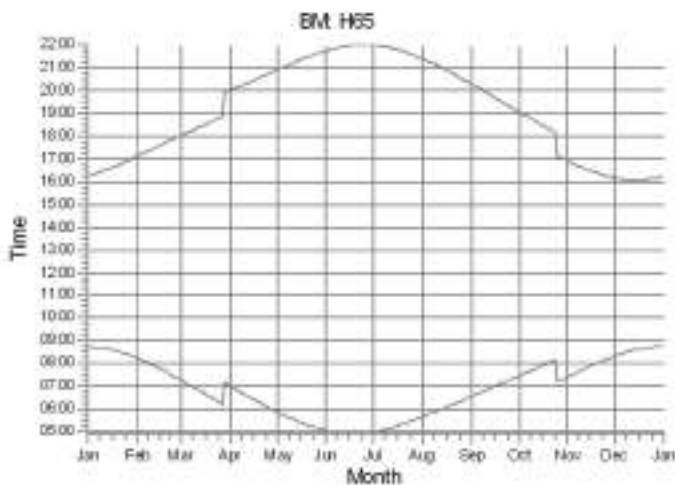
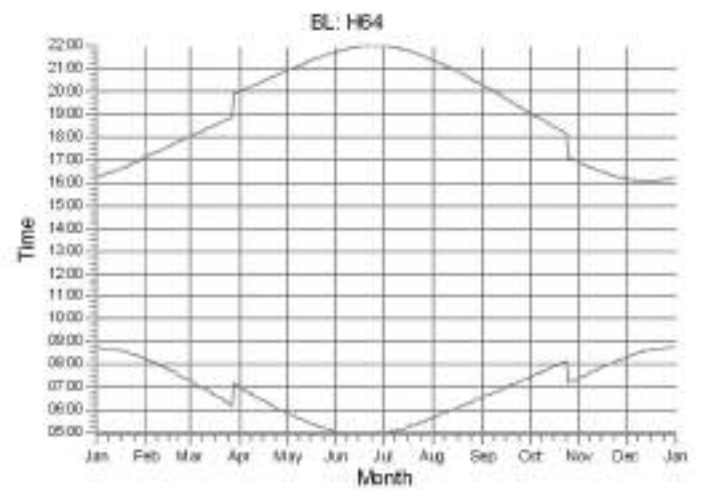
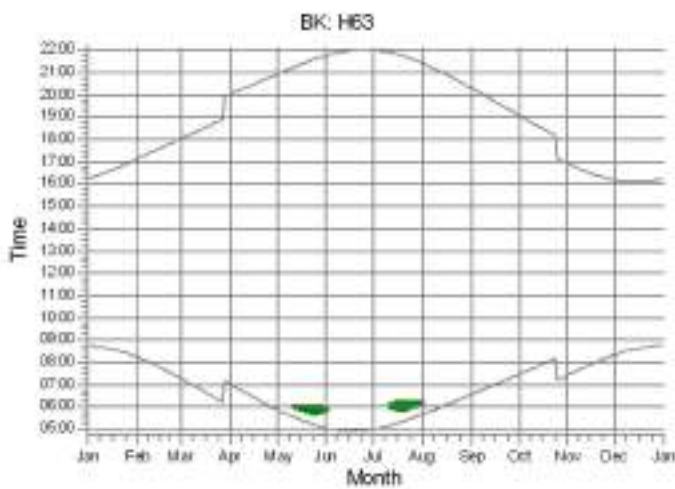
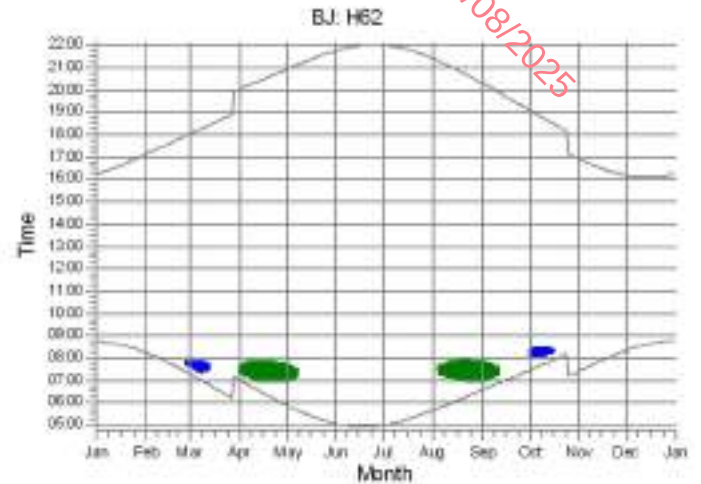
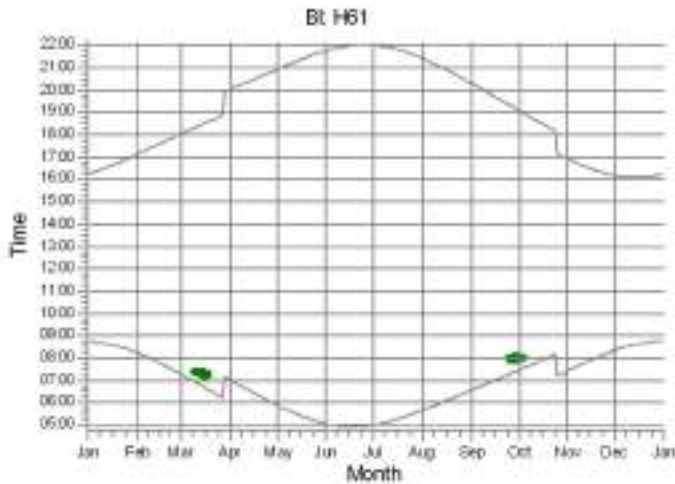


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

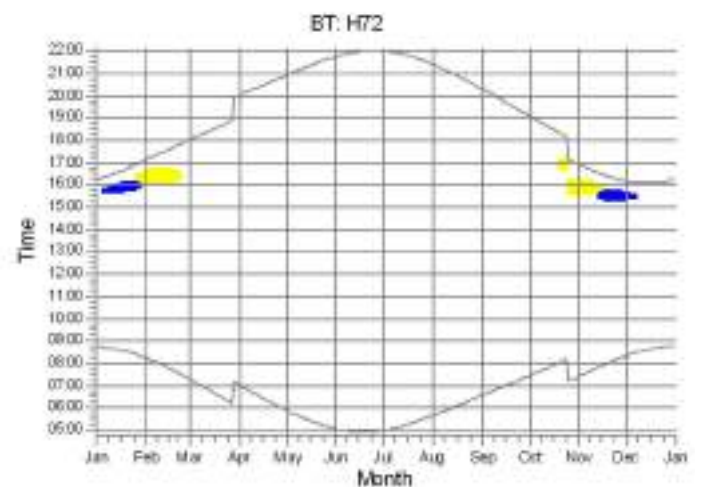
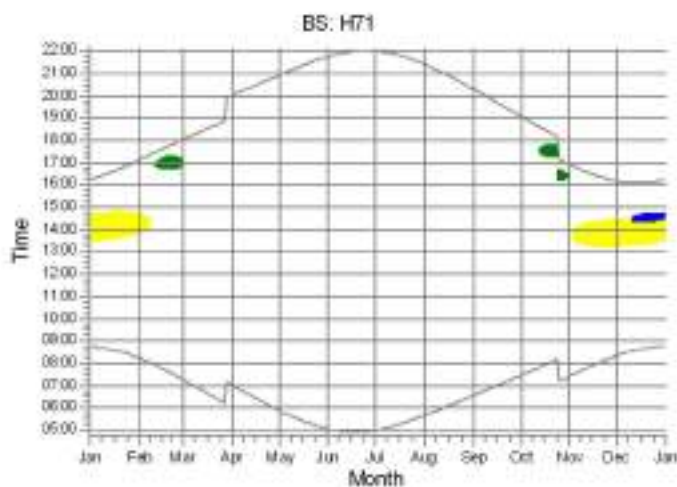
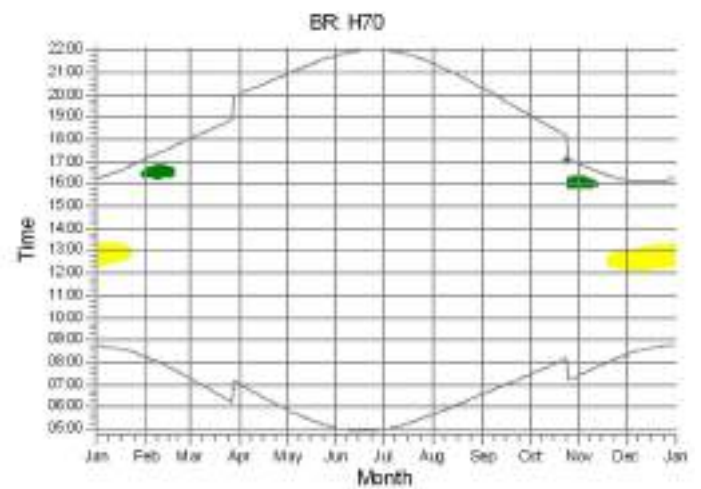
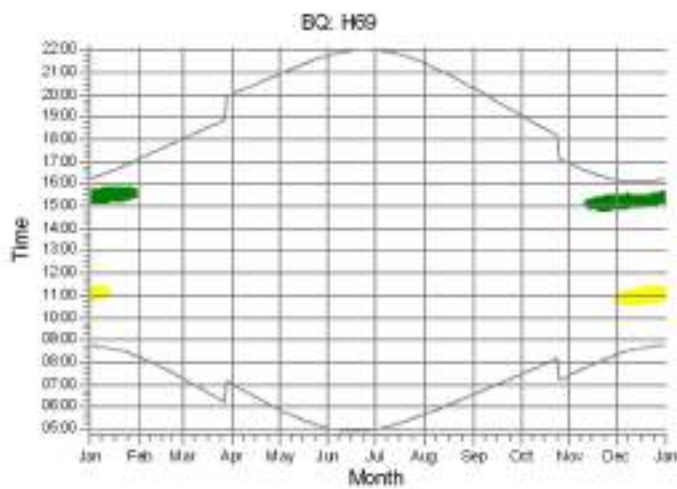
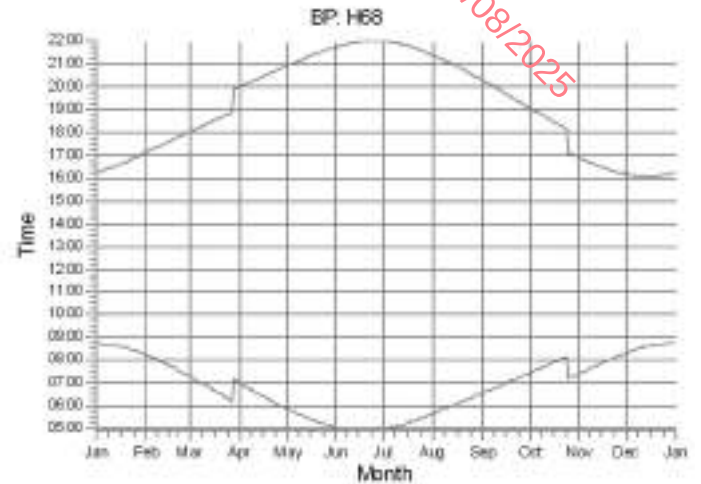
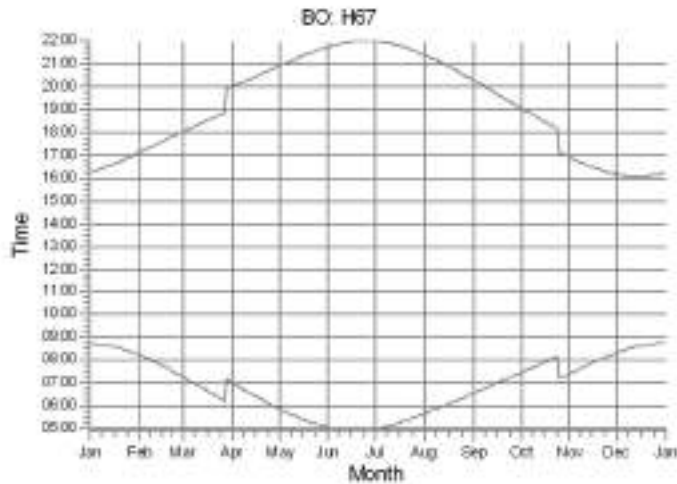


WTGs

1: T01 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

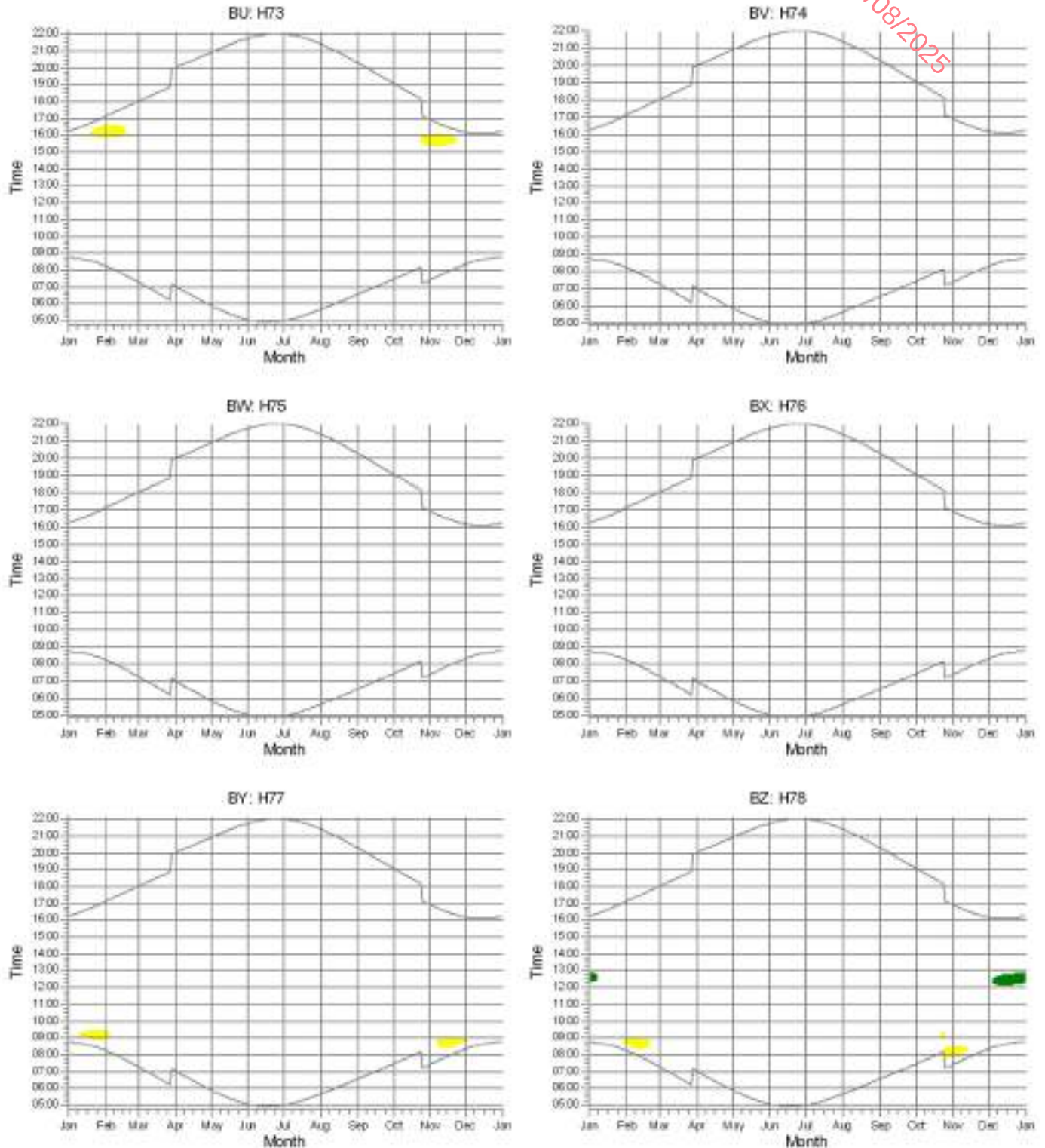


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

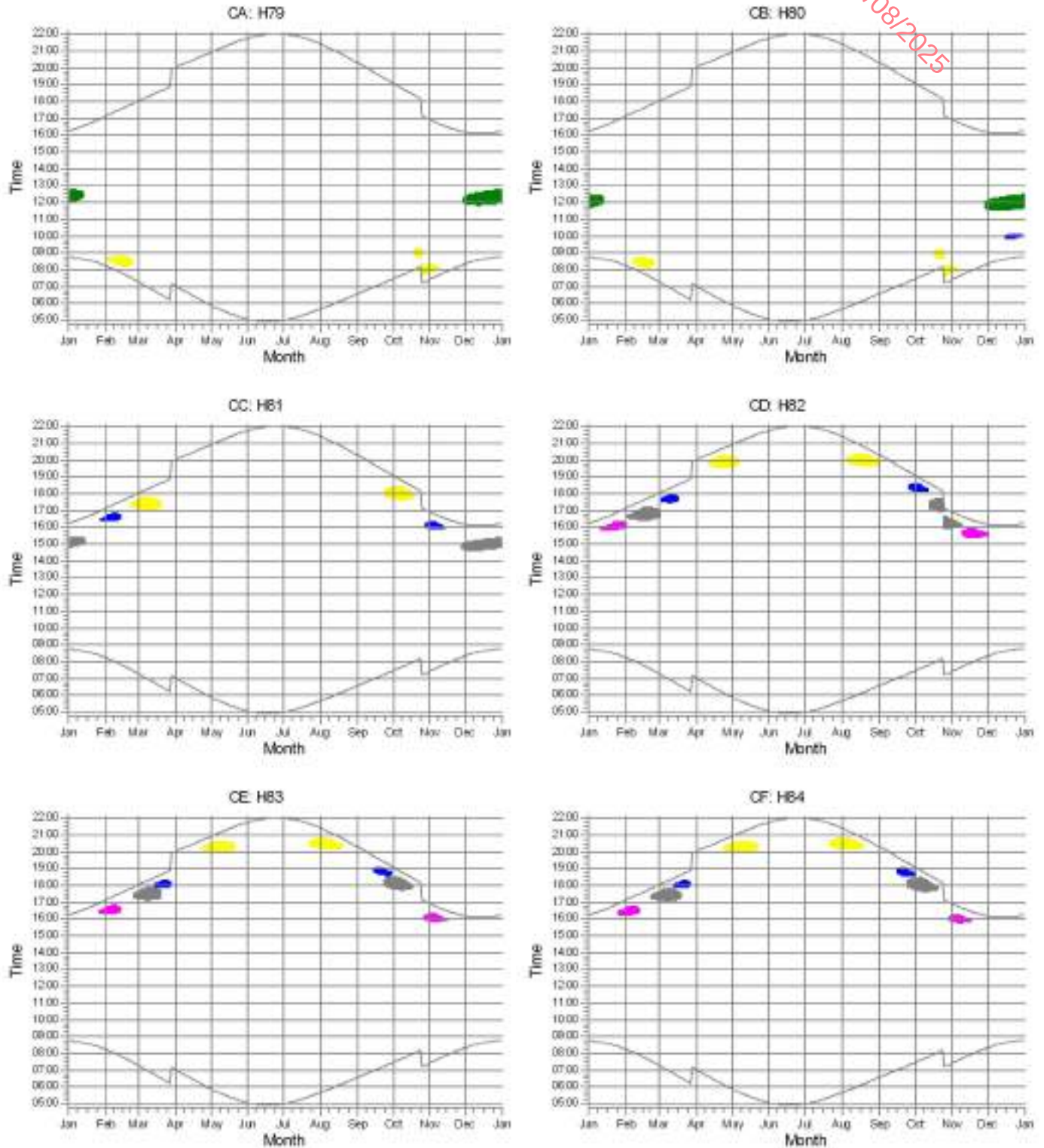


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

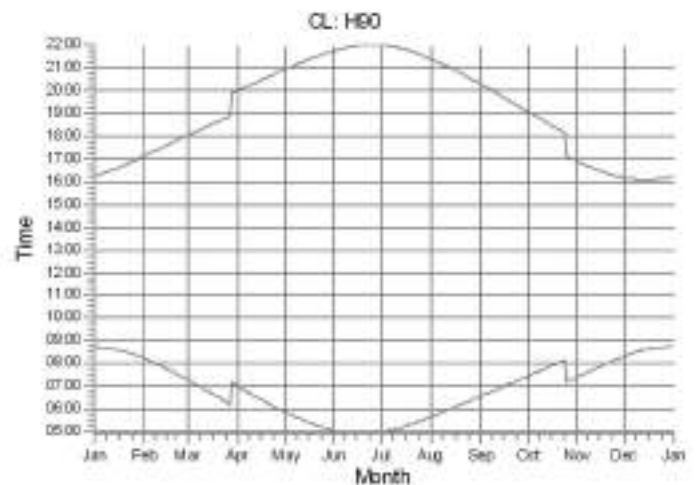
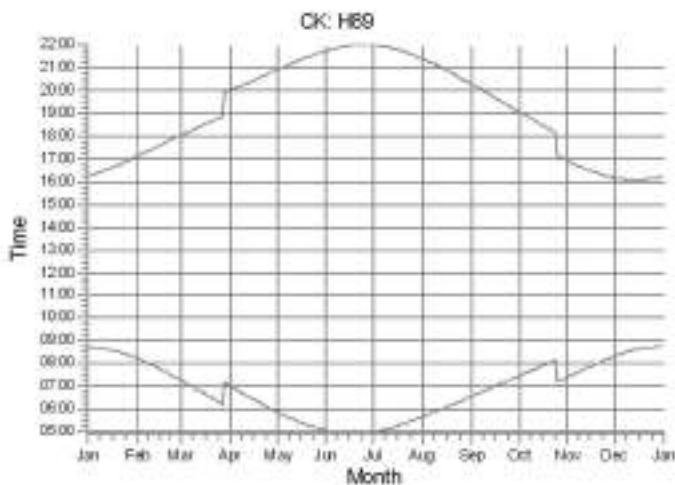
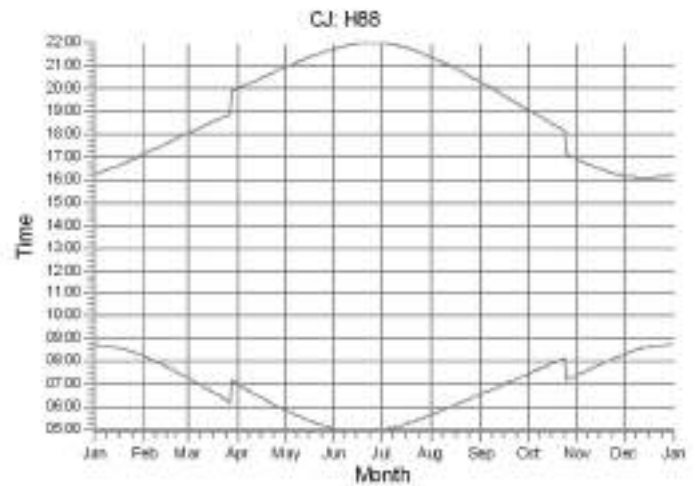
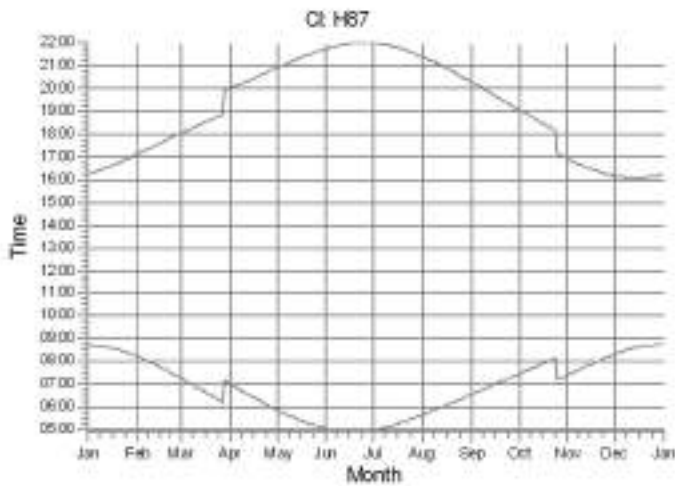
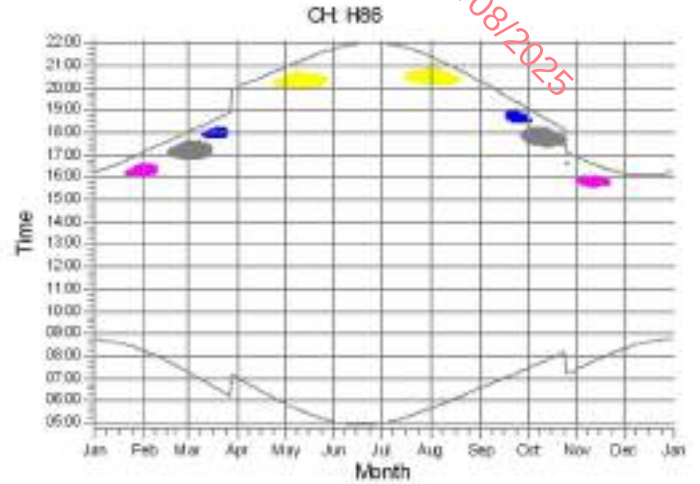
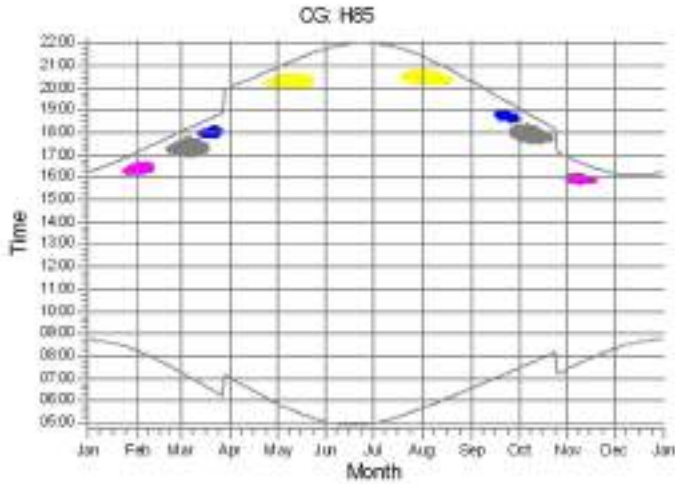


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

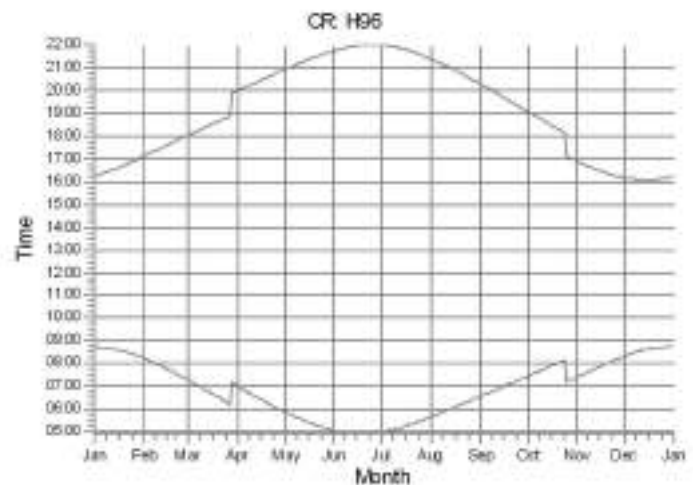
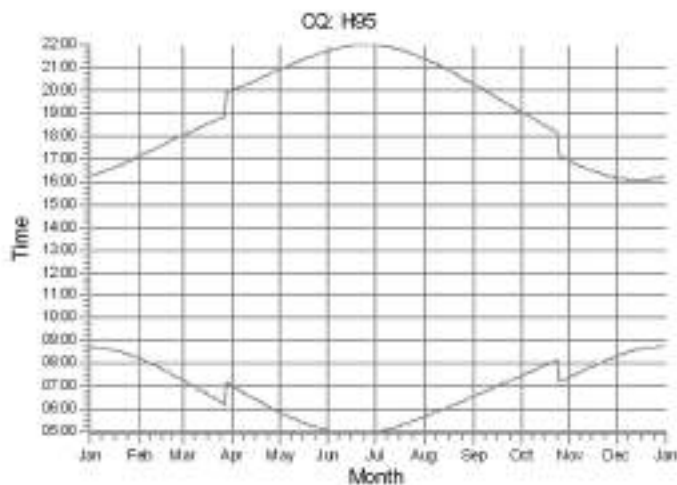
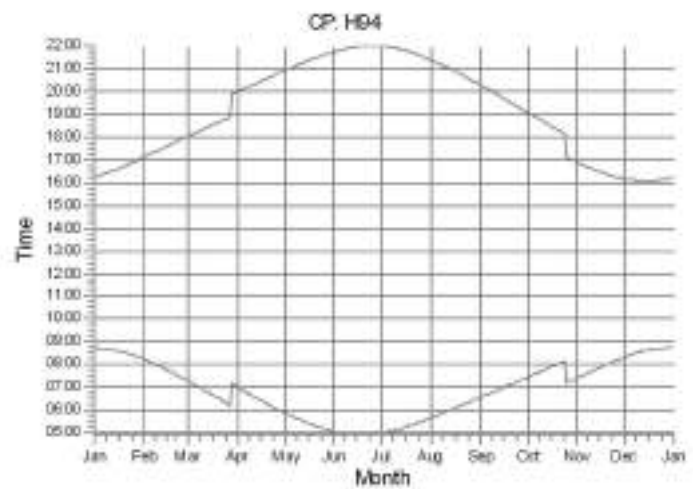
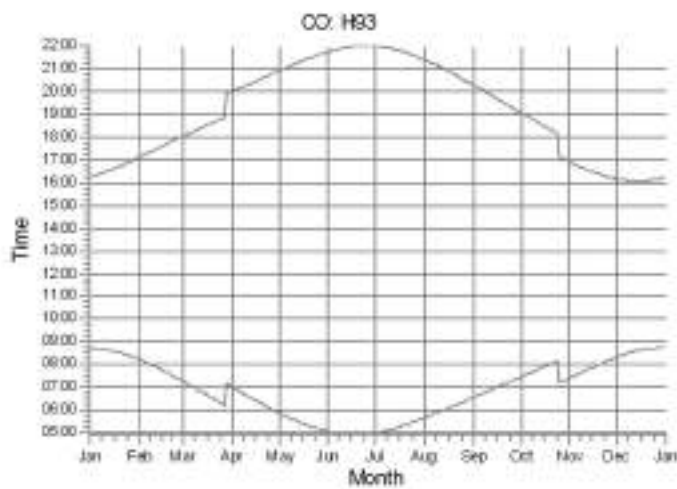
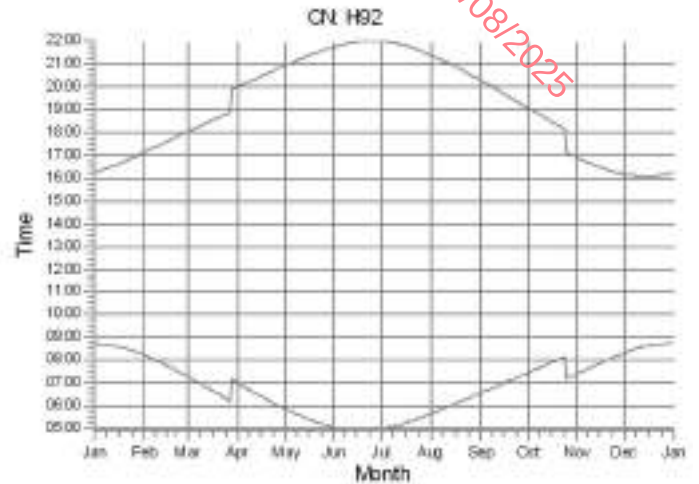
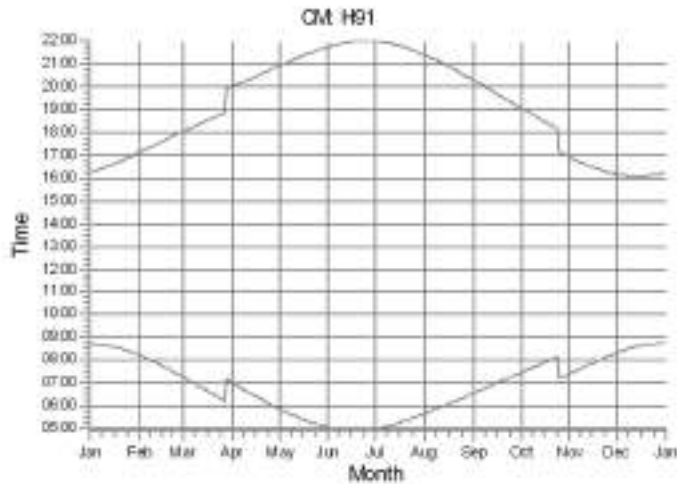


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

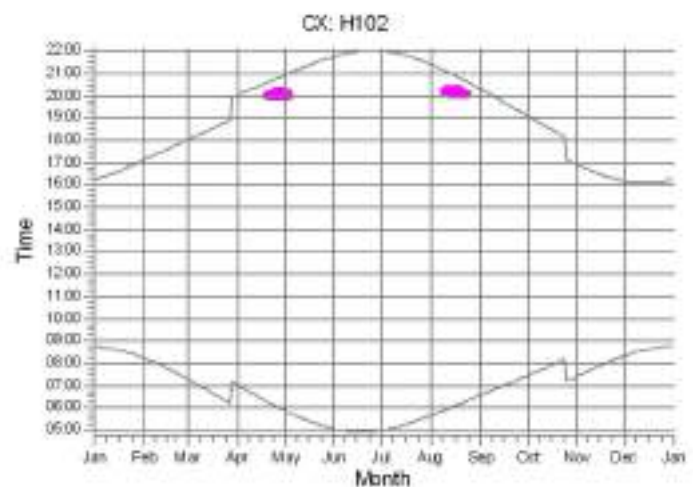
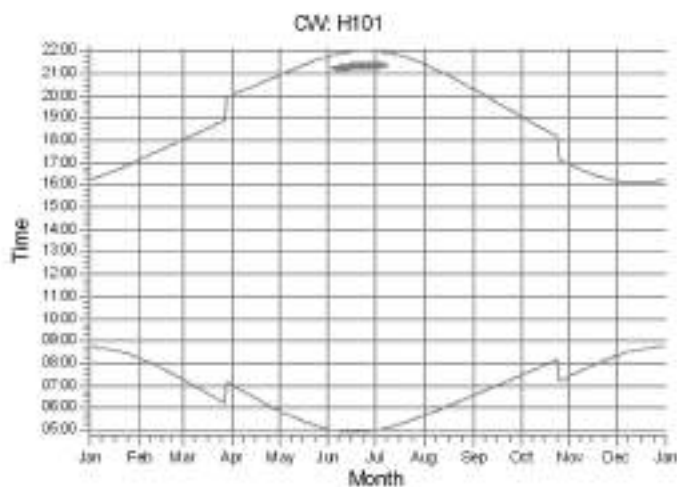
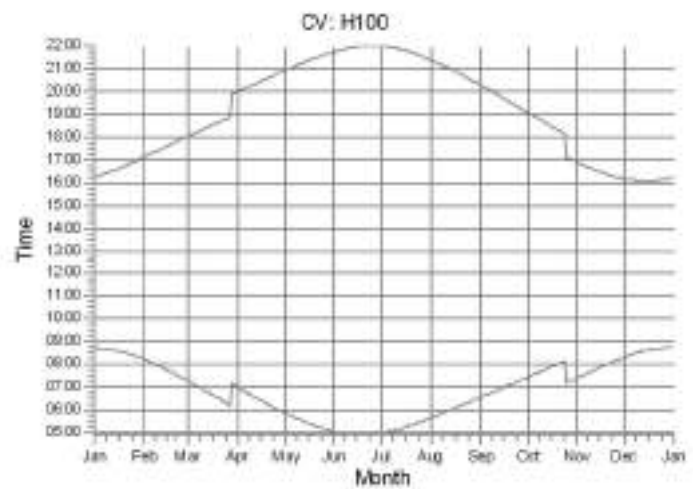
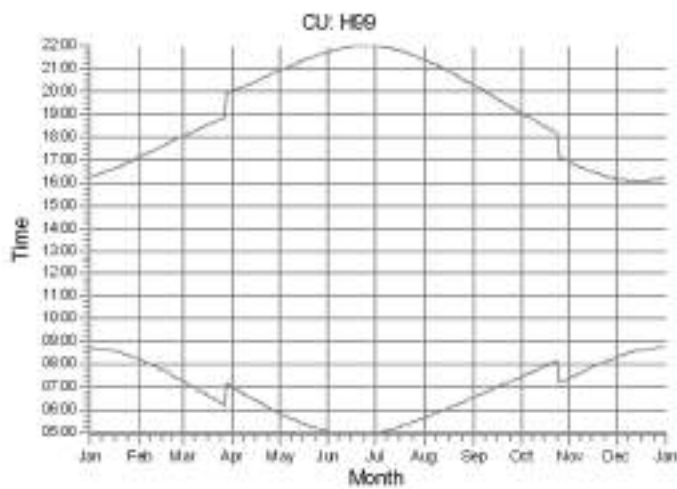
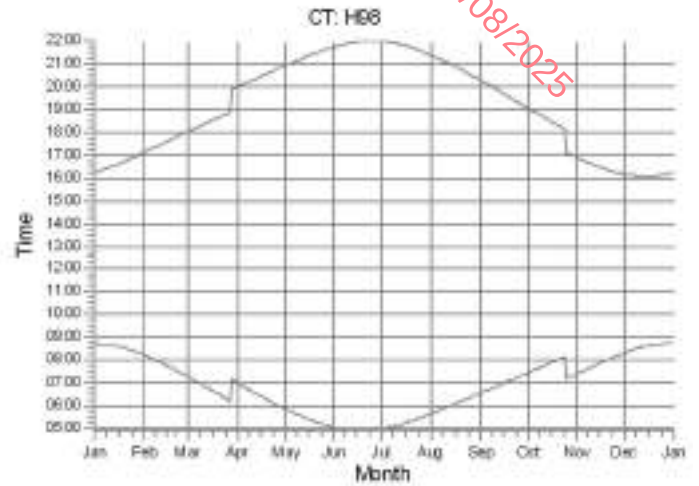
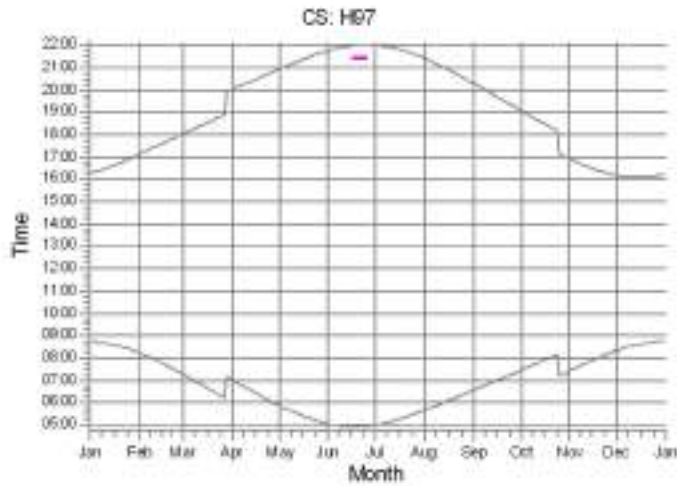
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

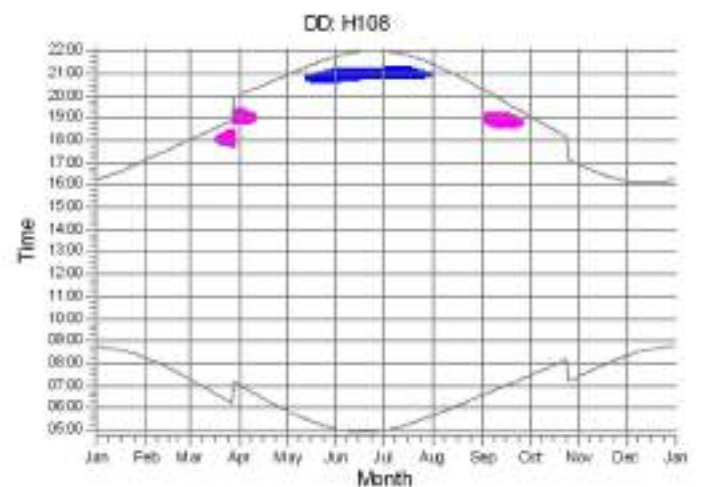
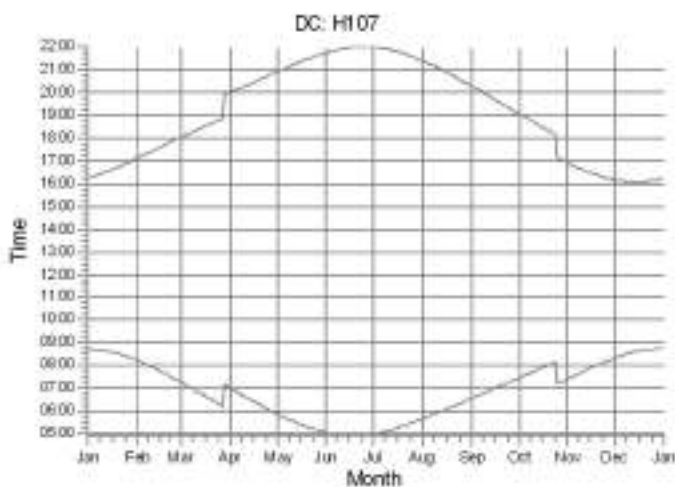
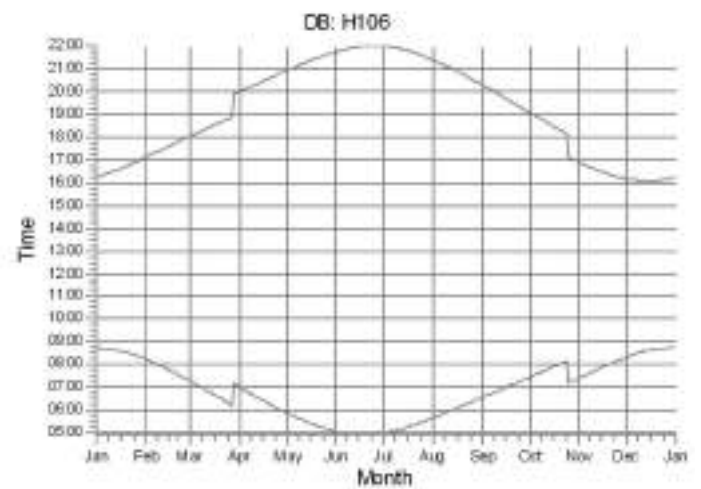
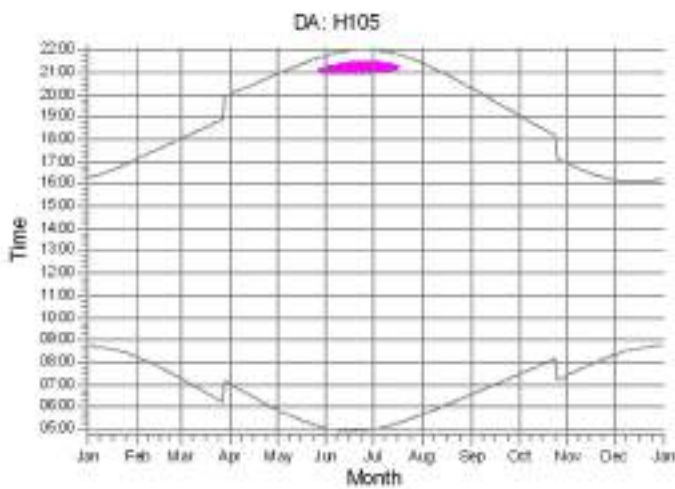
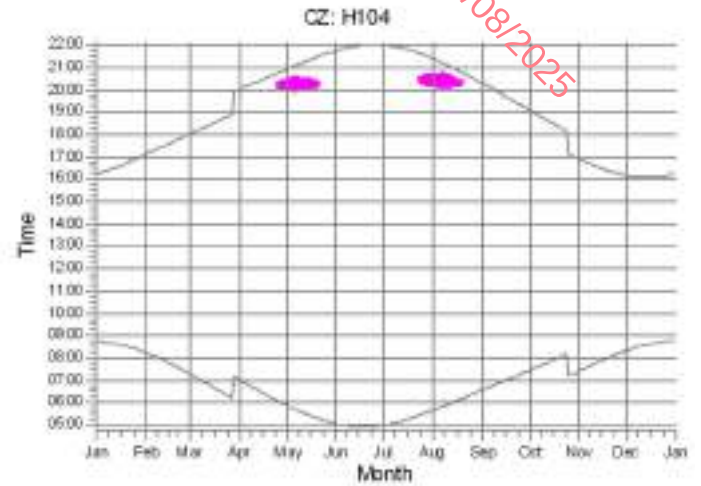
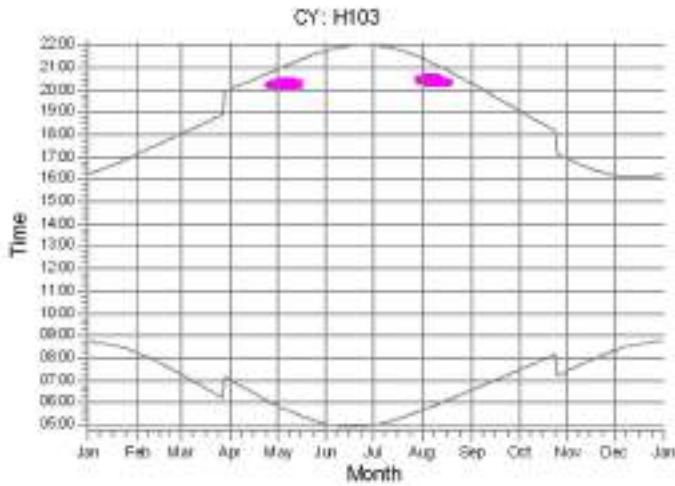


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

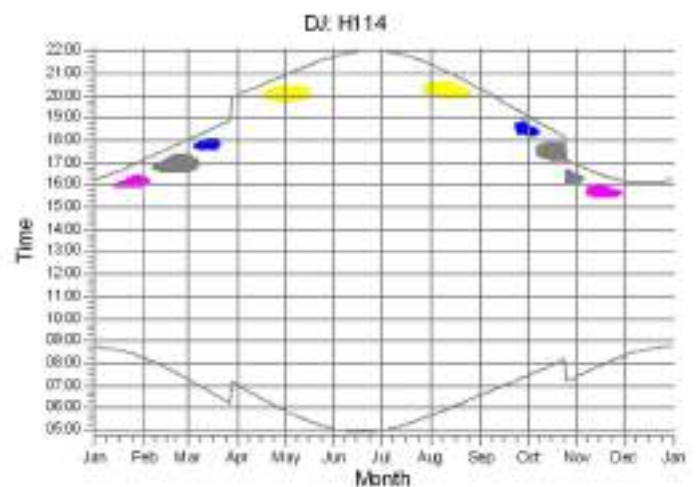
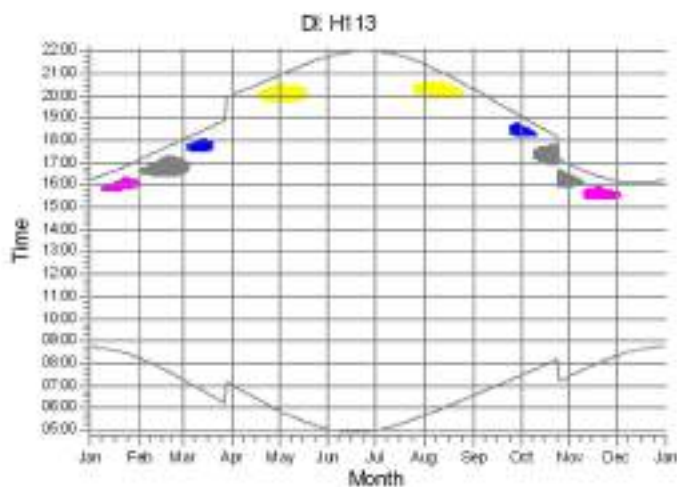
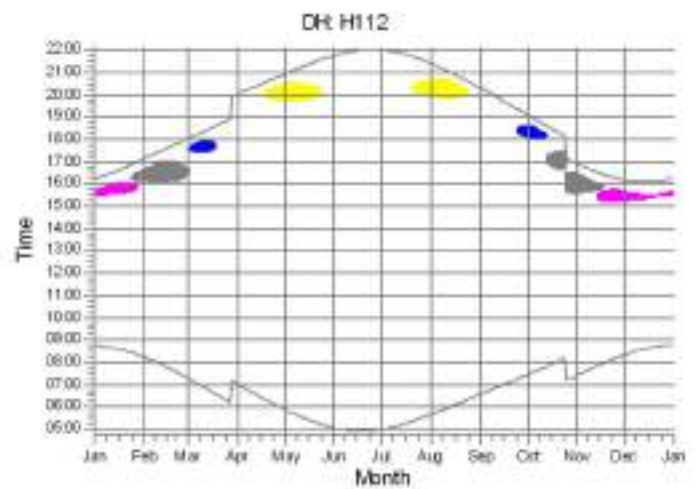
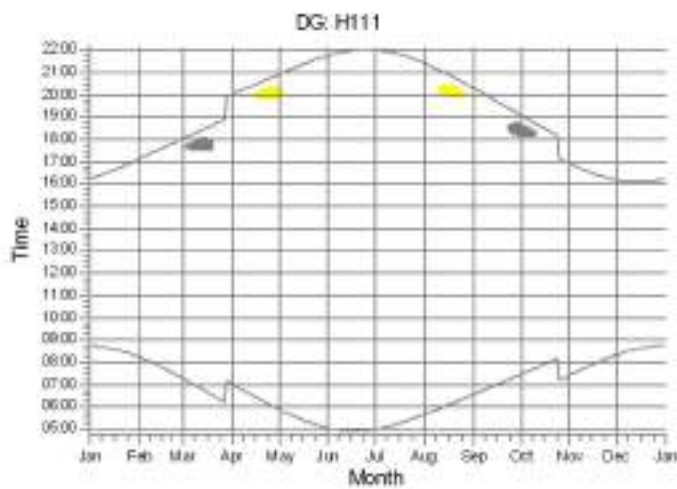
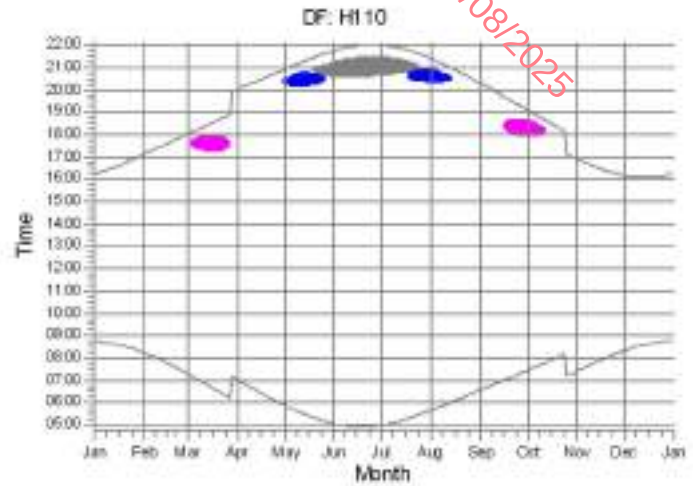
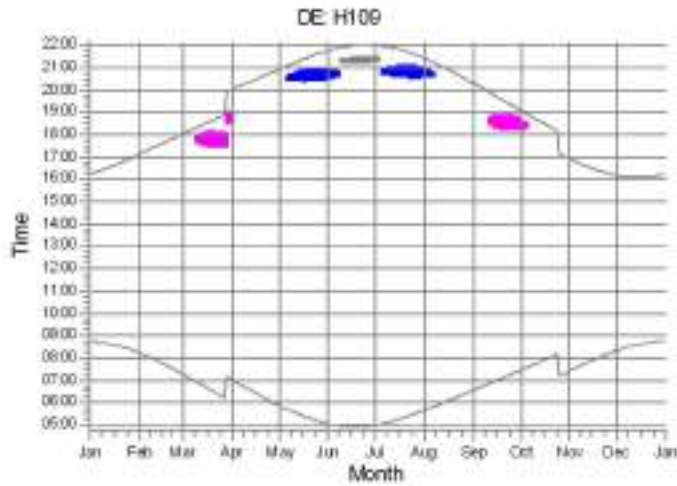


WTGs

3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

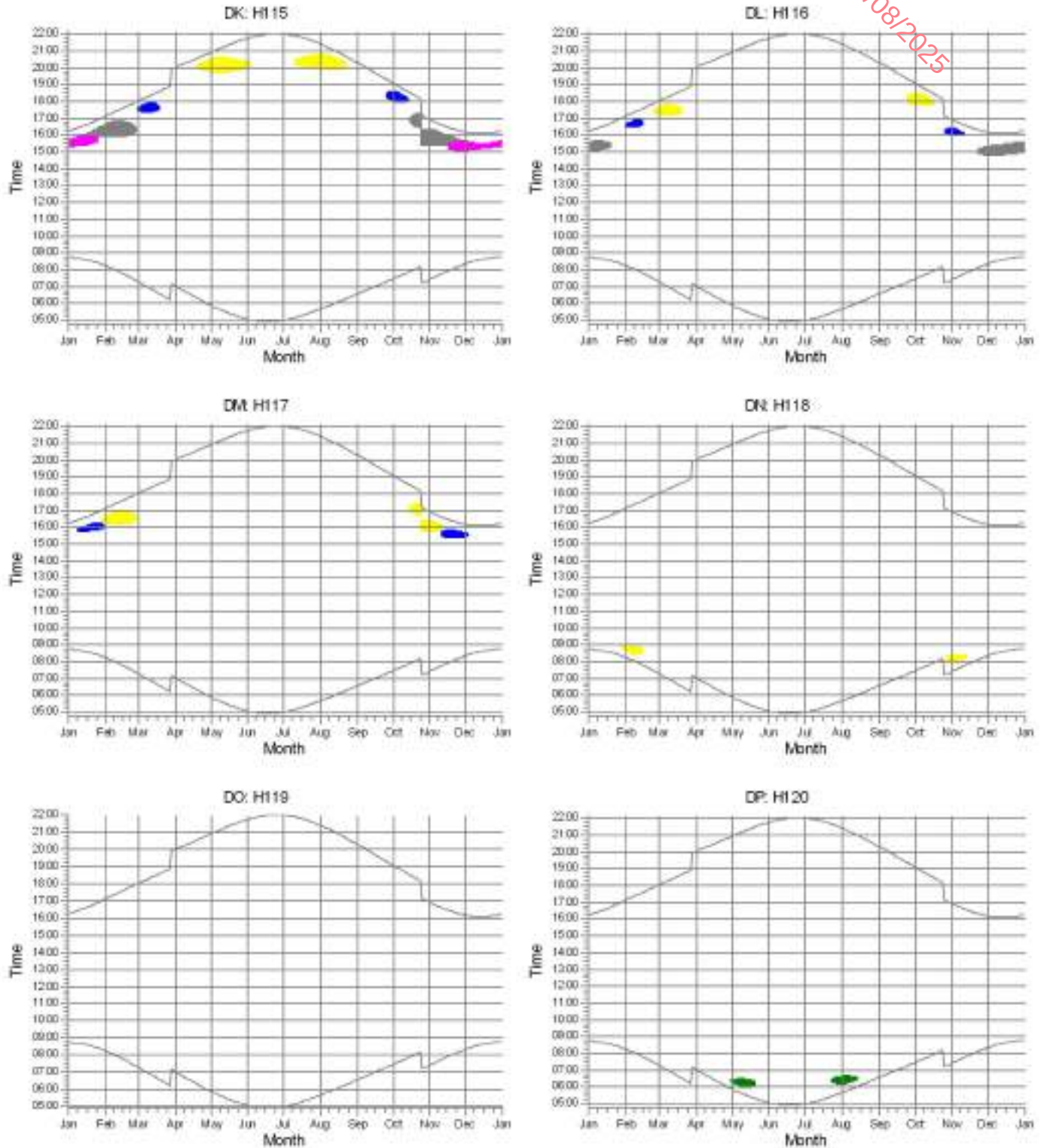


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

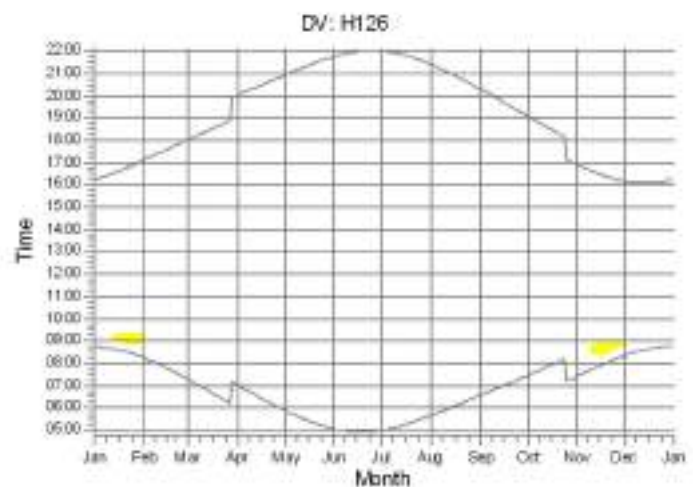
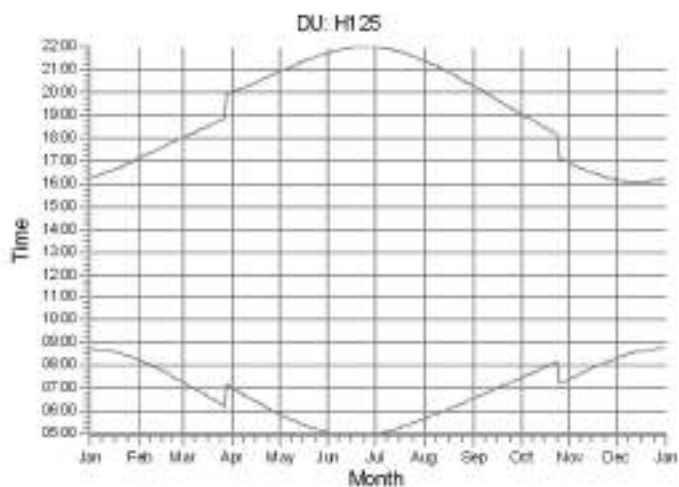
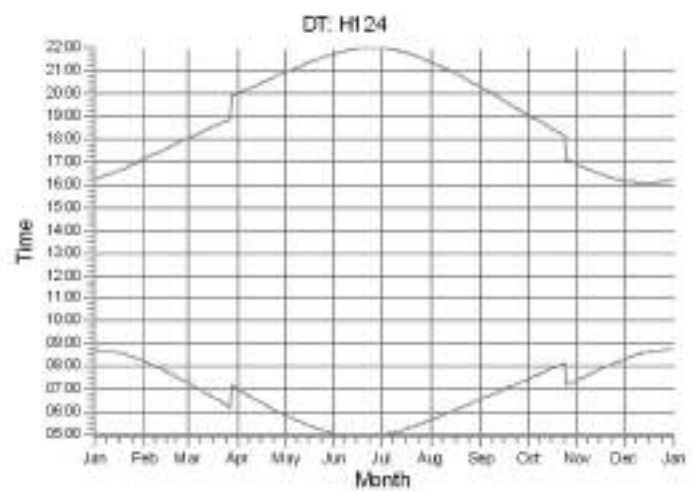
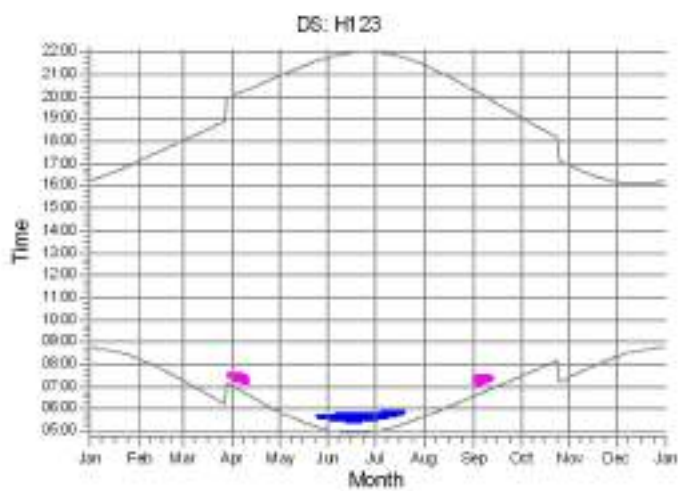
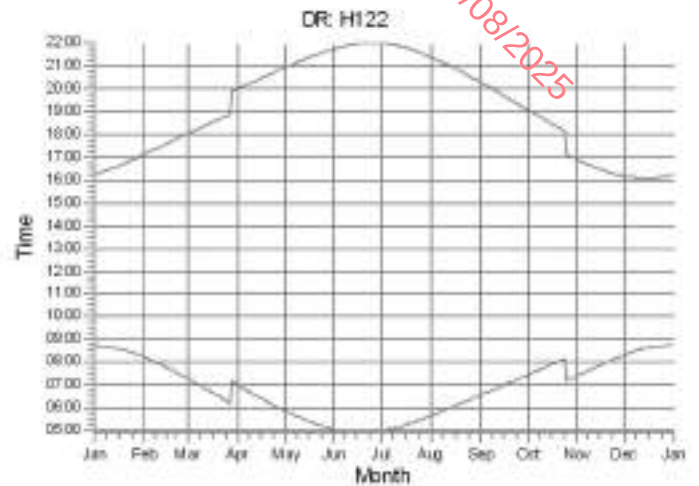
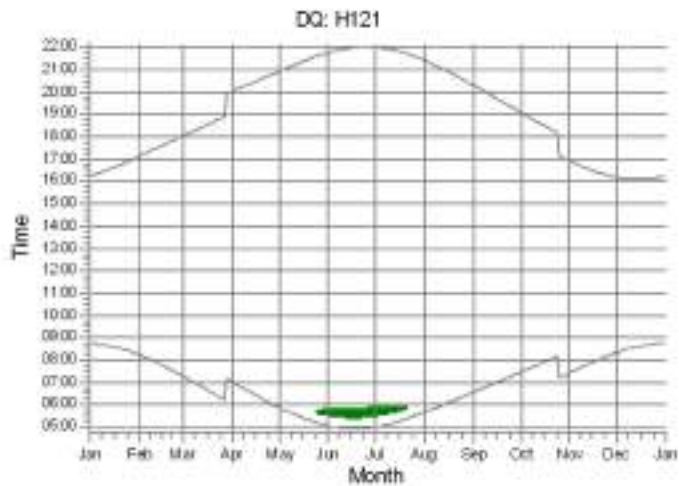


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

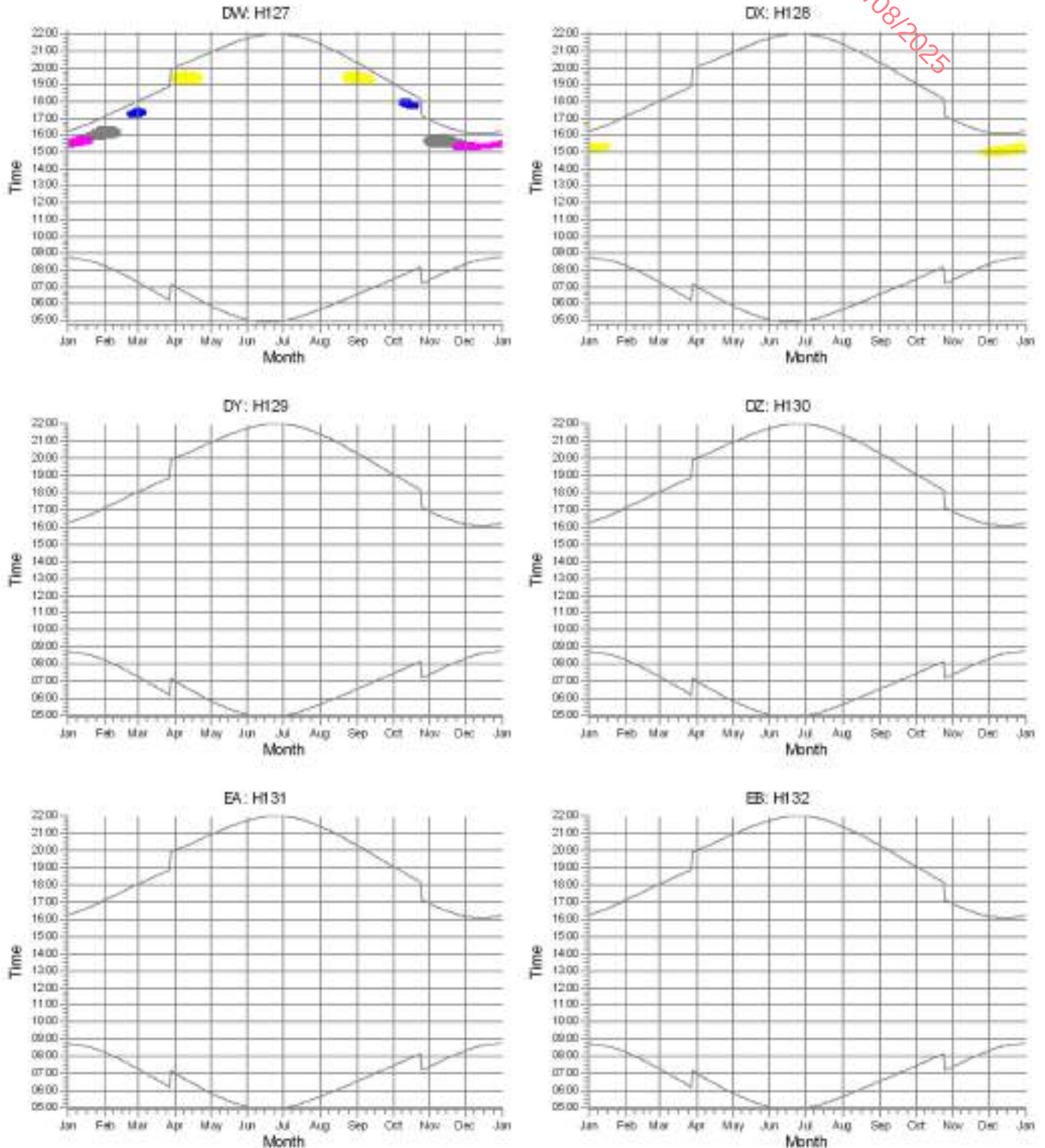


WTGs

1: T01 2: T02 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

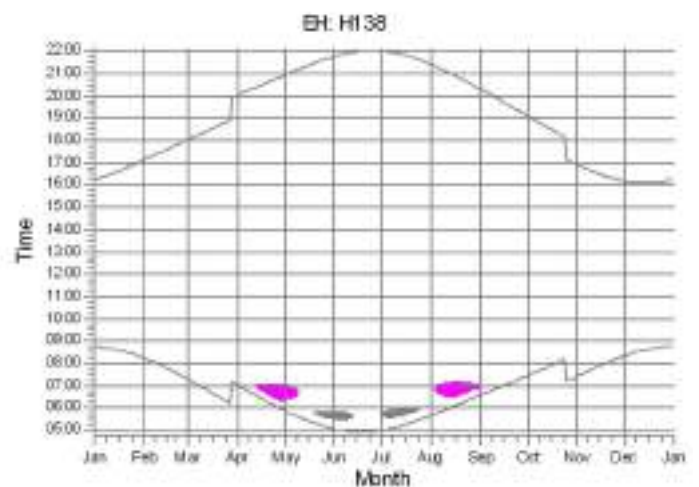
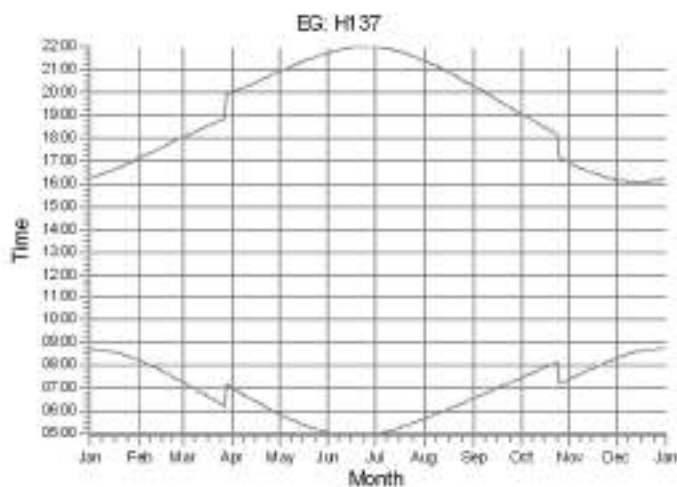
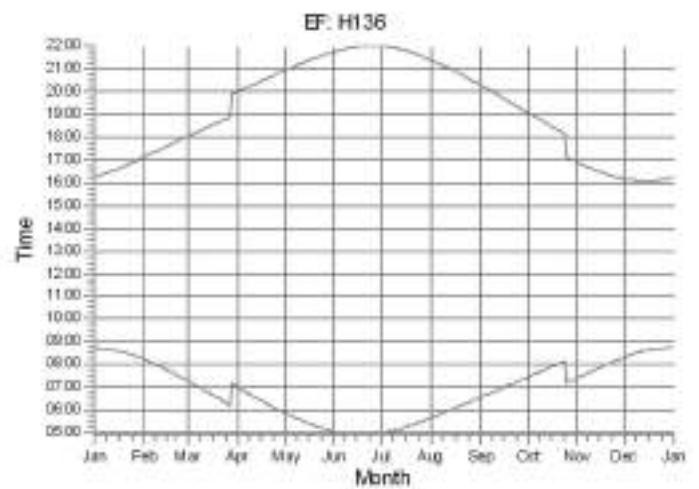
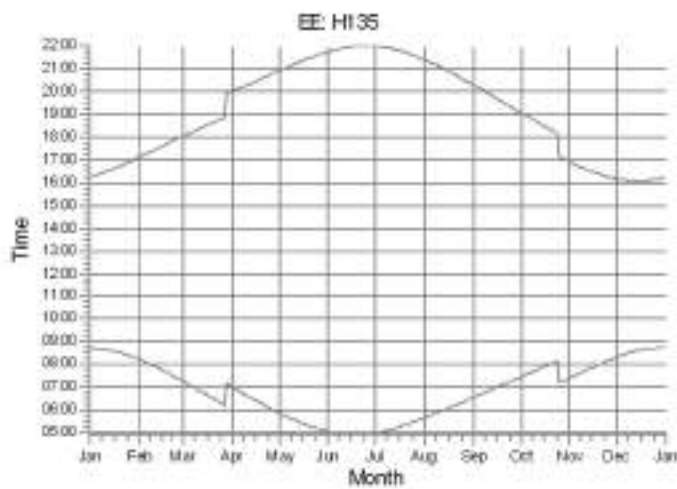
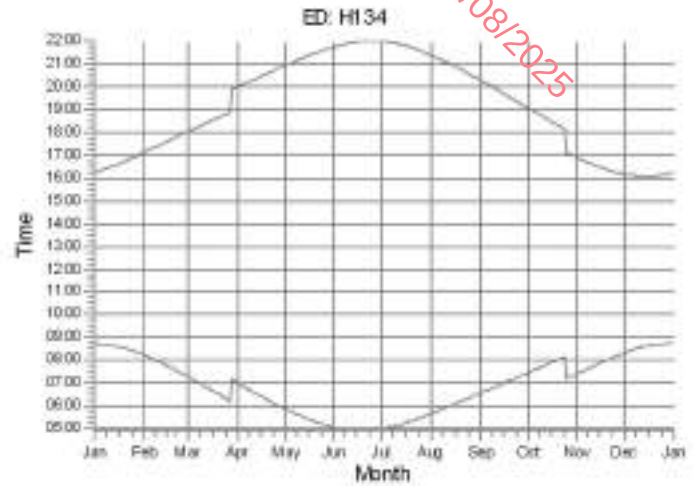
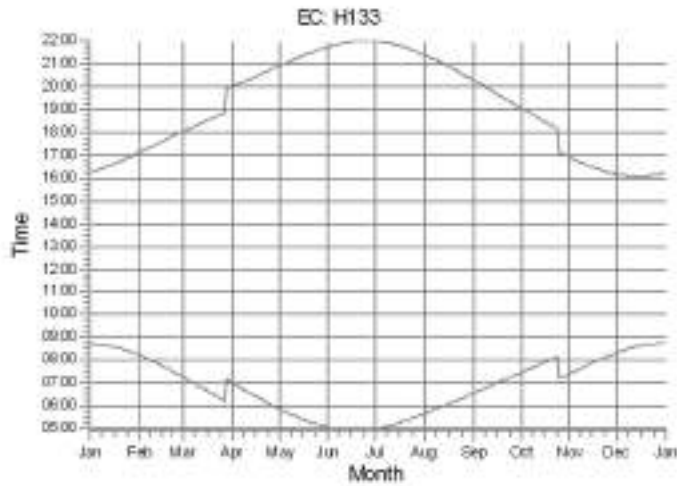


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

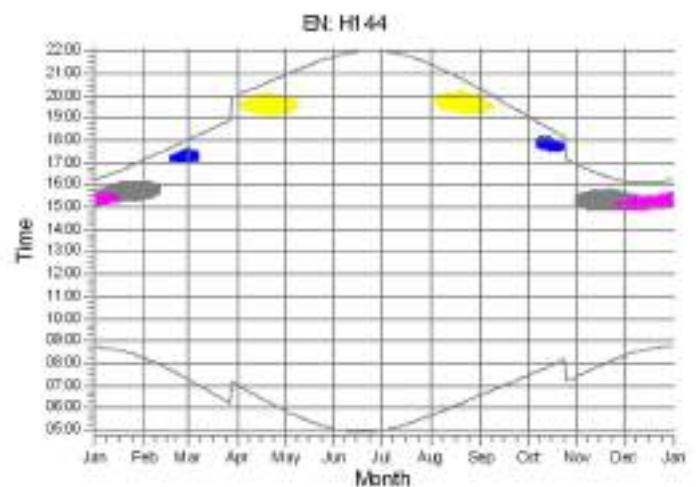
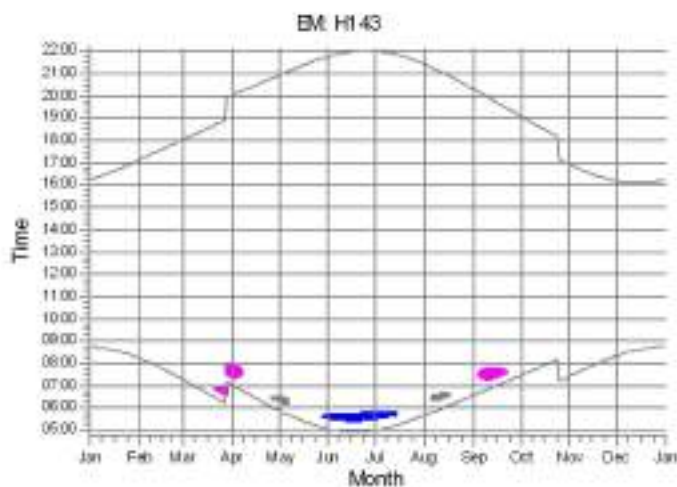
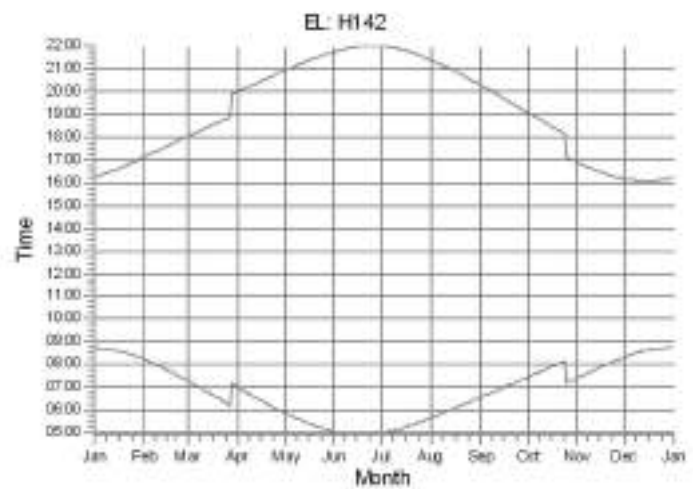
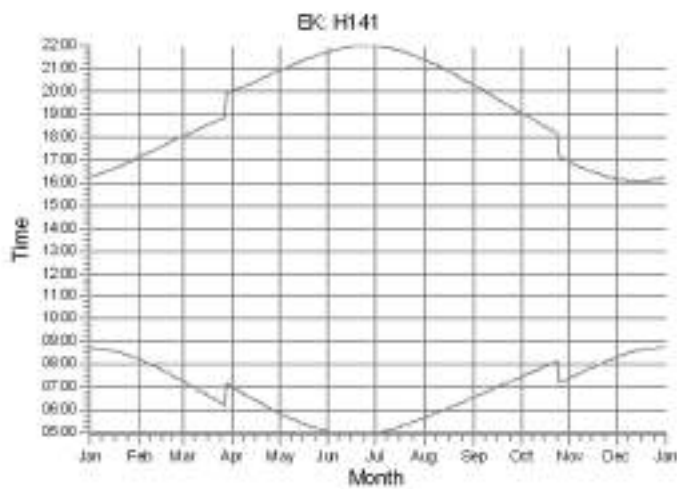
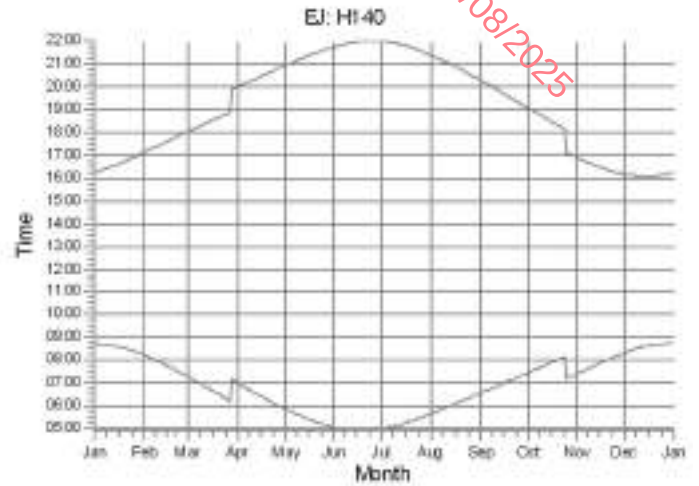
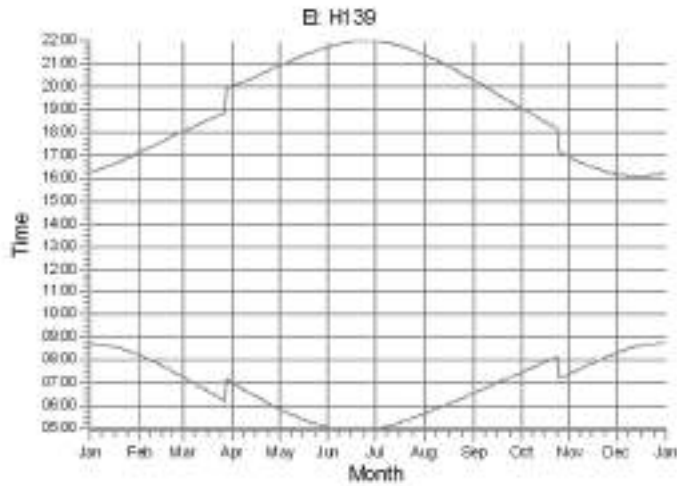


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

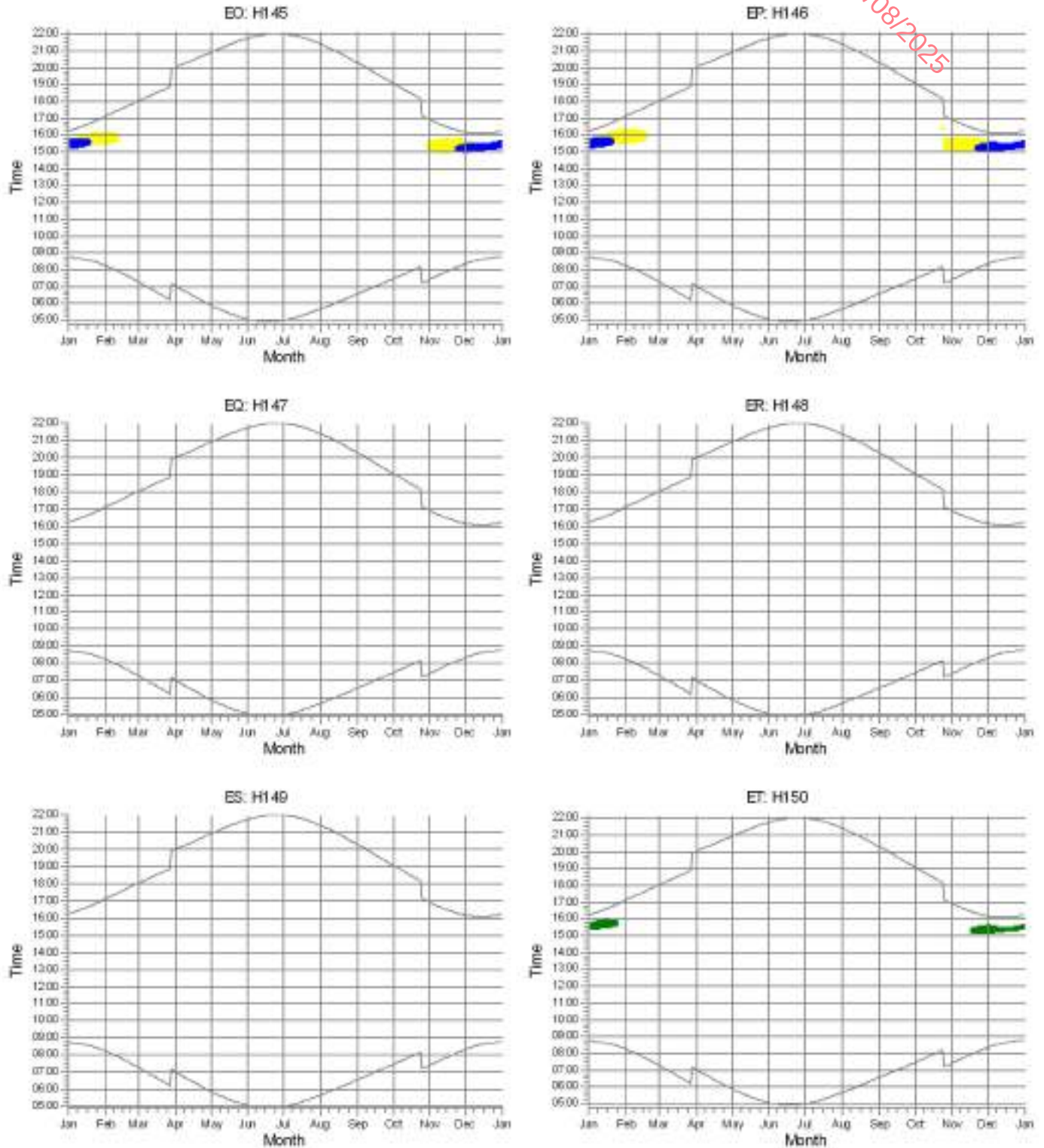


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

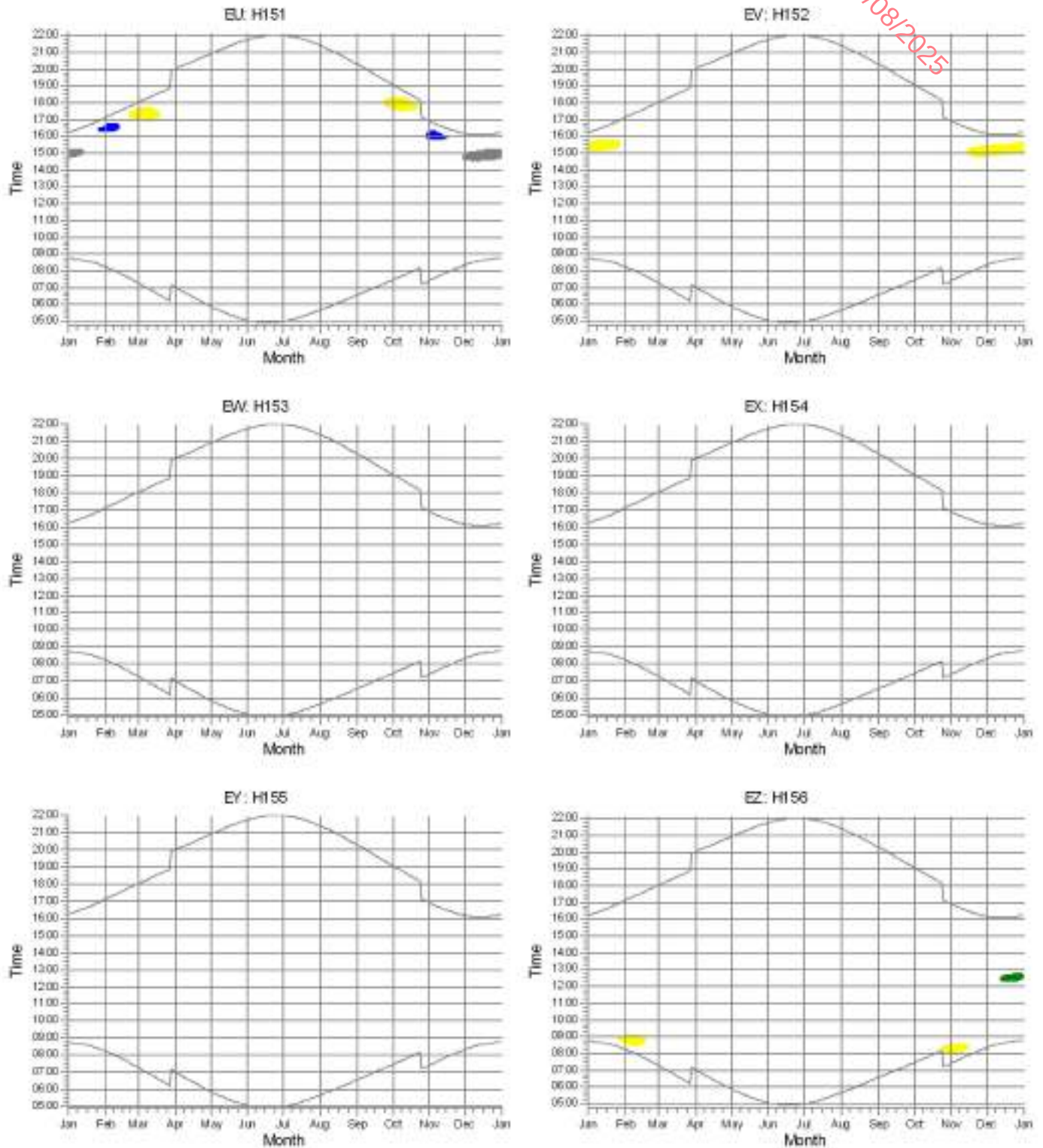


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

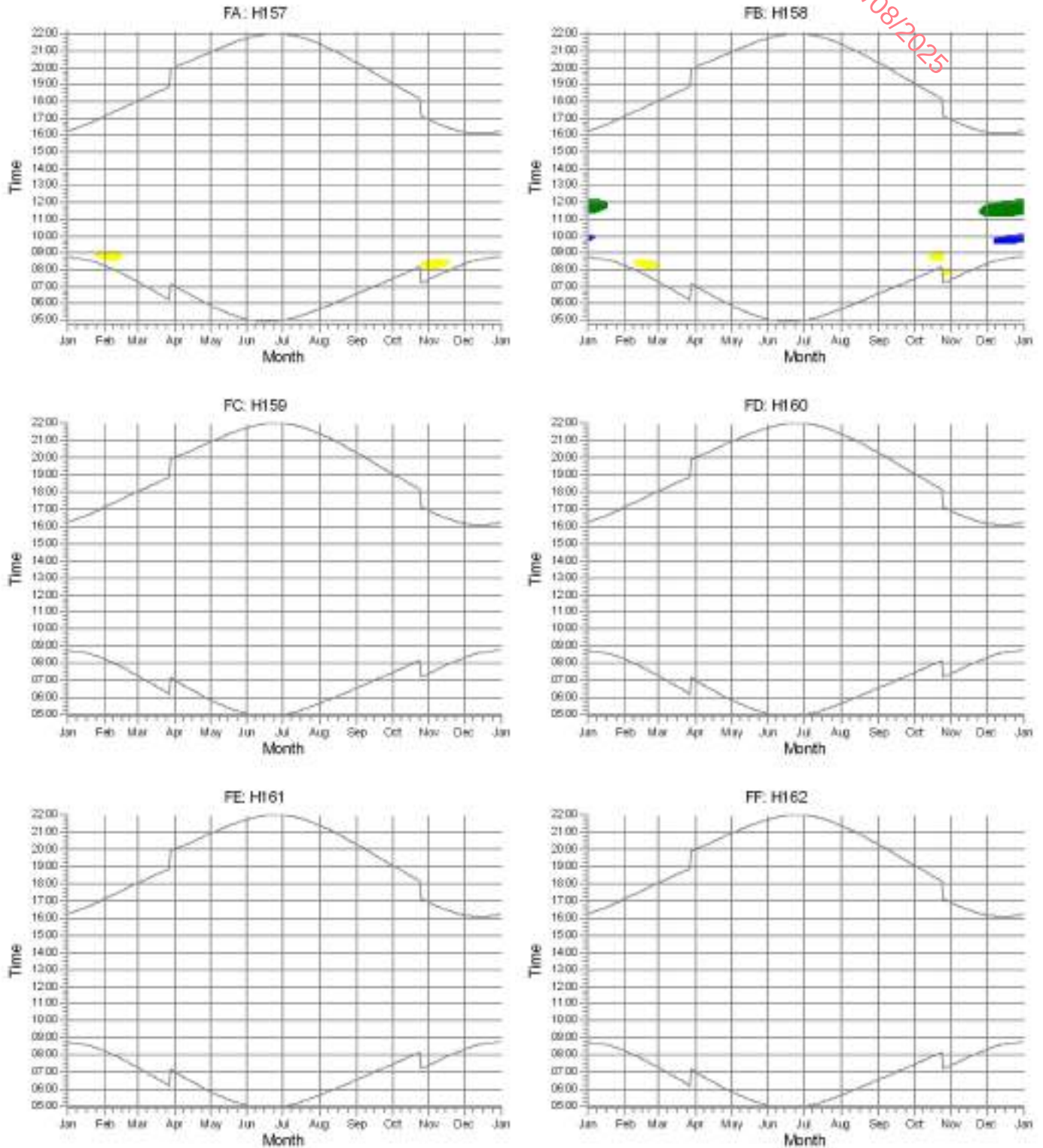


WTGs

1: T01 2: T02 3: T03 4: T04

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

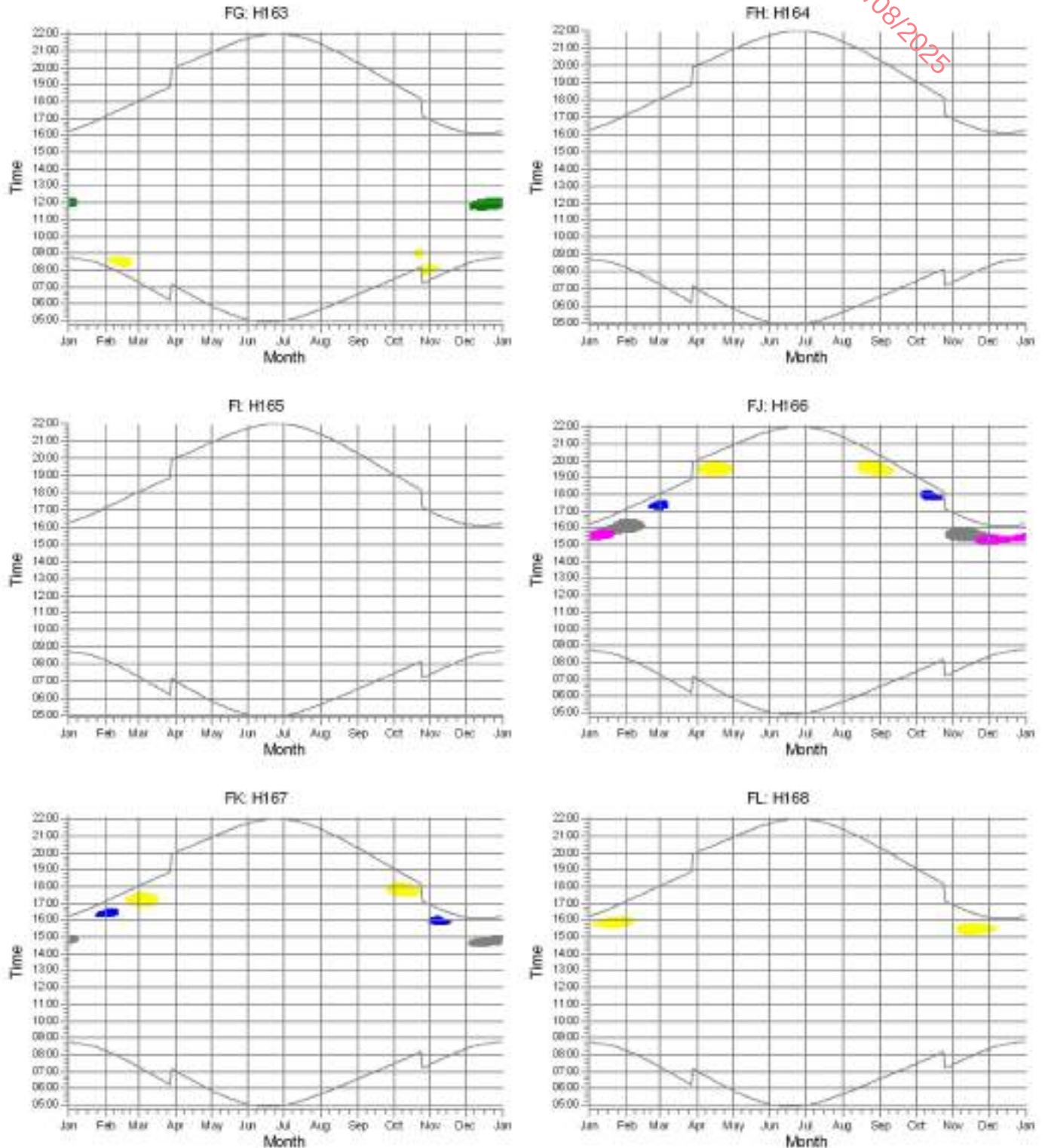


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

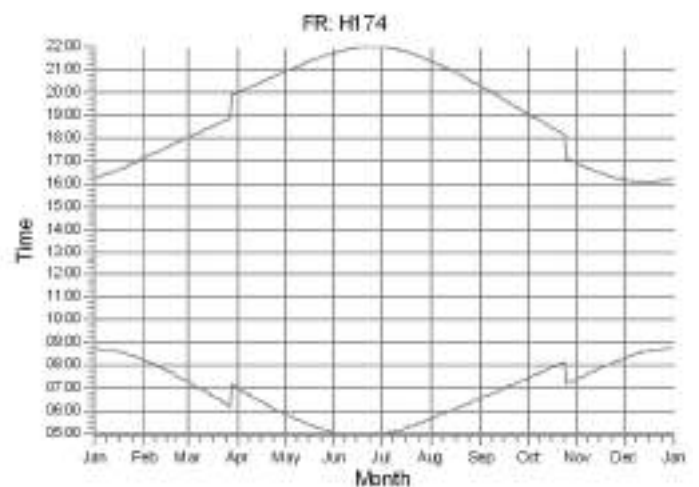
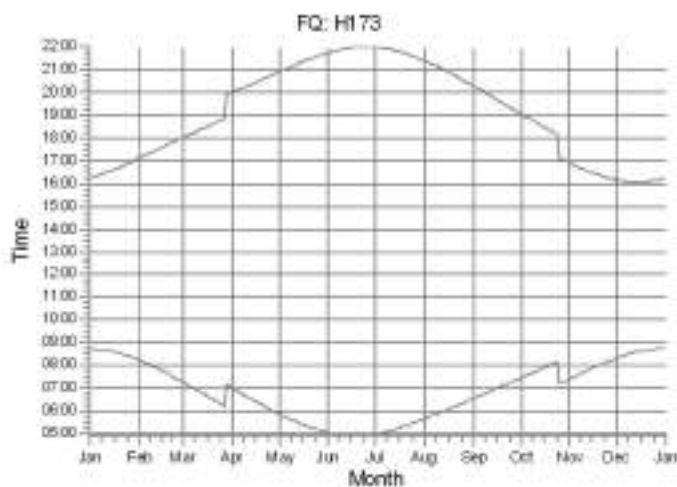
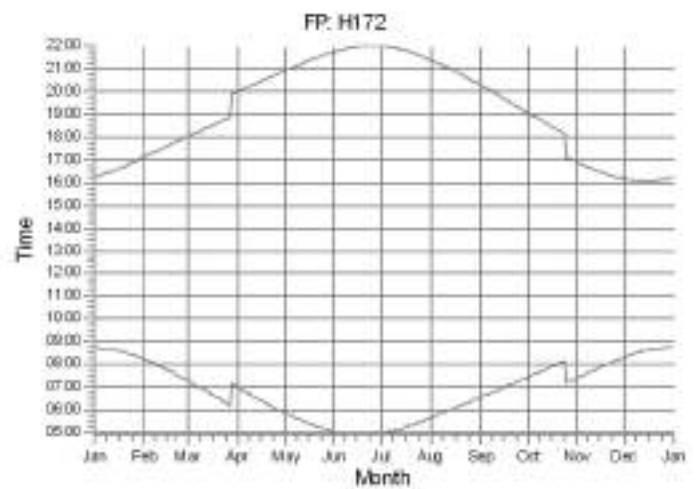
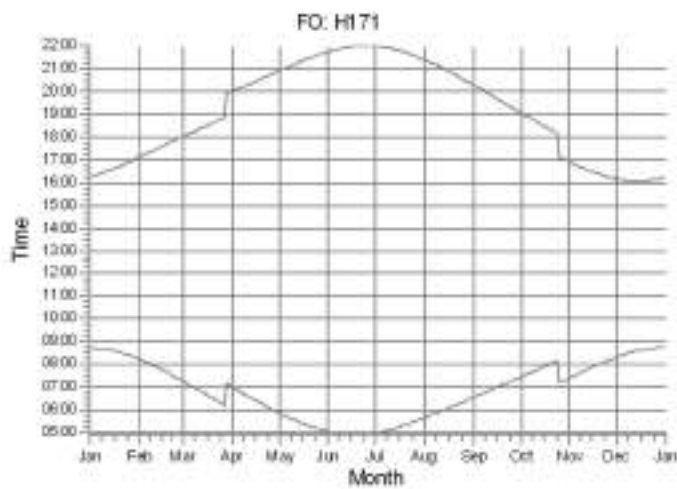
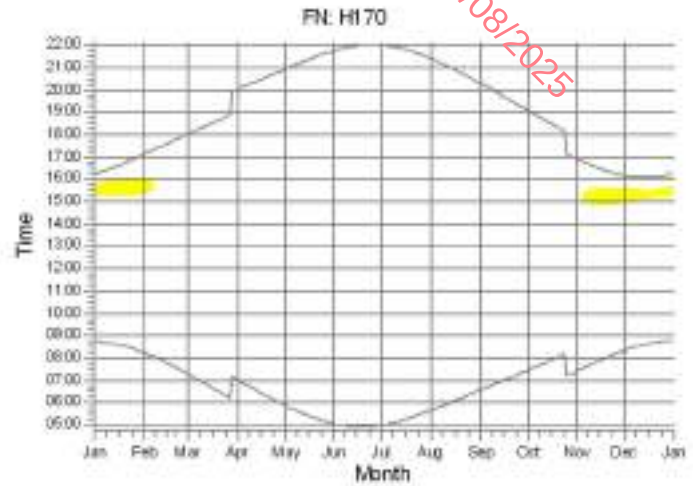
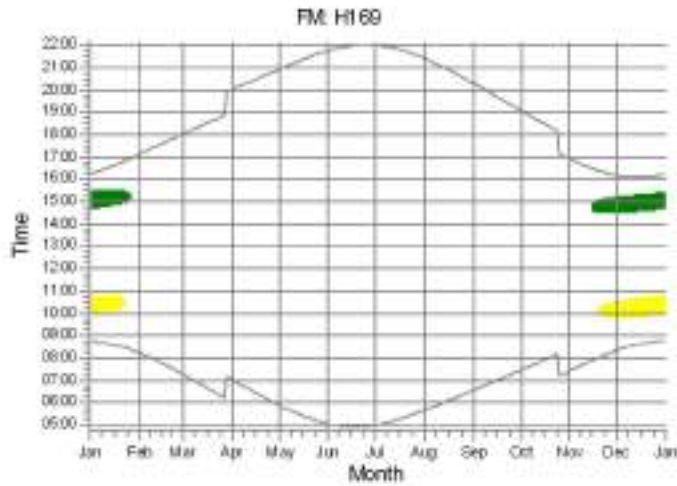


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

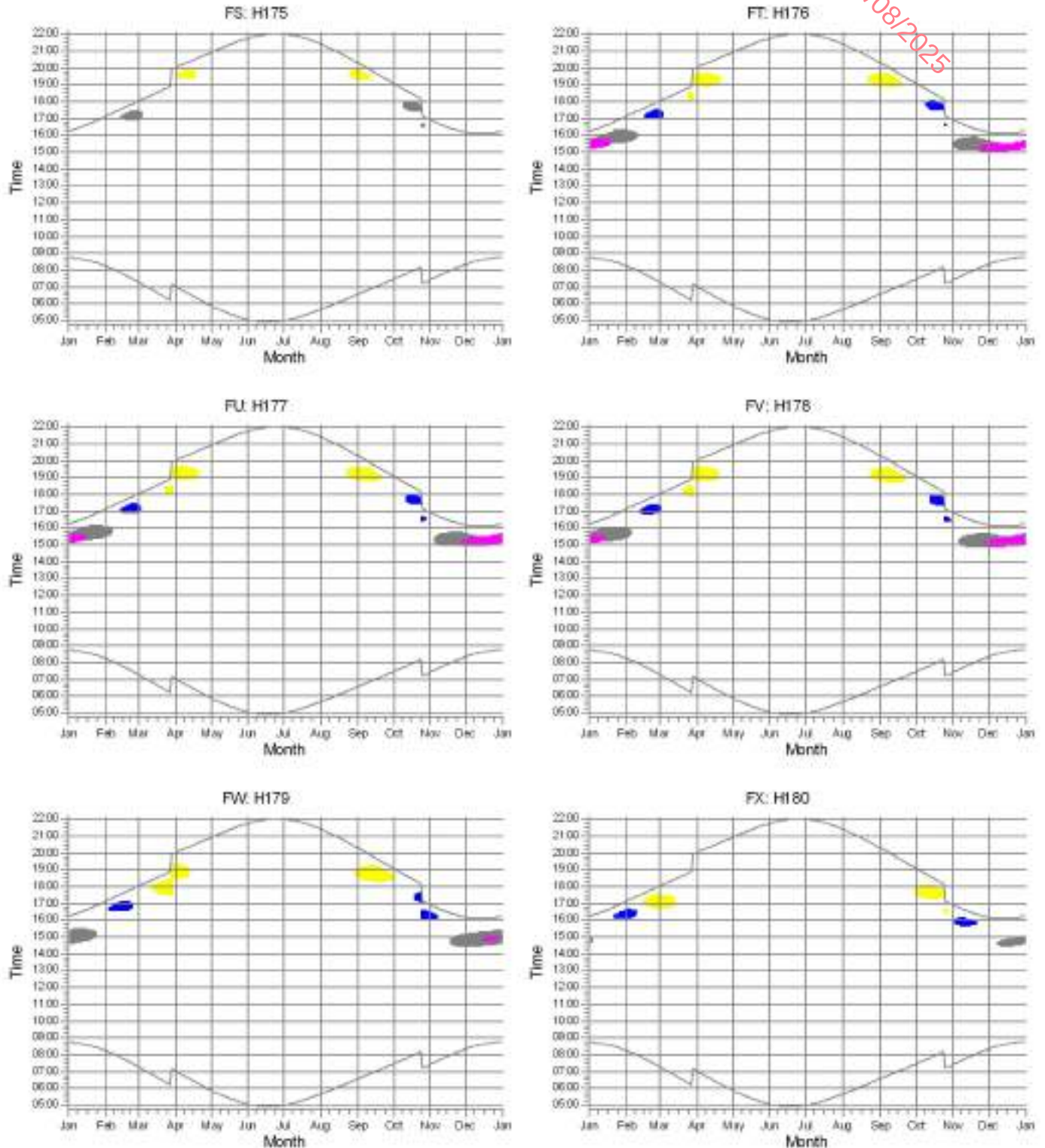


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

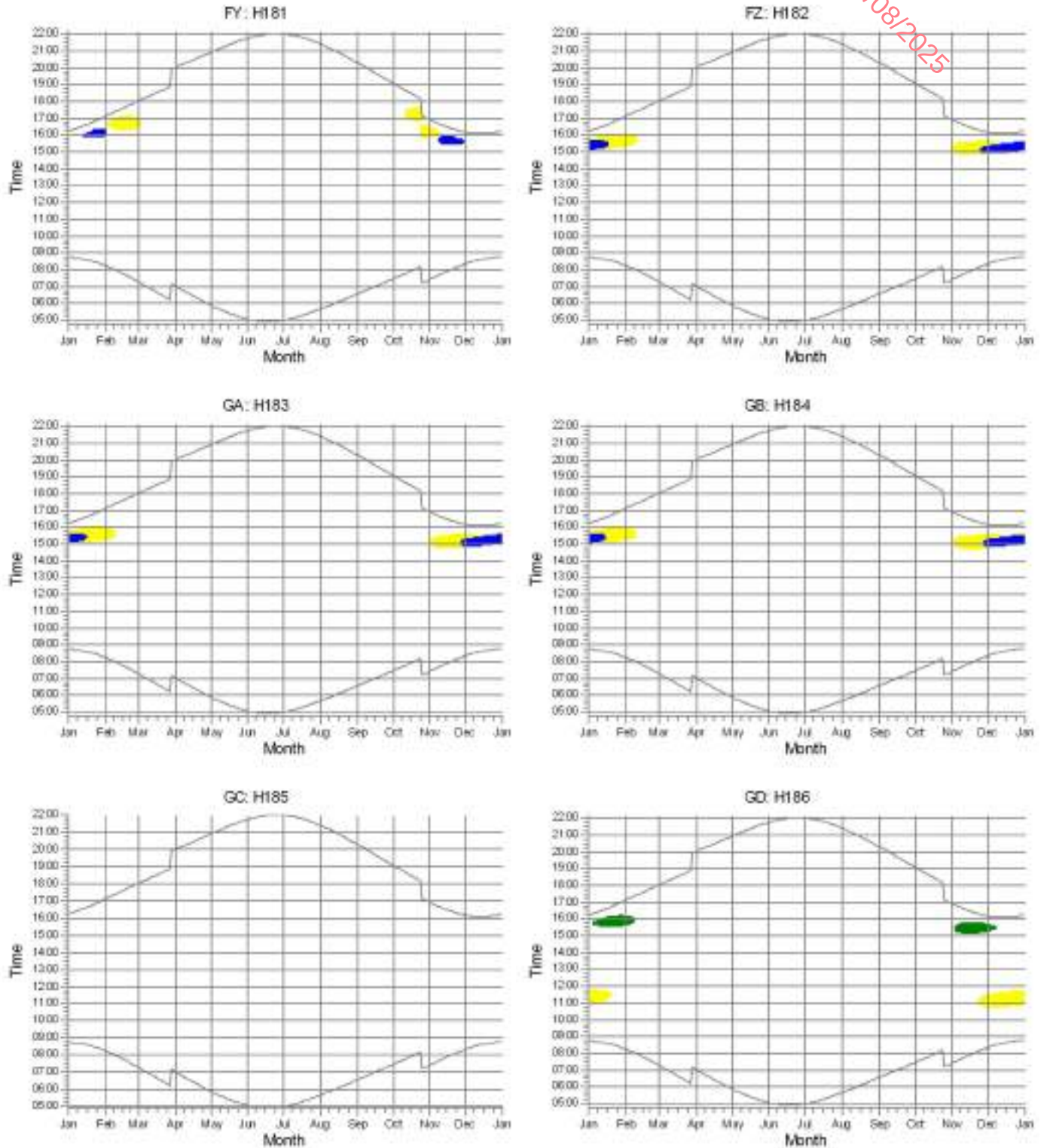


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

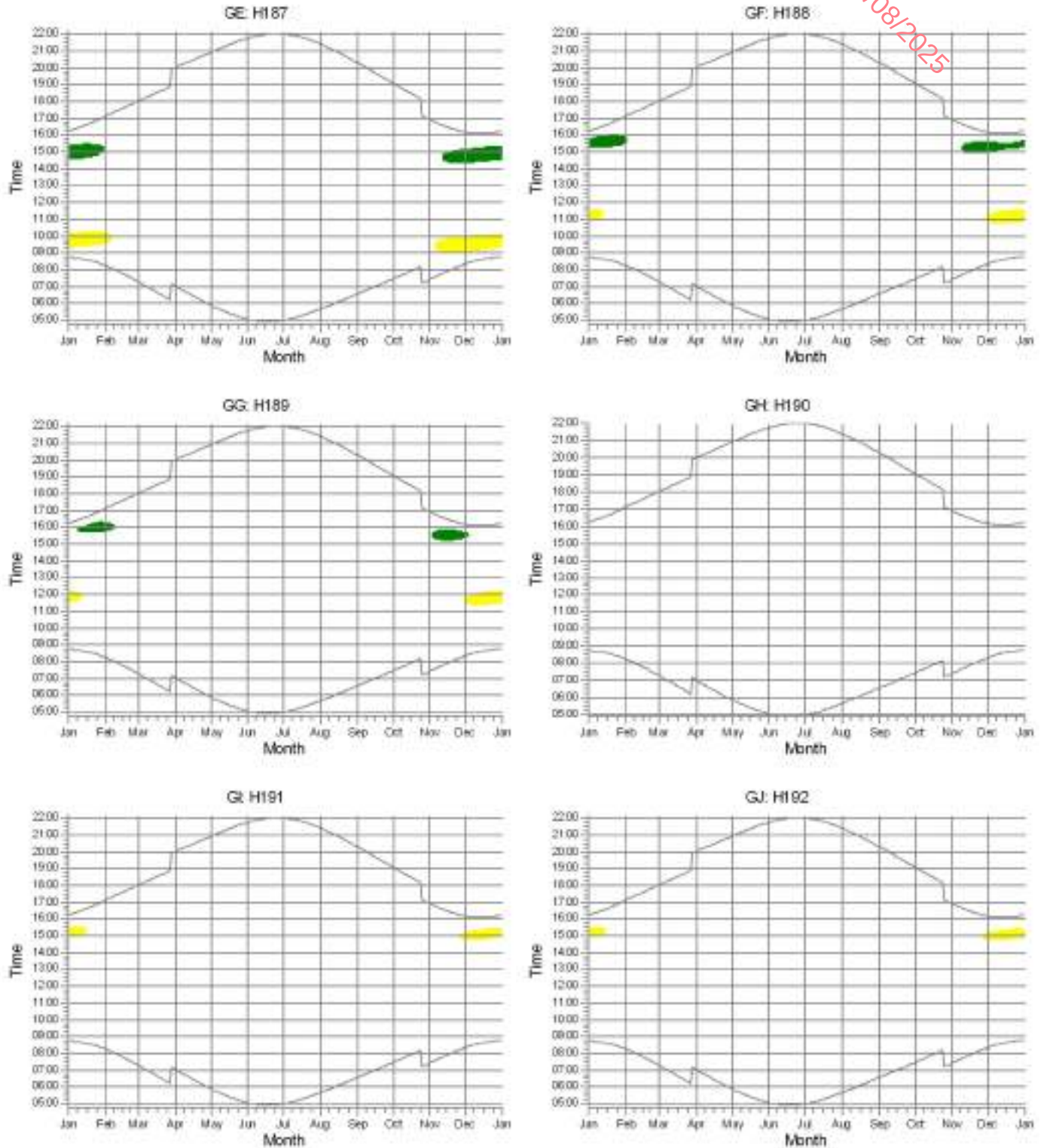


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

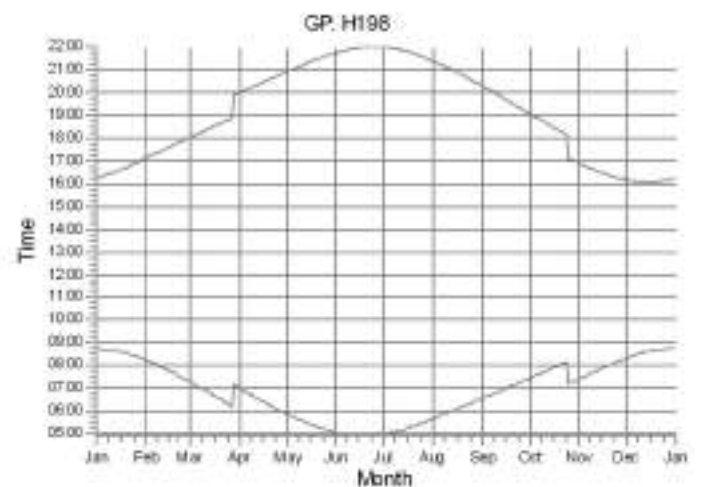
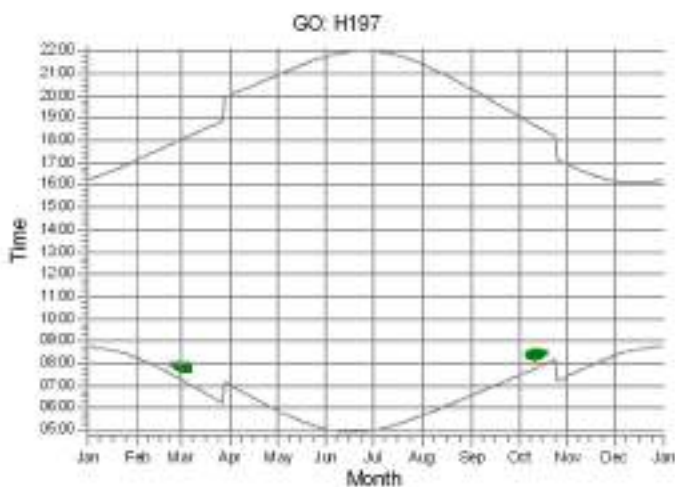
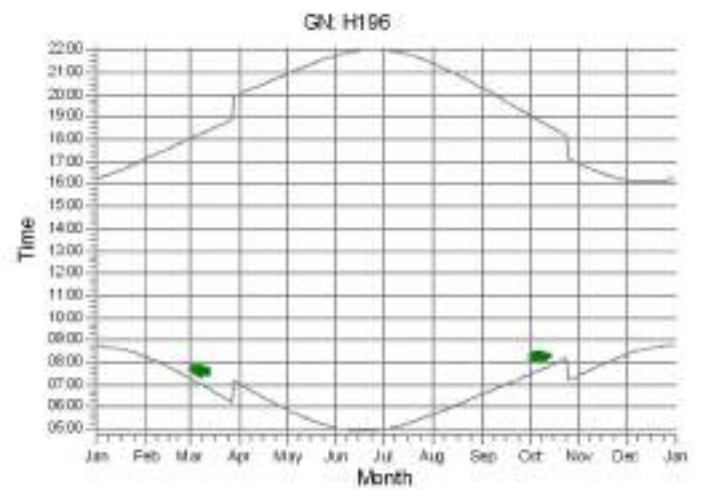
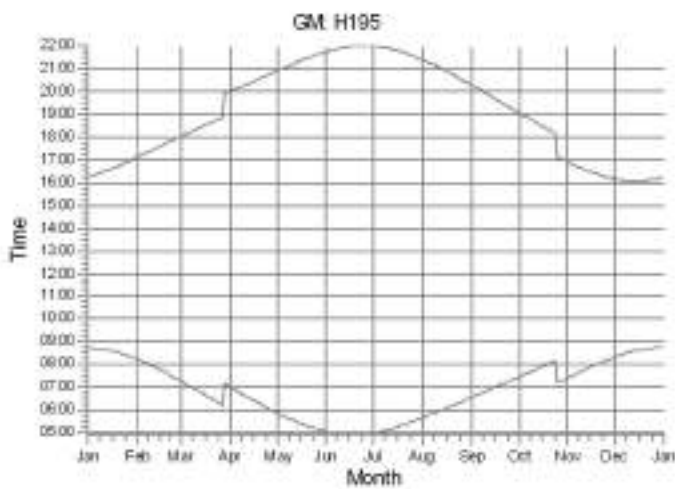
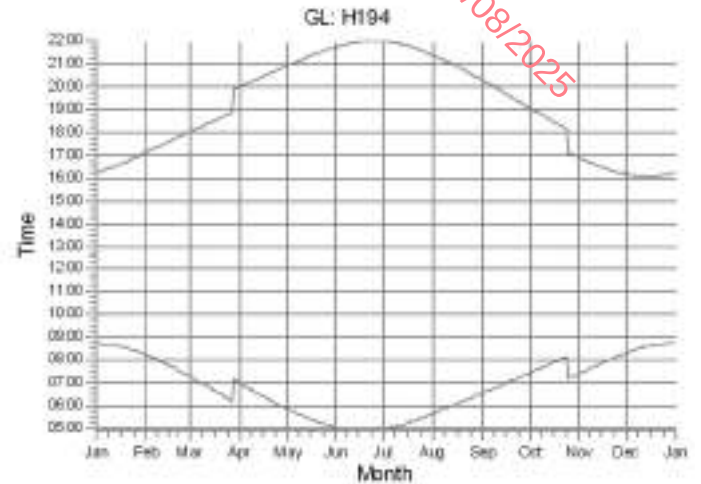
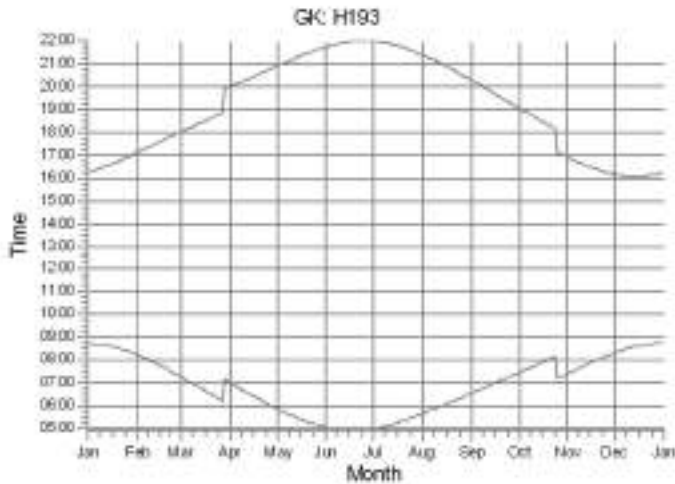


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

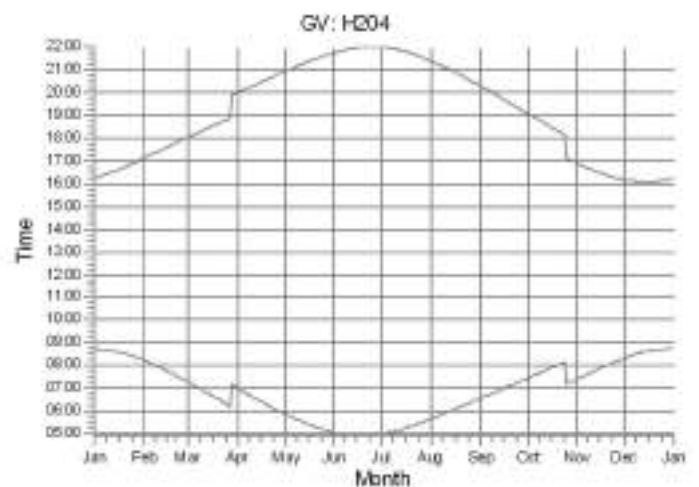
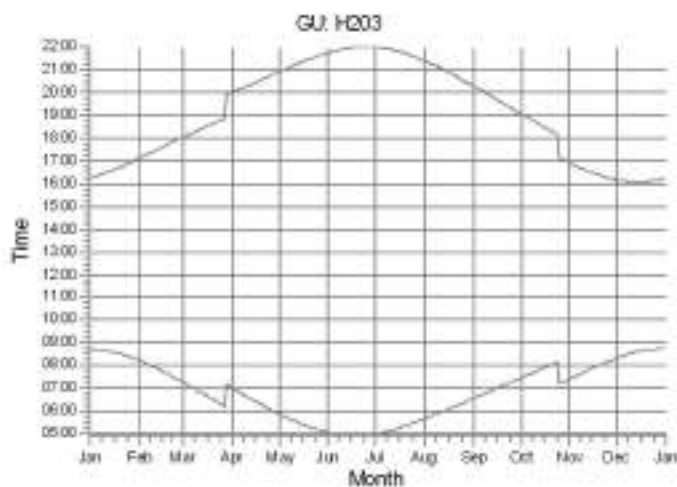
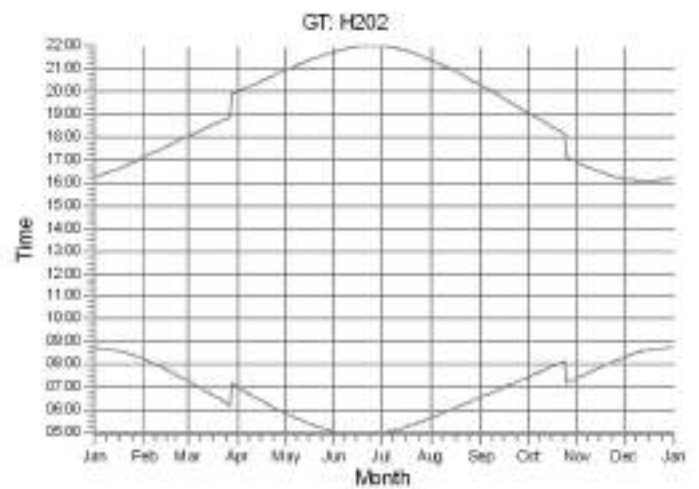
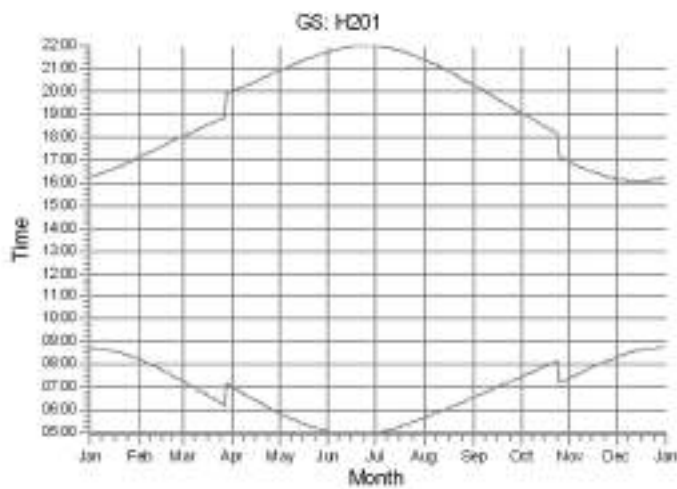
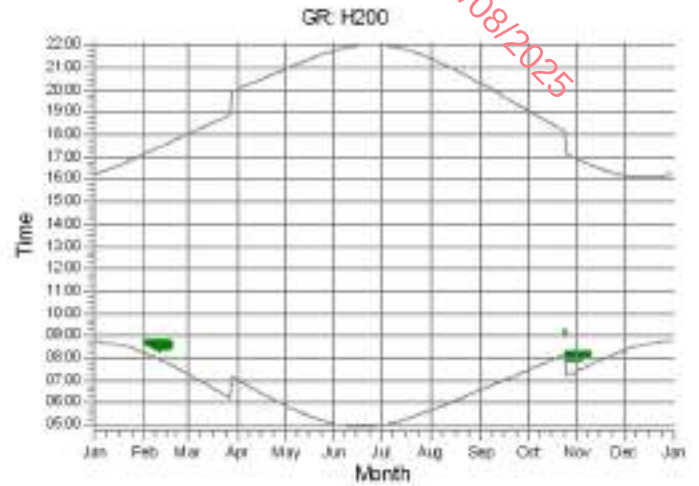
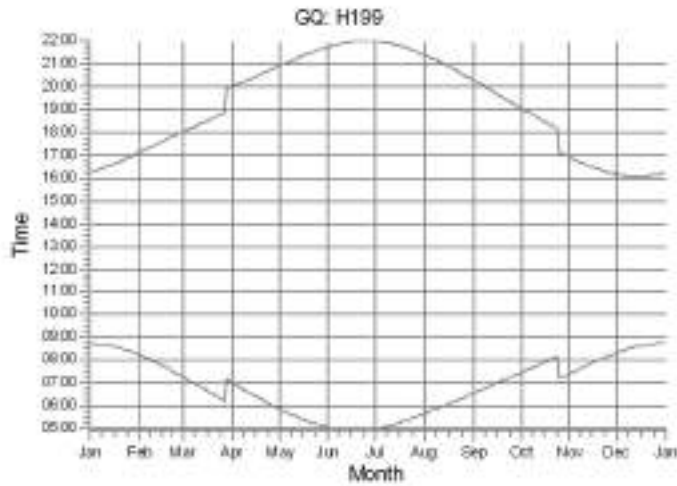


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

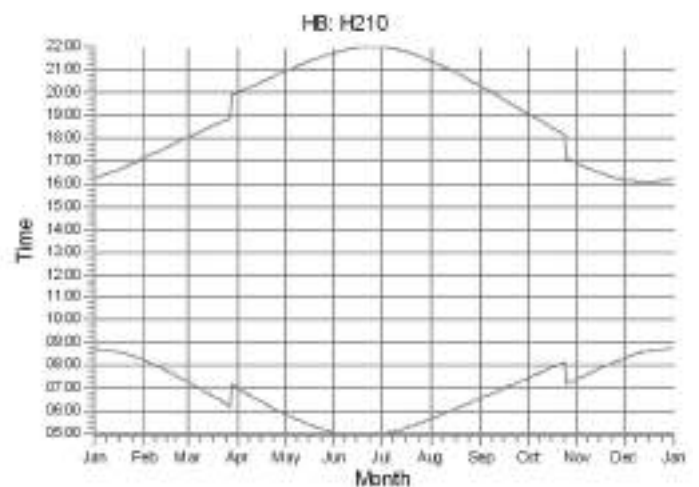
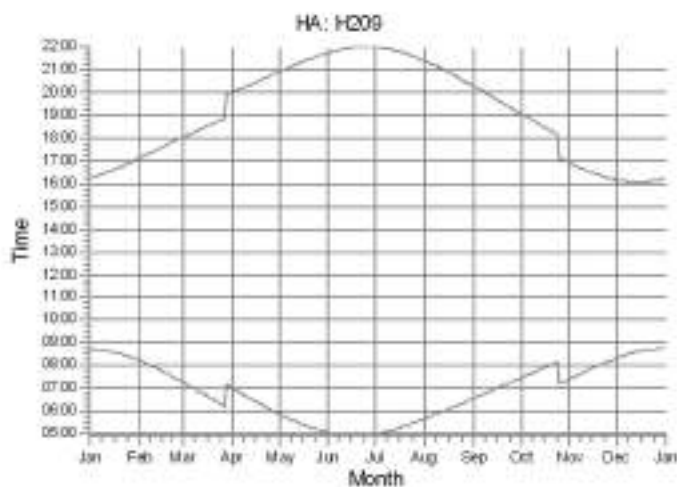
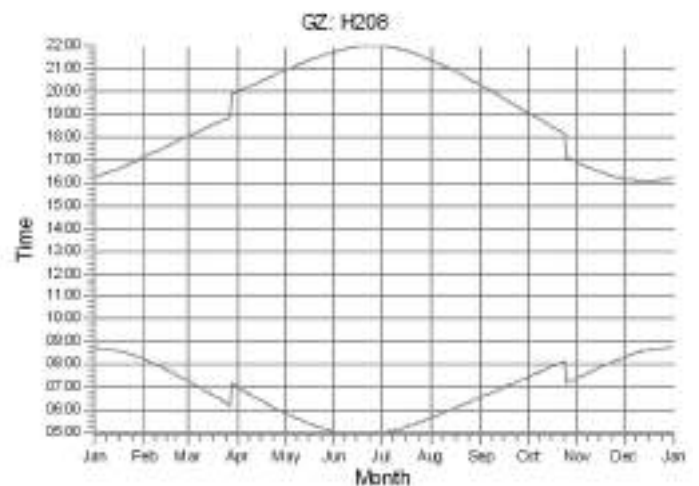
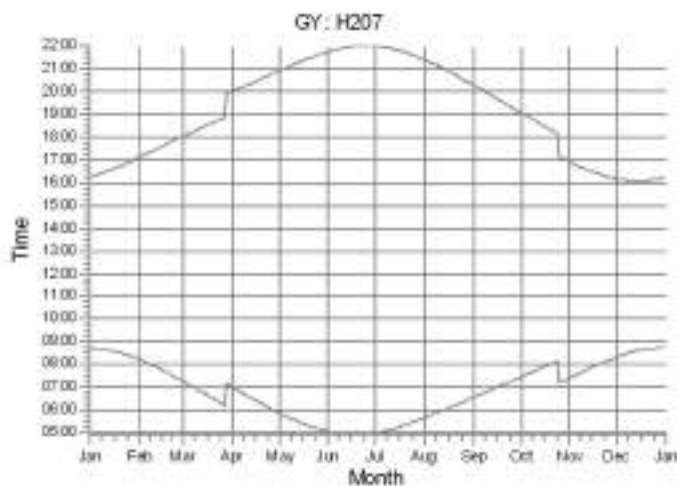
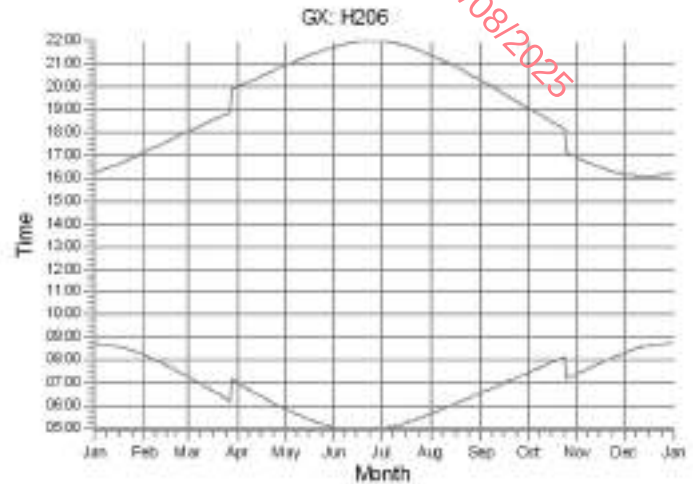
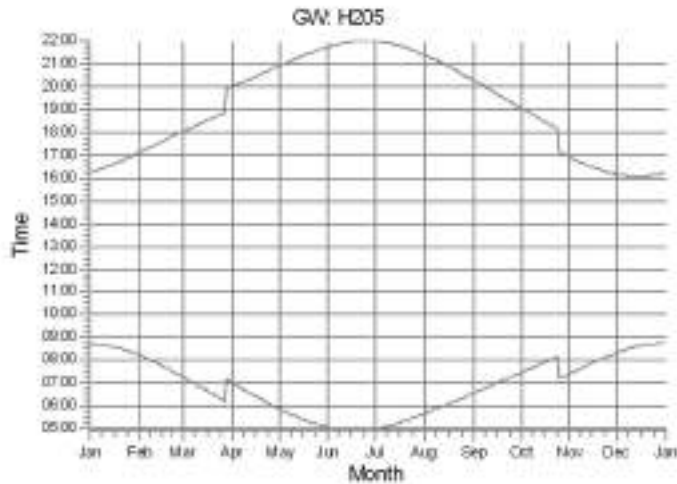


WTGs

1: T01

SHADOW - Calendar, graphical

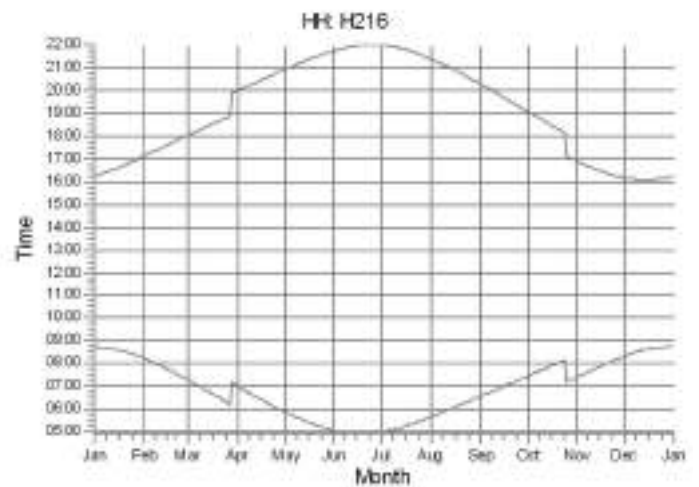
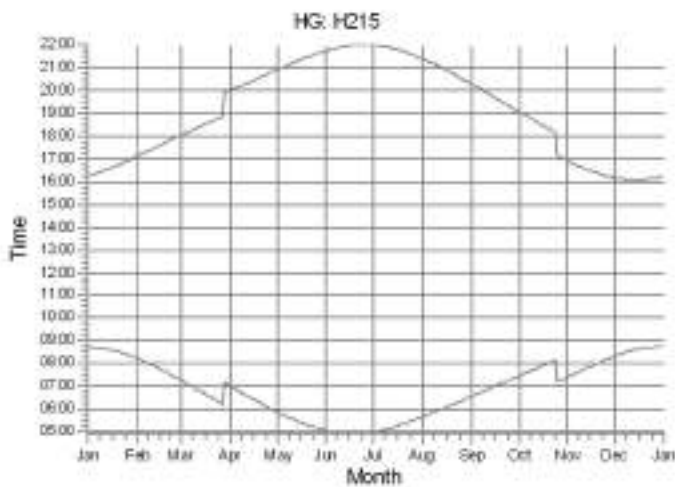
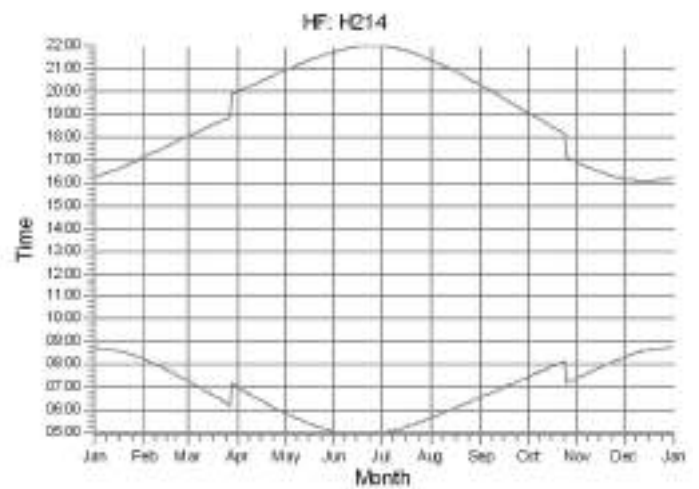
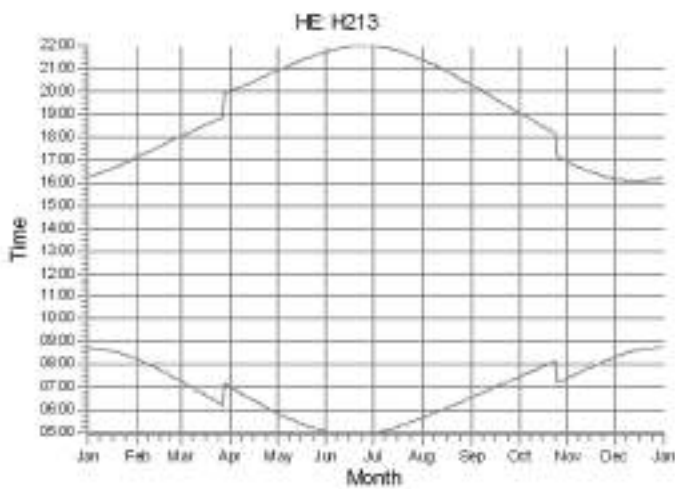
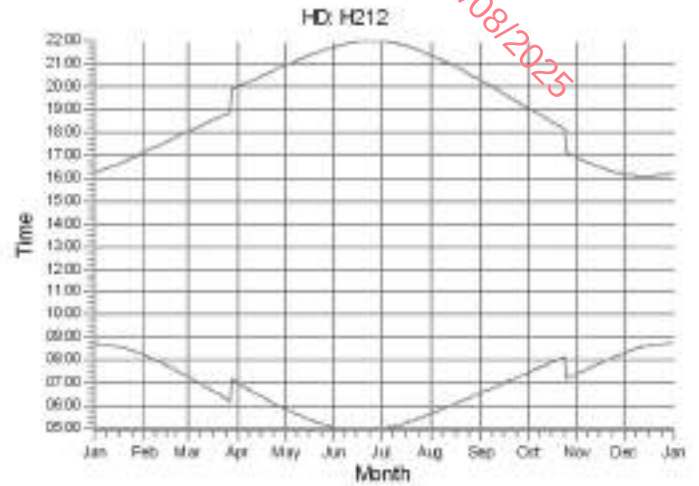
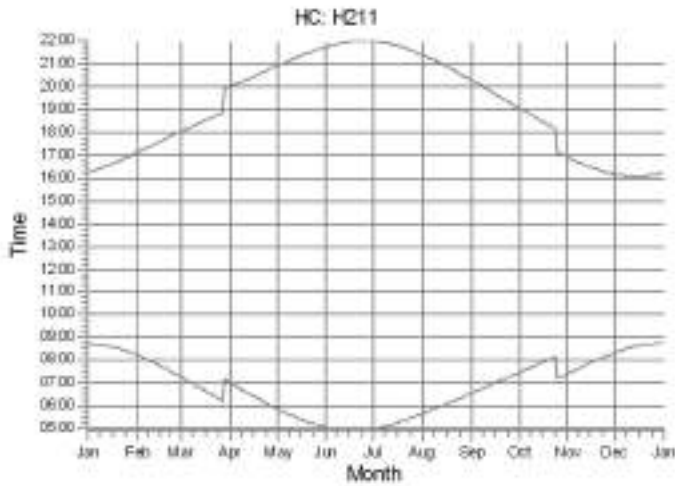
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

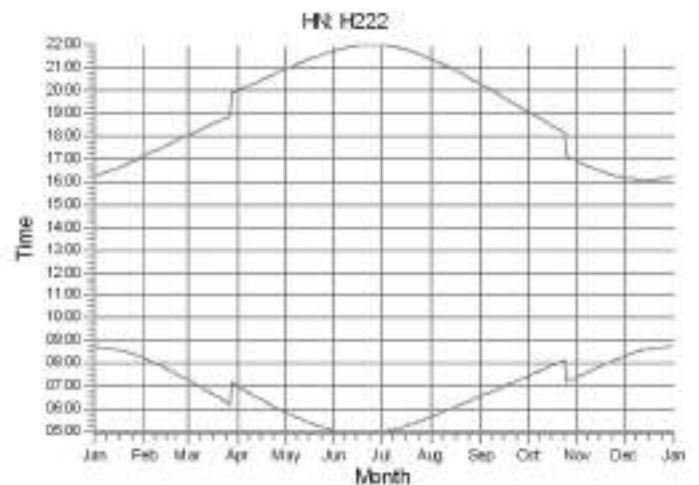
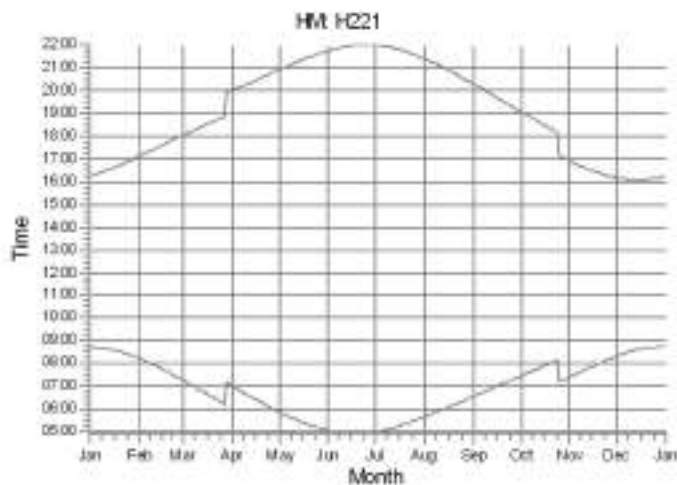
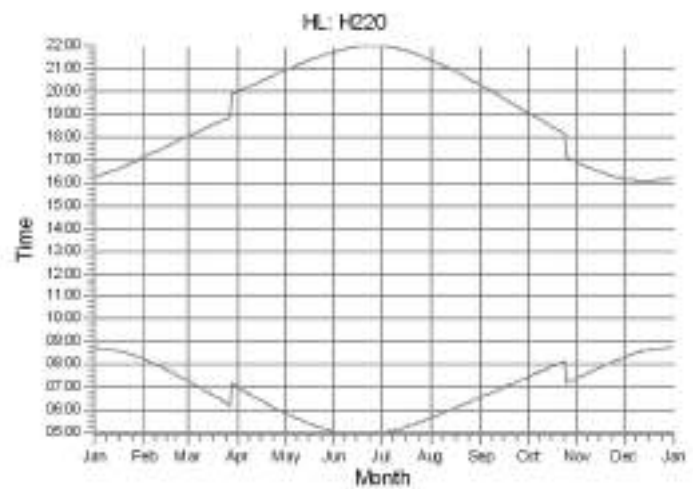
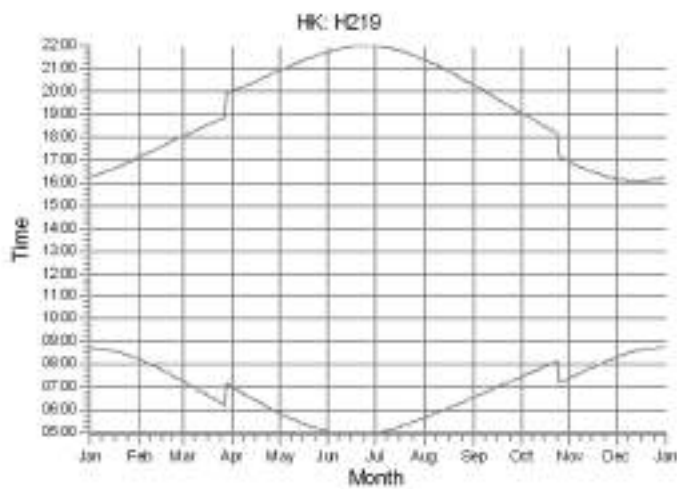
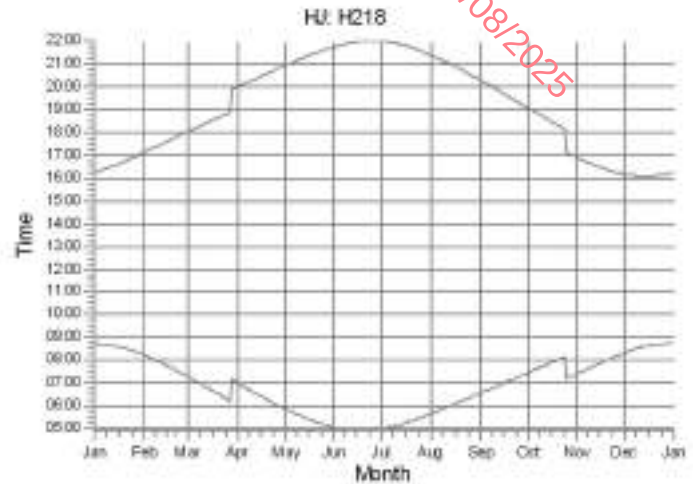
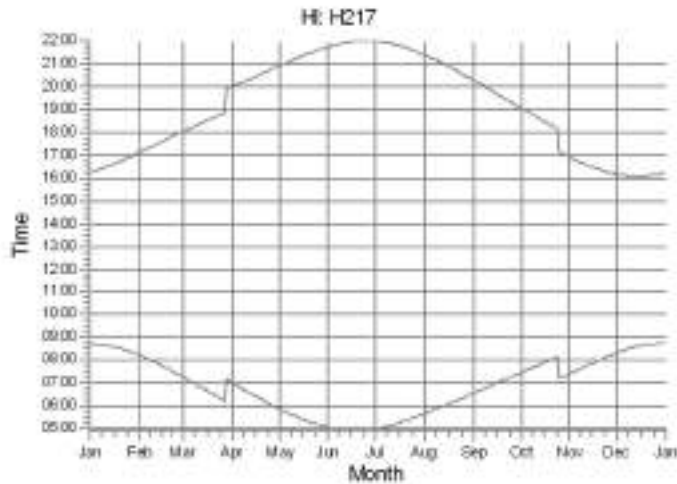
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

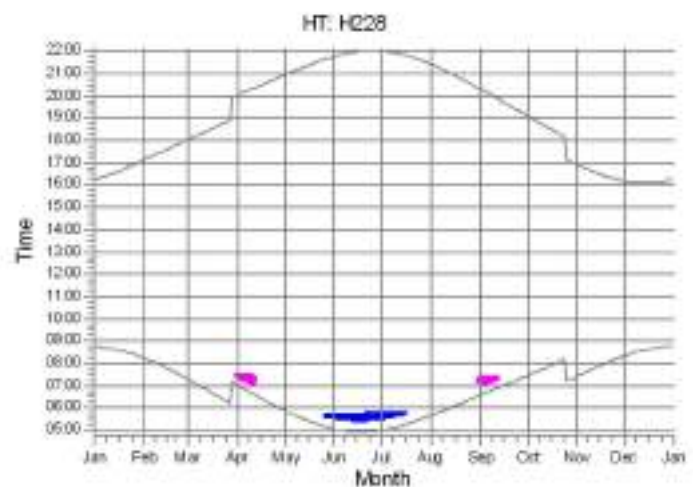
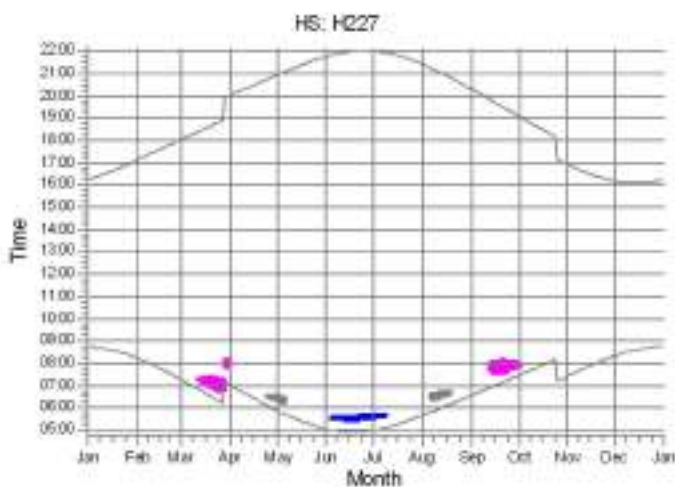
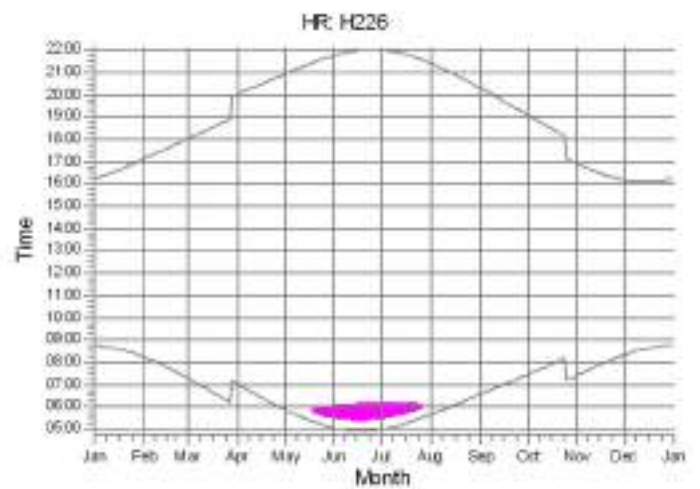
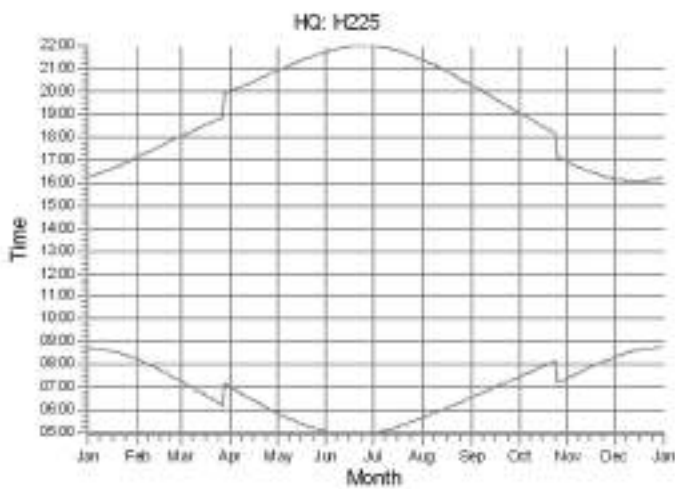
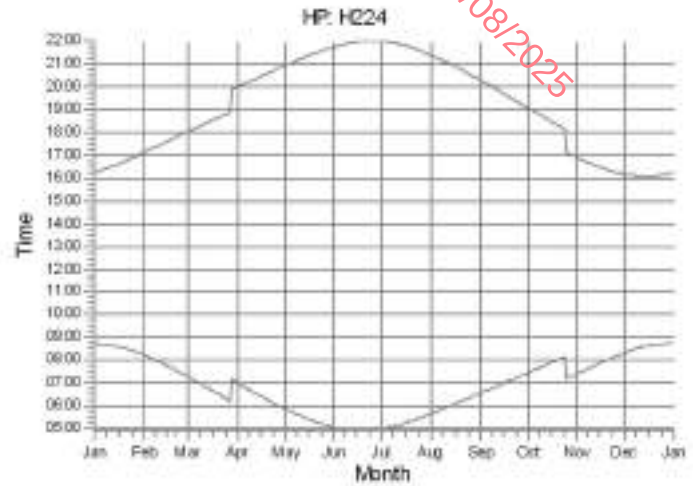
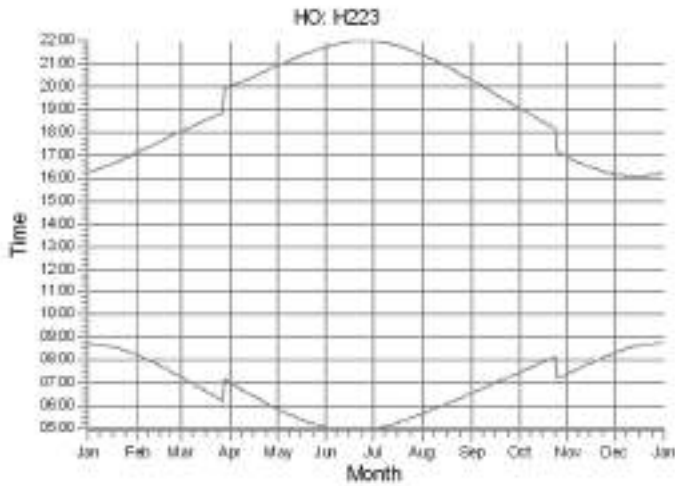
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

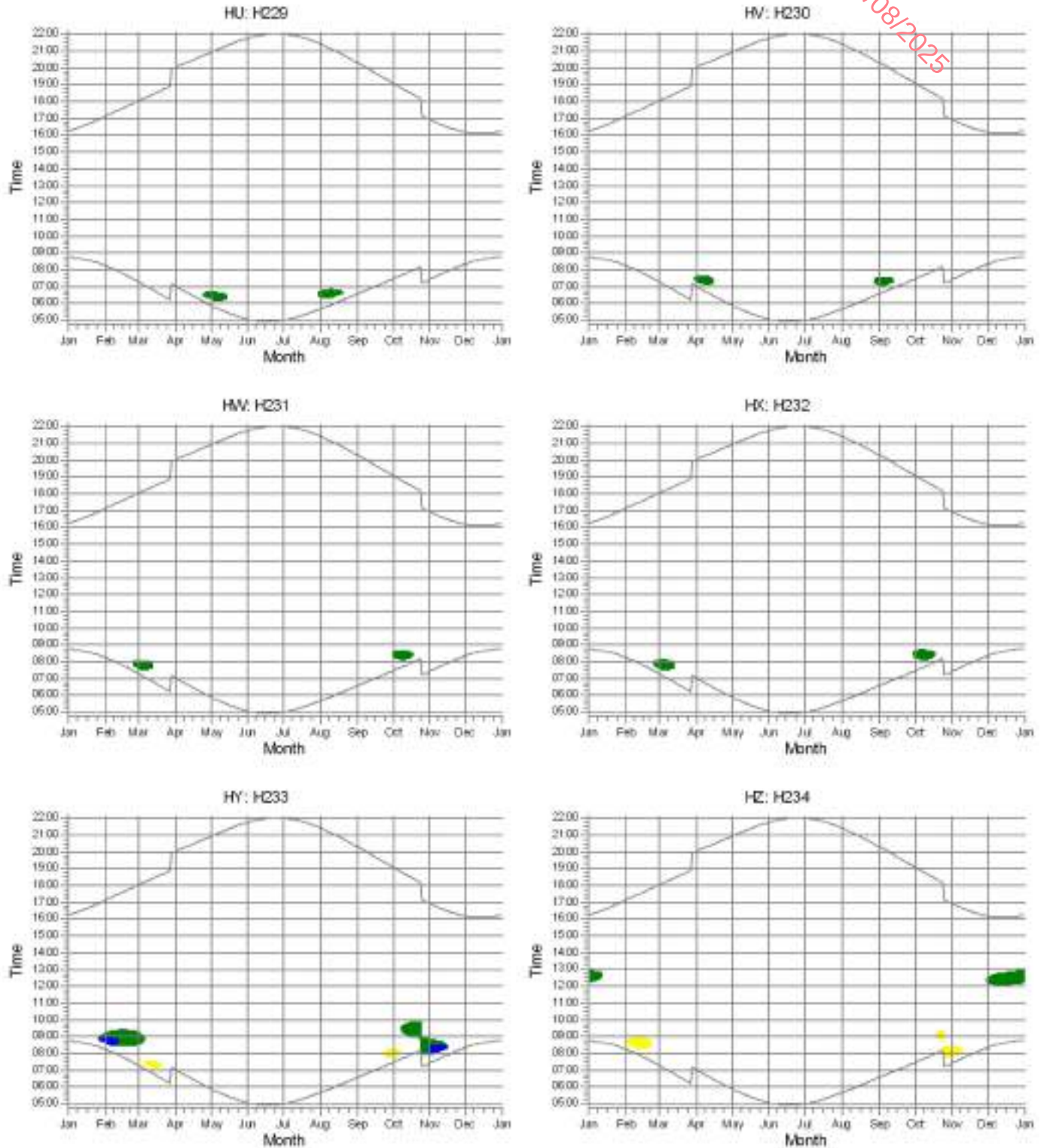


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

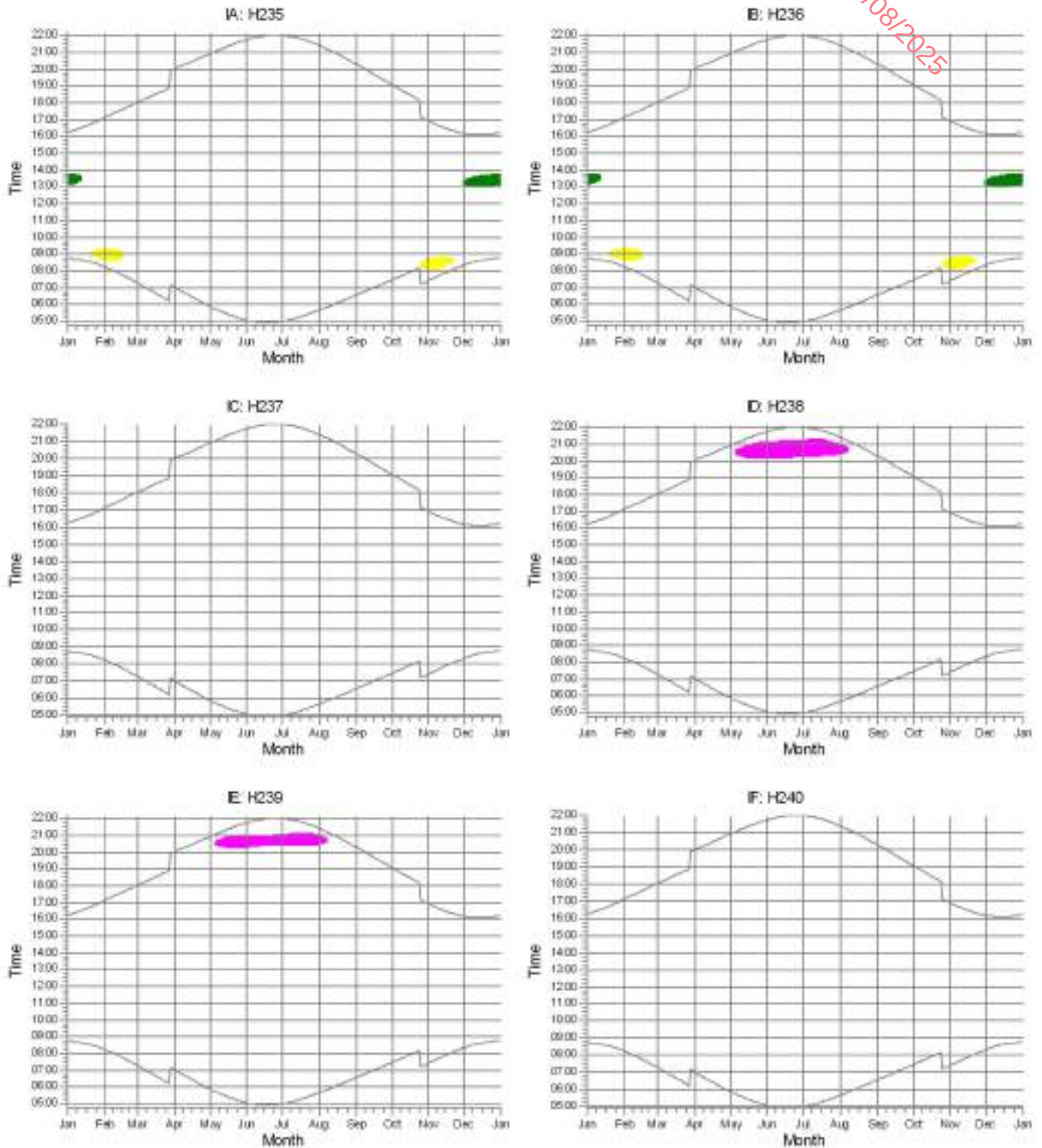


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

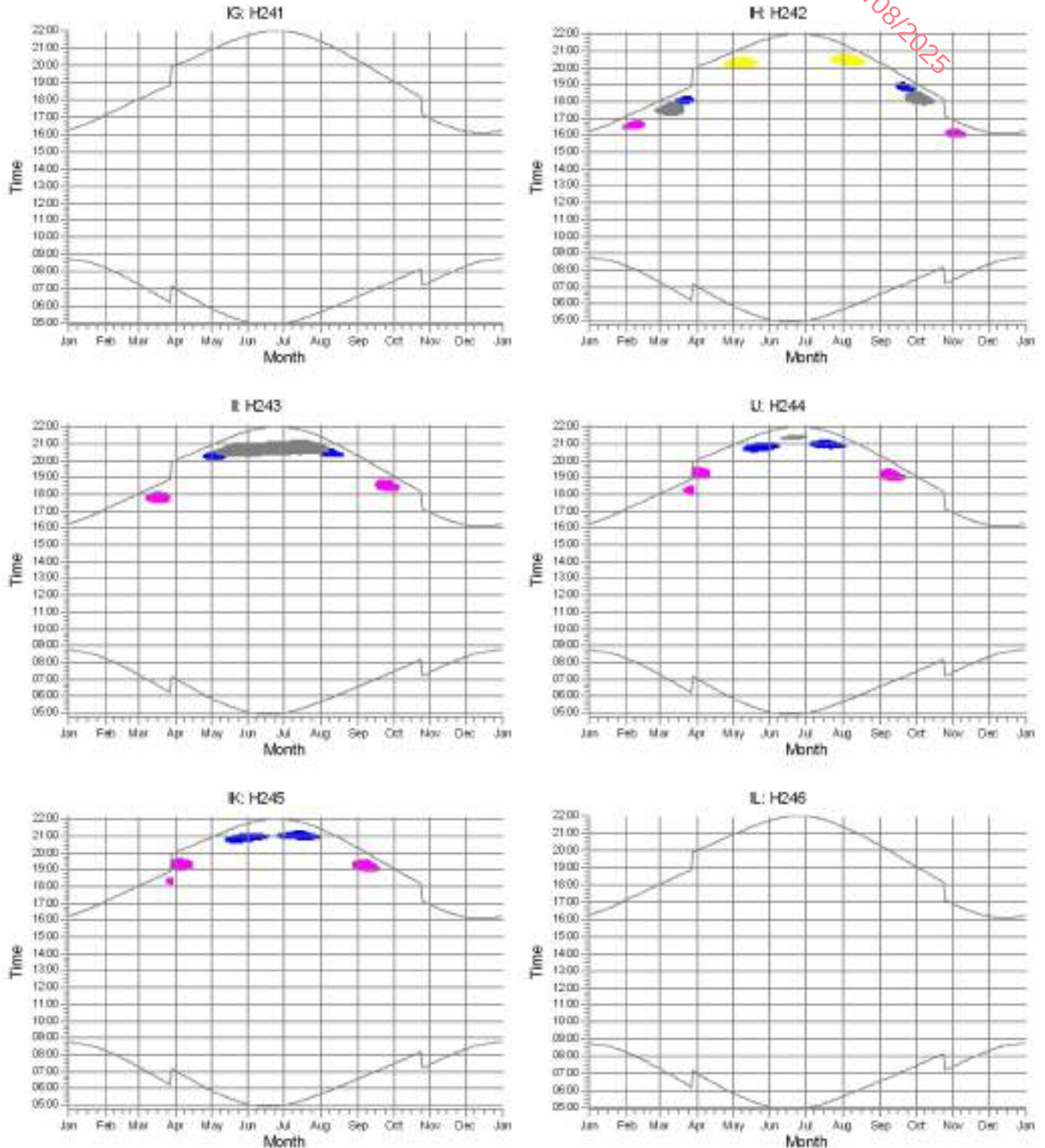


WTGs

1: T01 2: T02 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

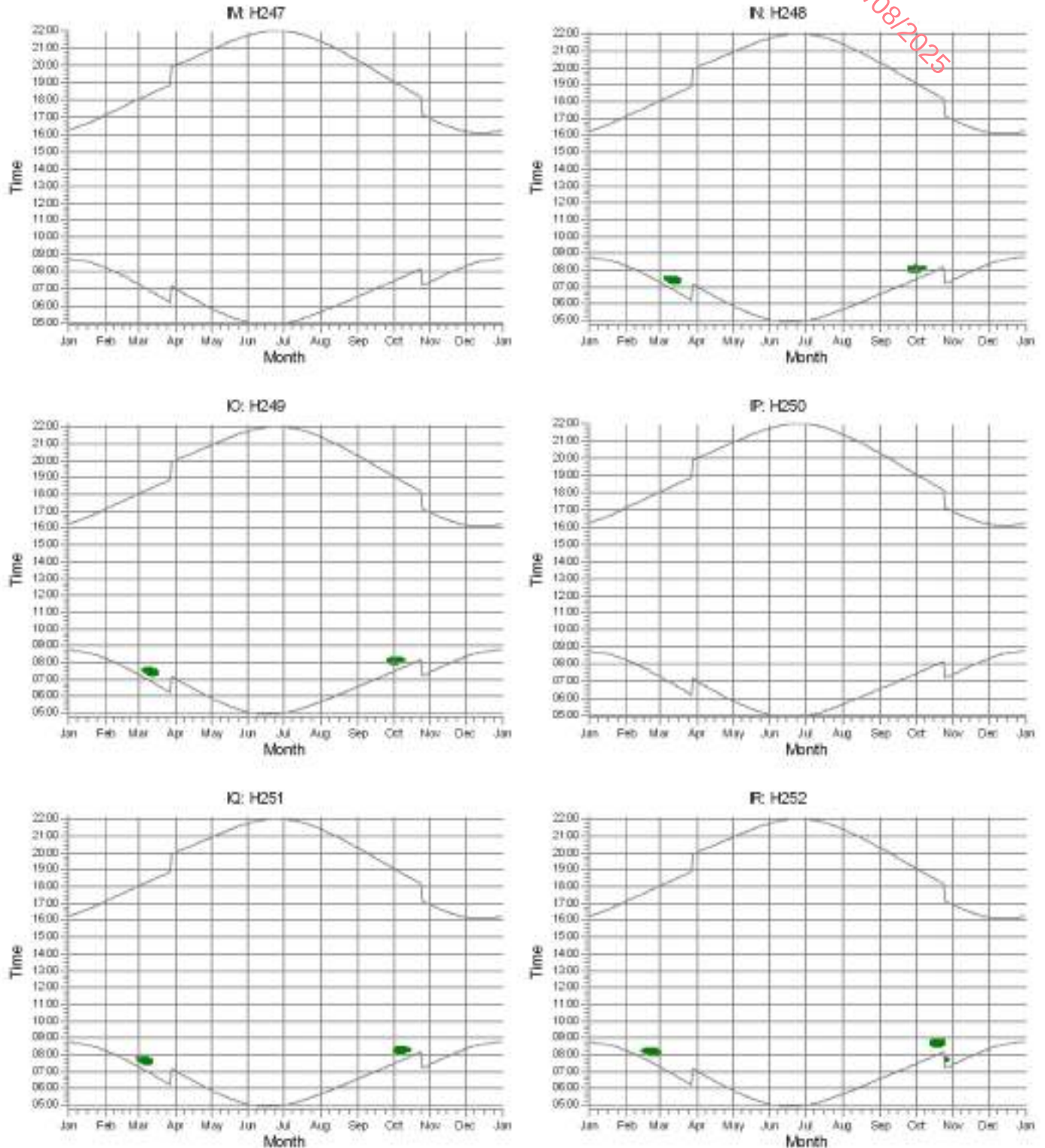


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

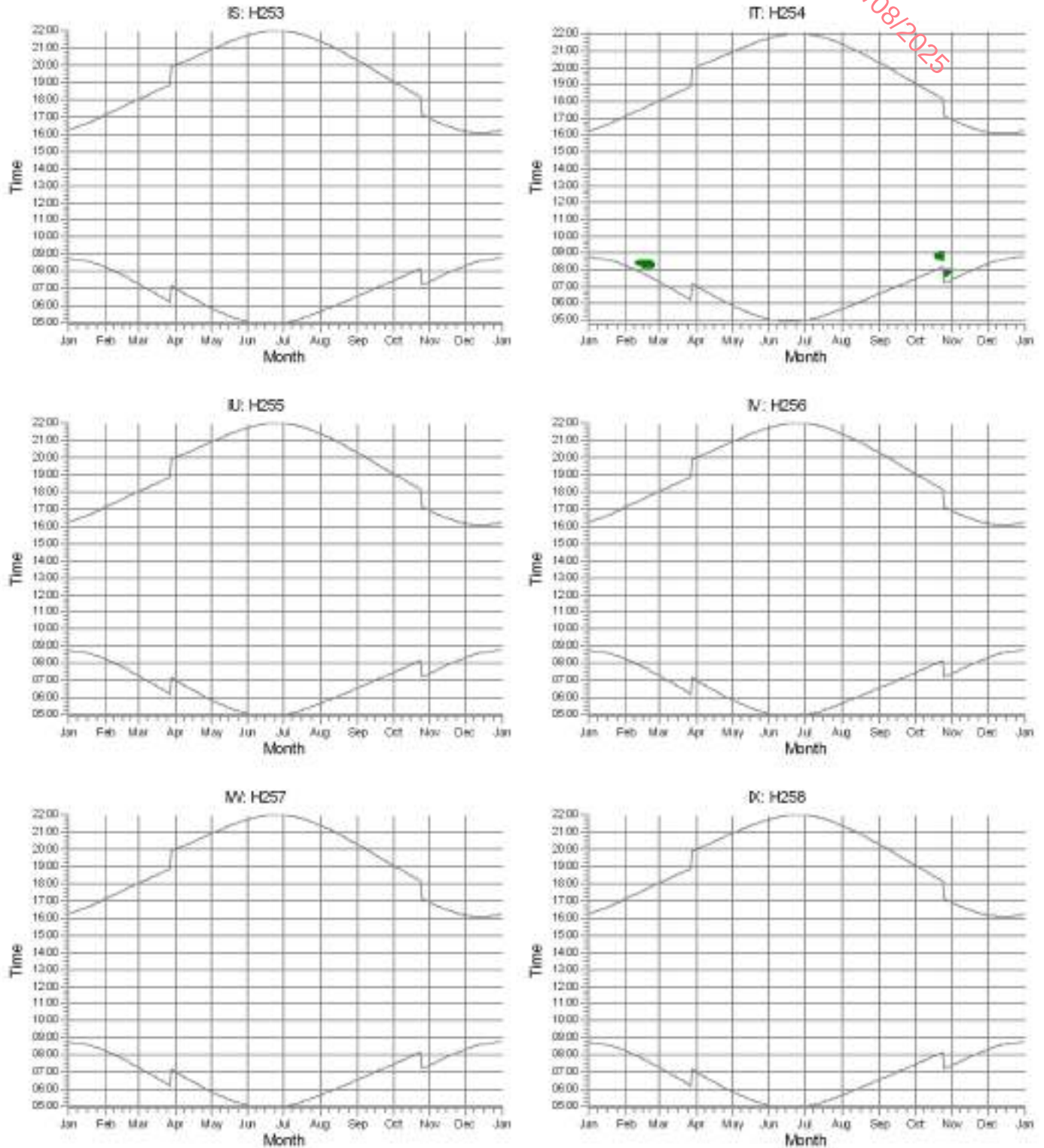


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

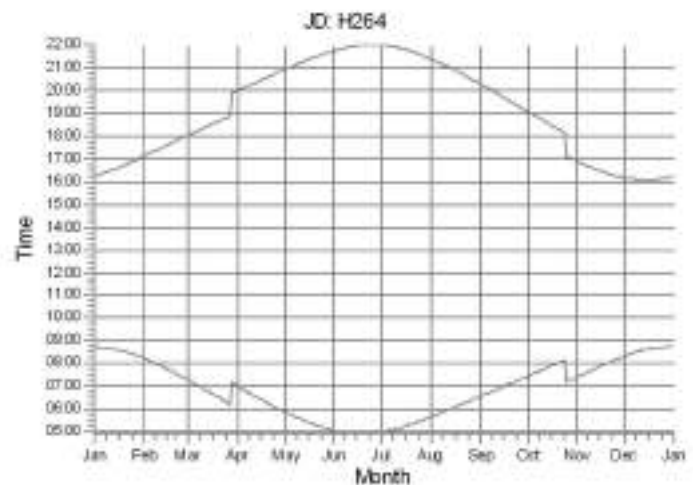
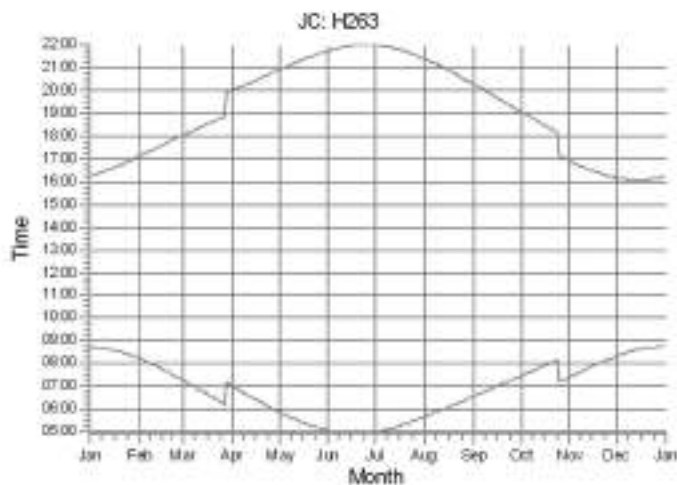
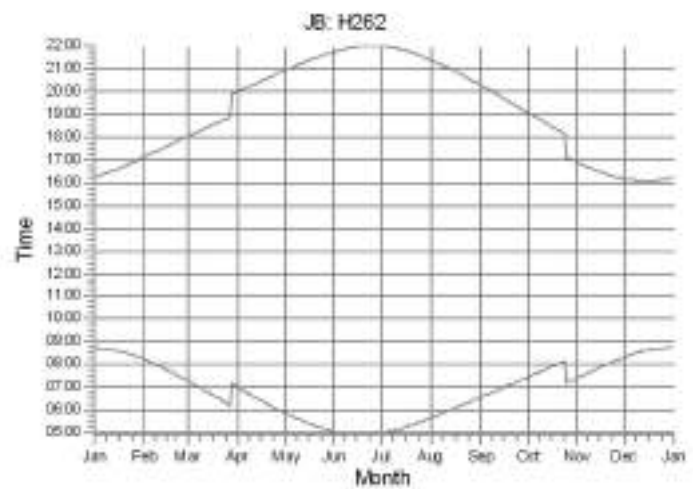
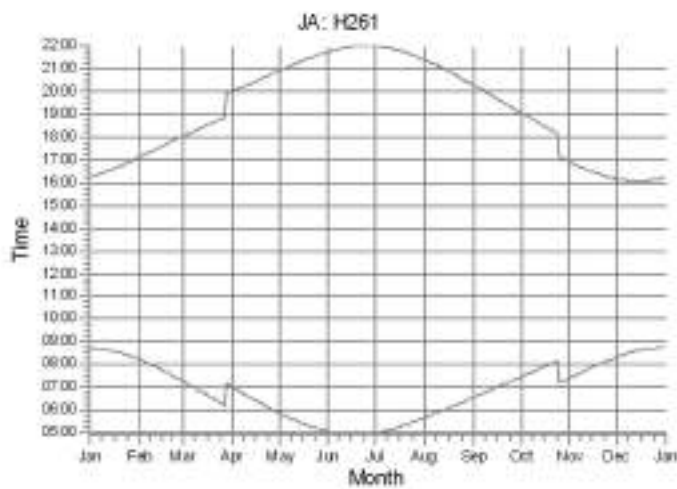
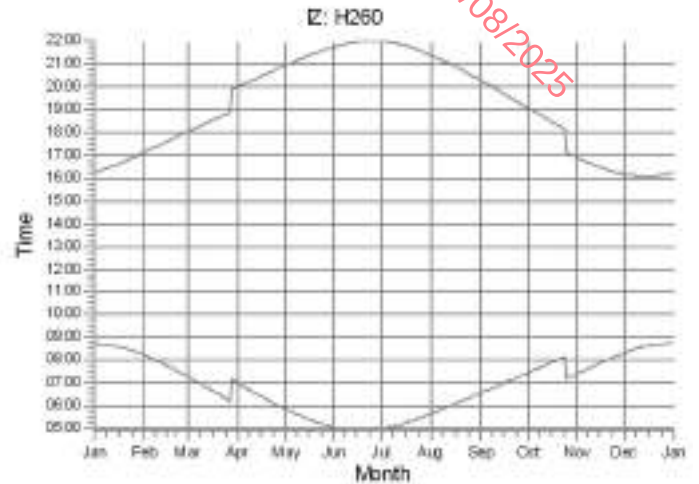
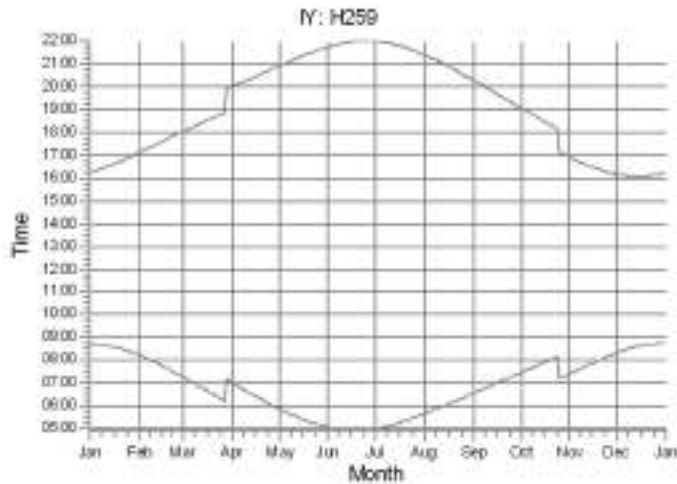


WTGs

1: T01

SHADOW - Calendar, graphical

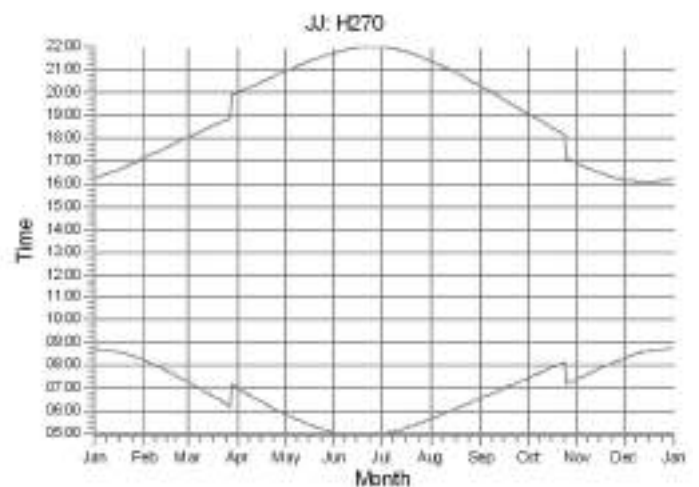
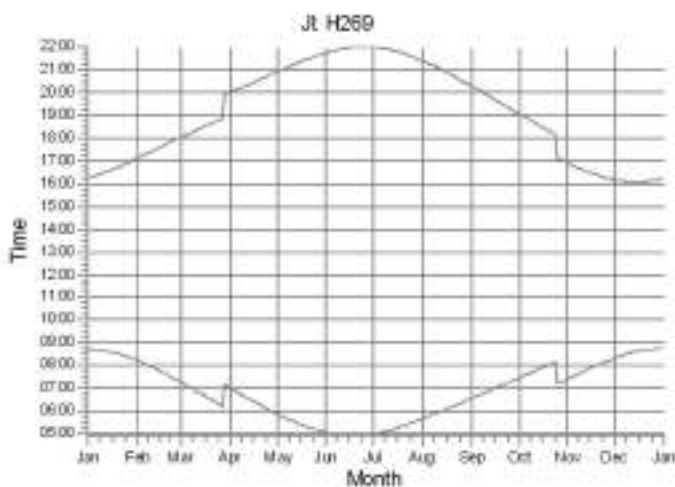
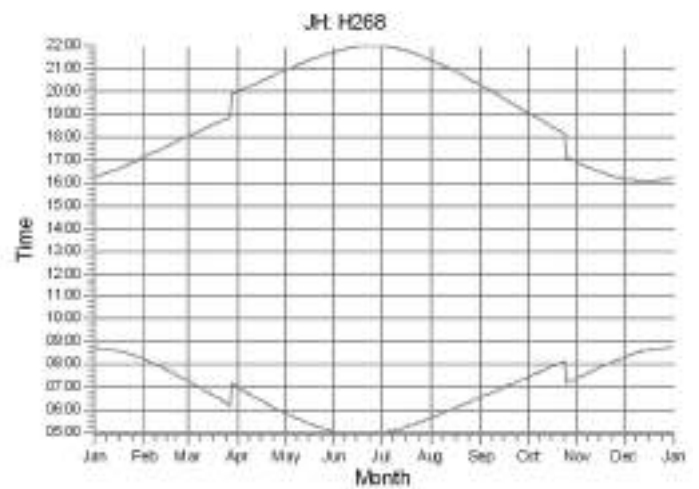
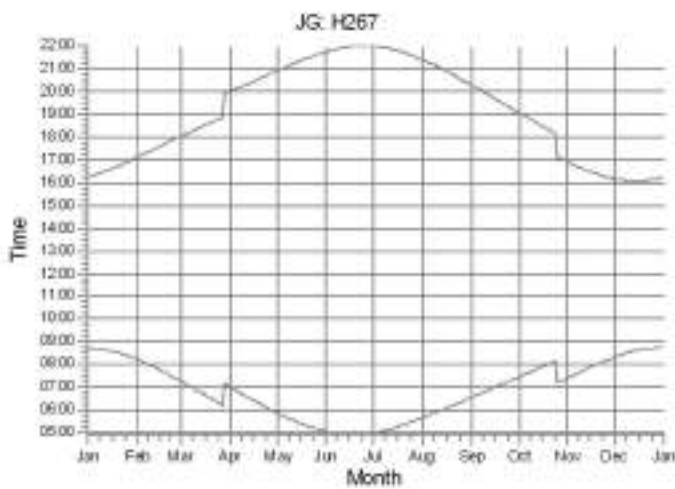
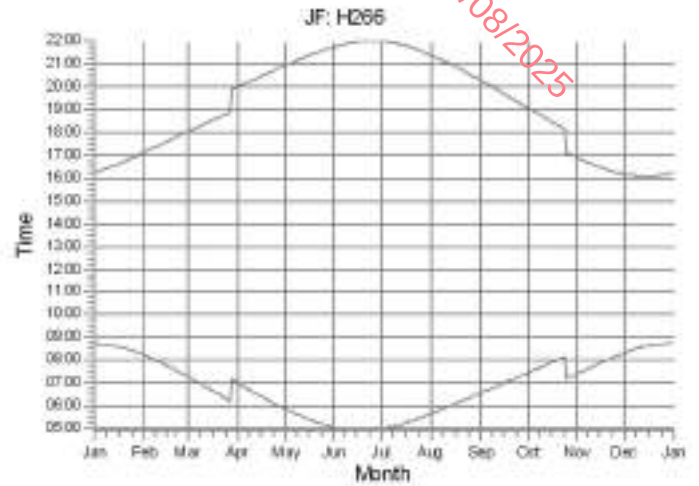
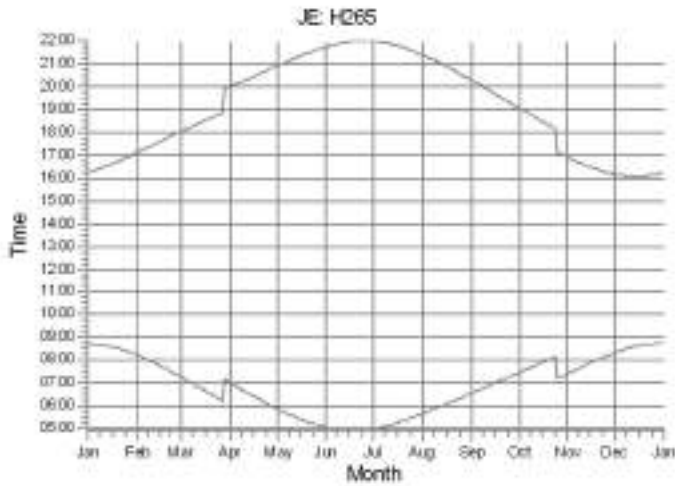
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

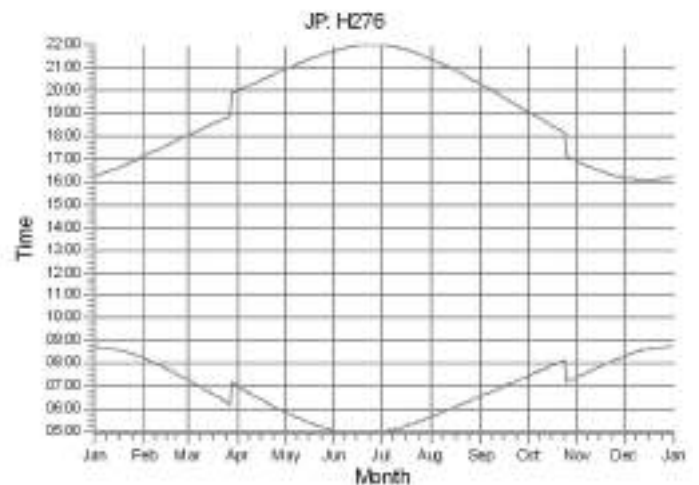
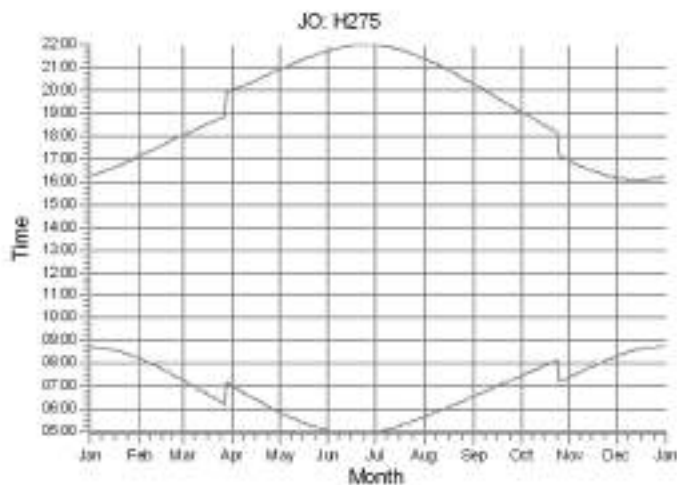
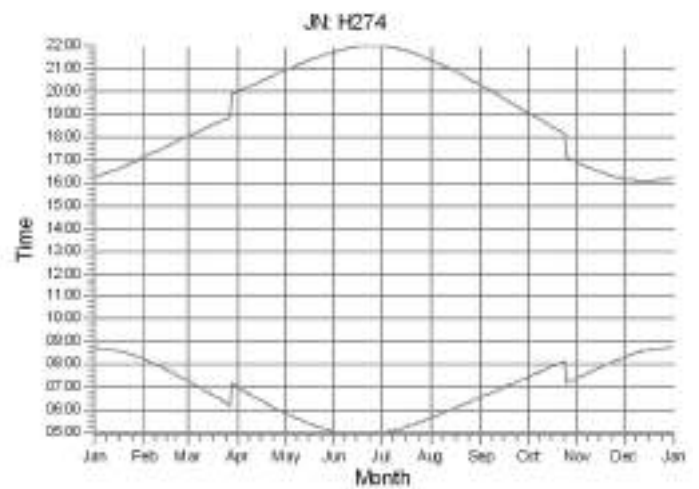
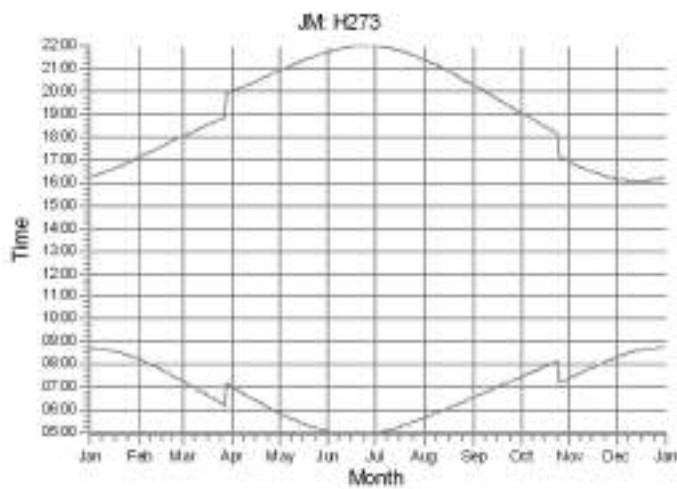
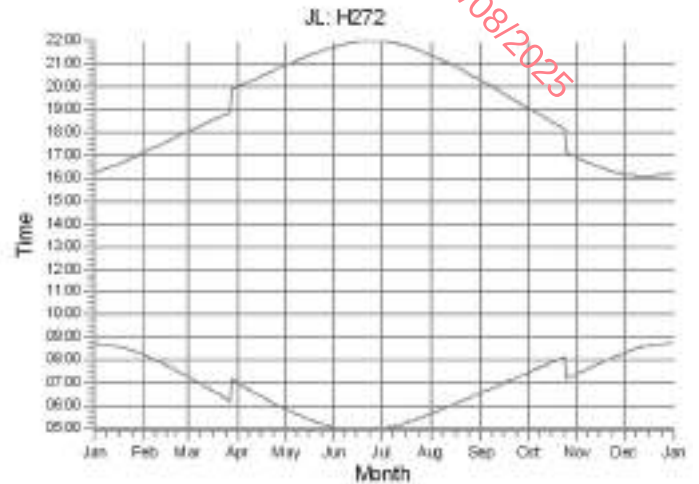
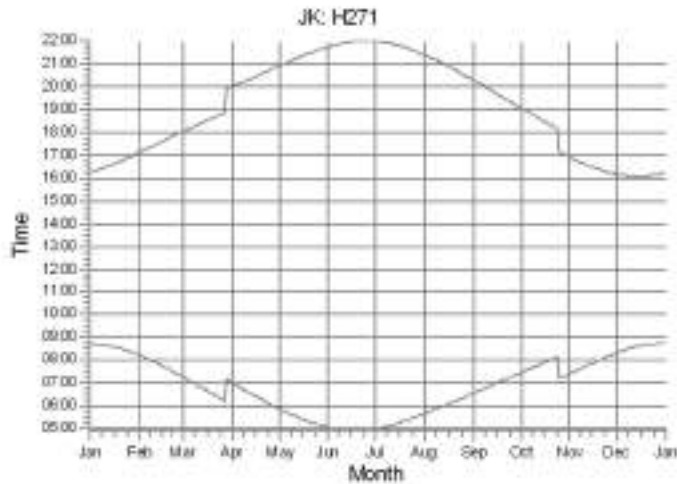
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

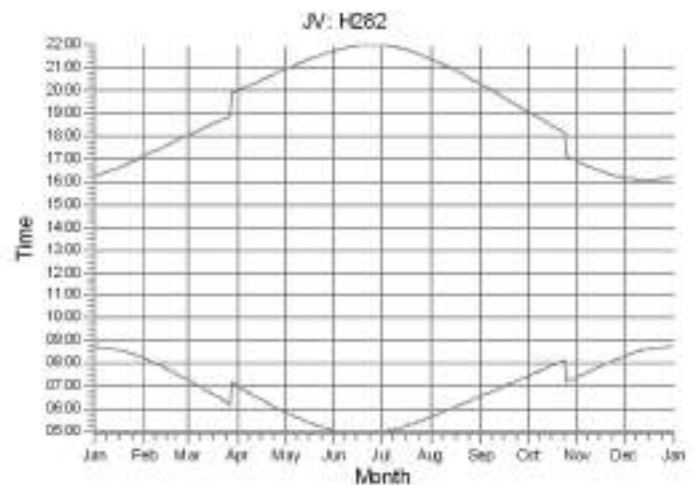
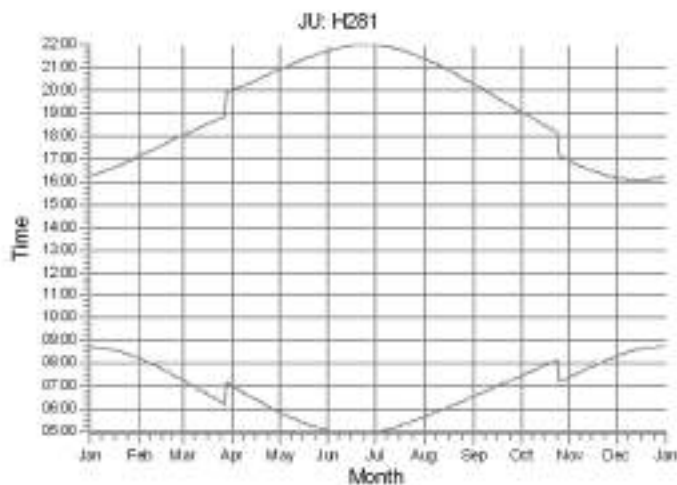
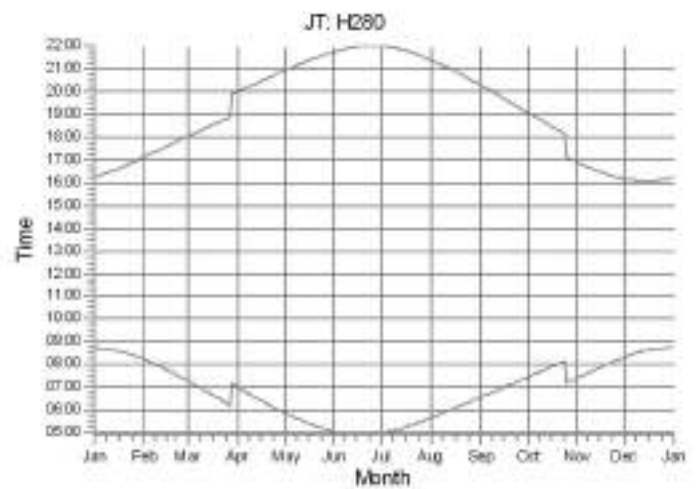
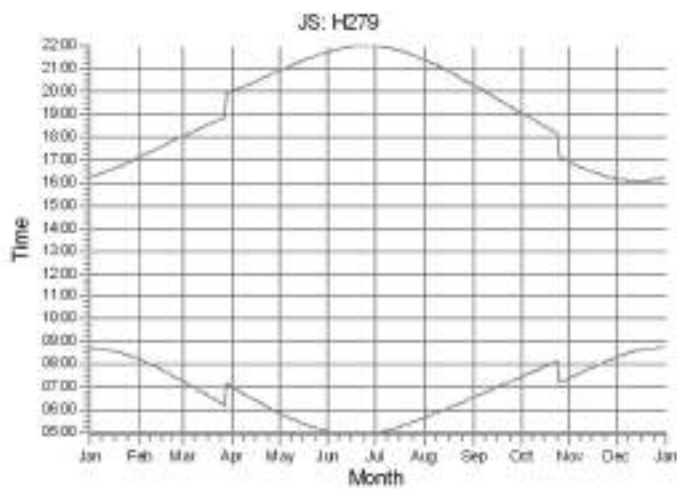
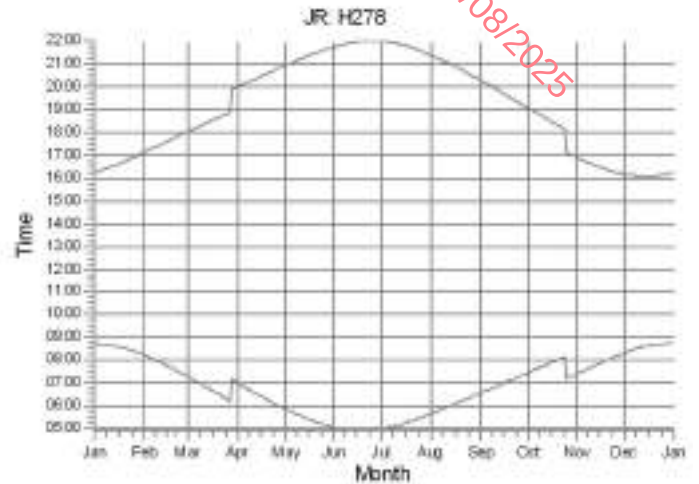
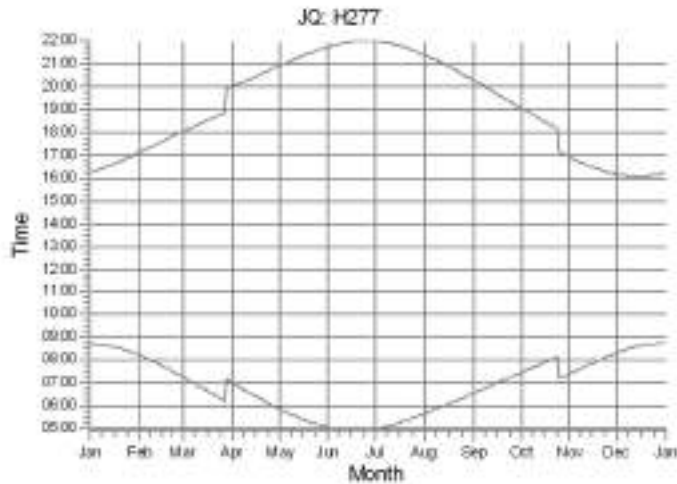
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

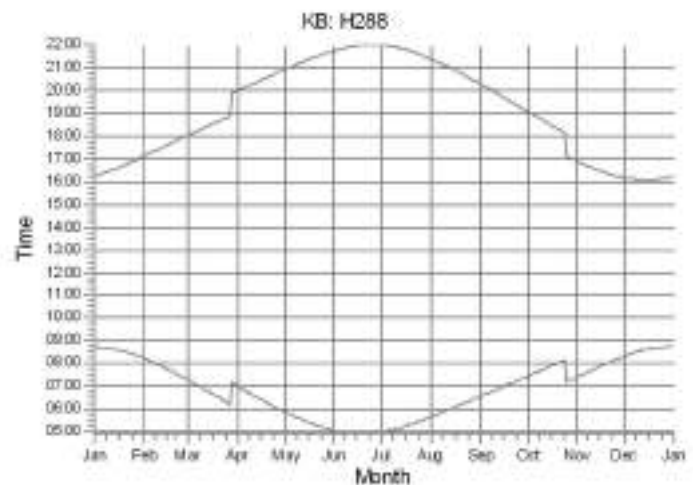
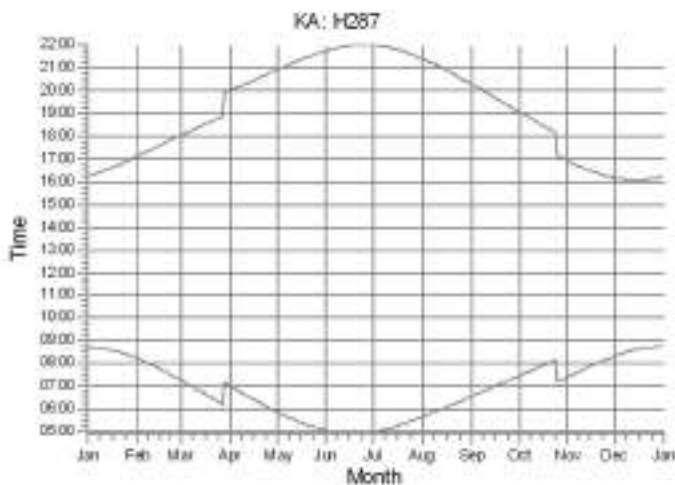
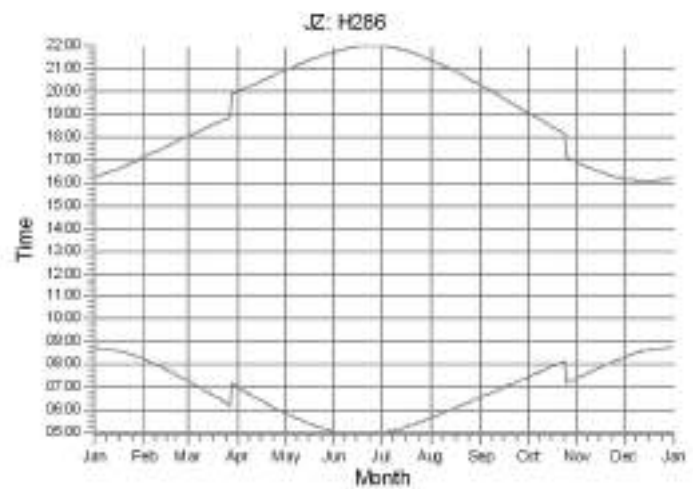
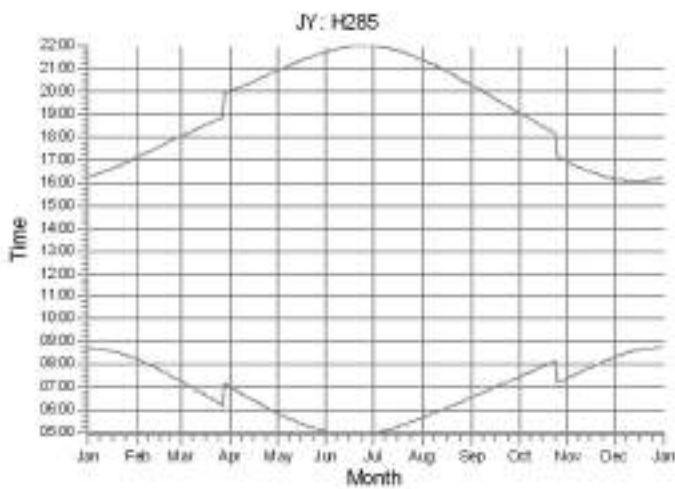
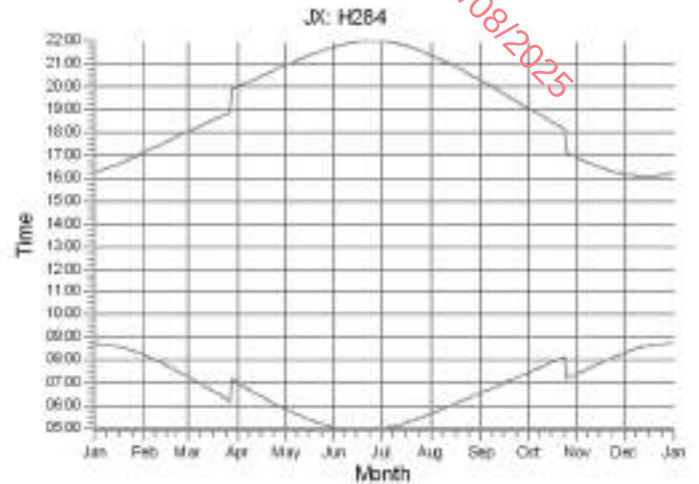
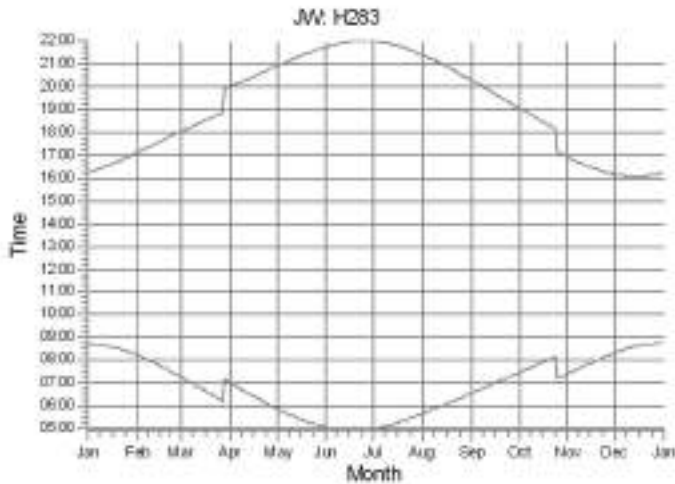
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

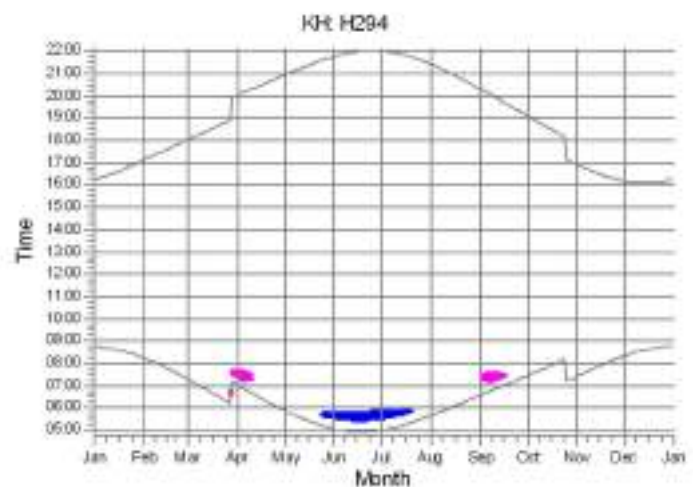
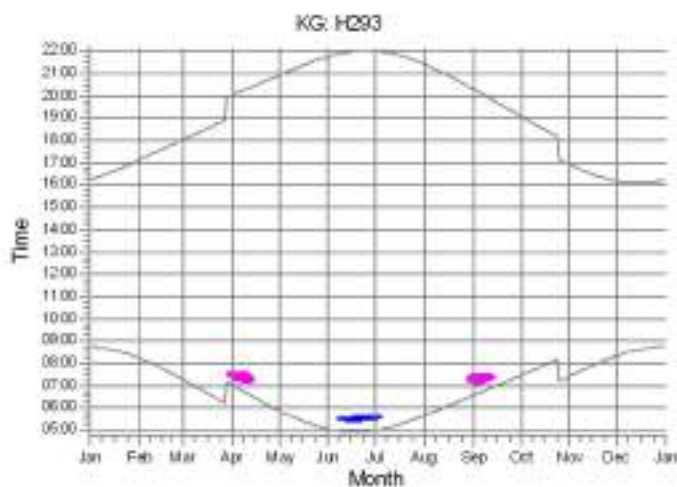
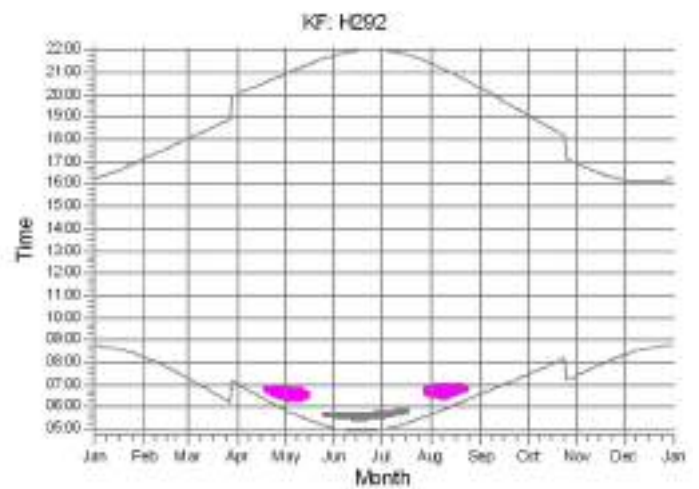
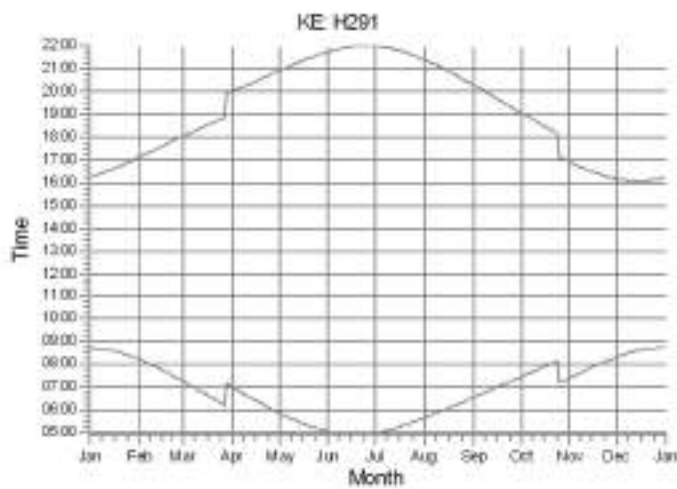
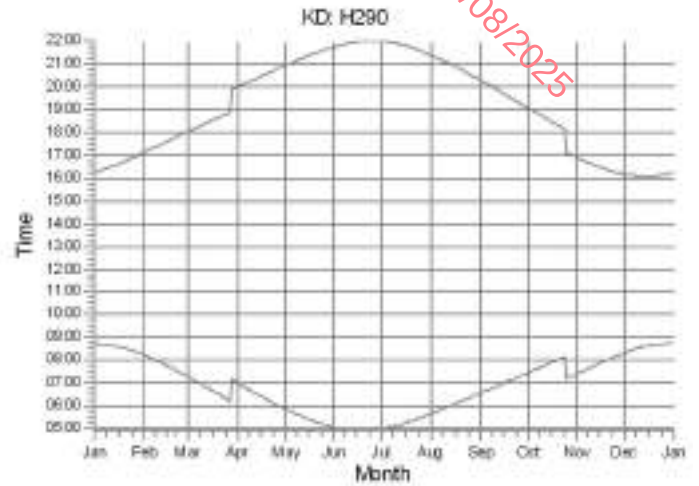
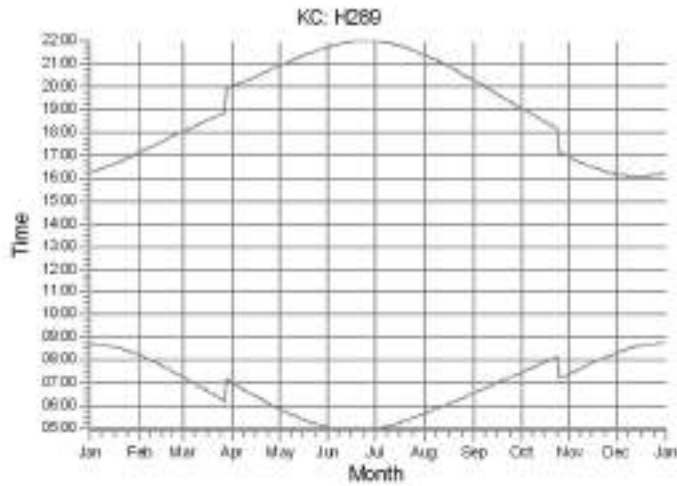
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

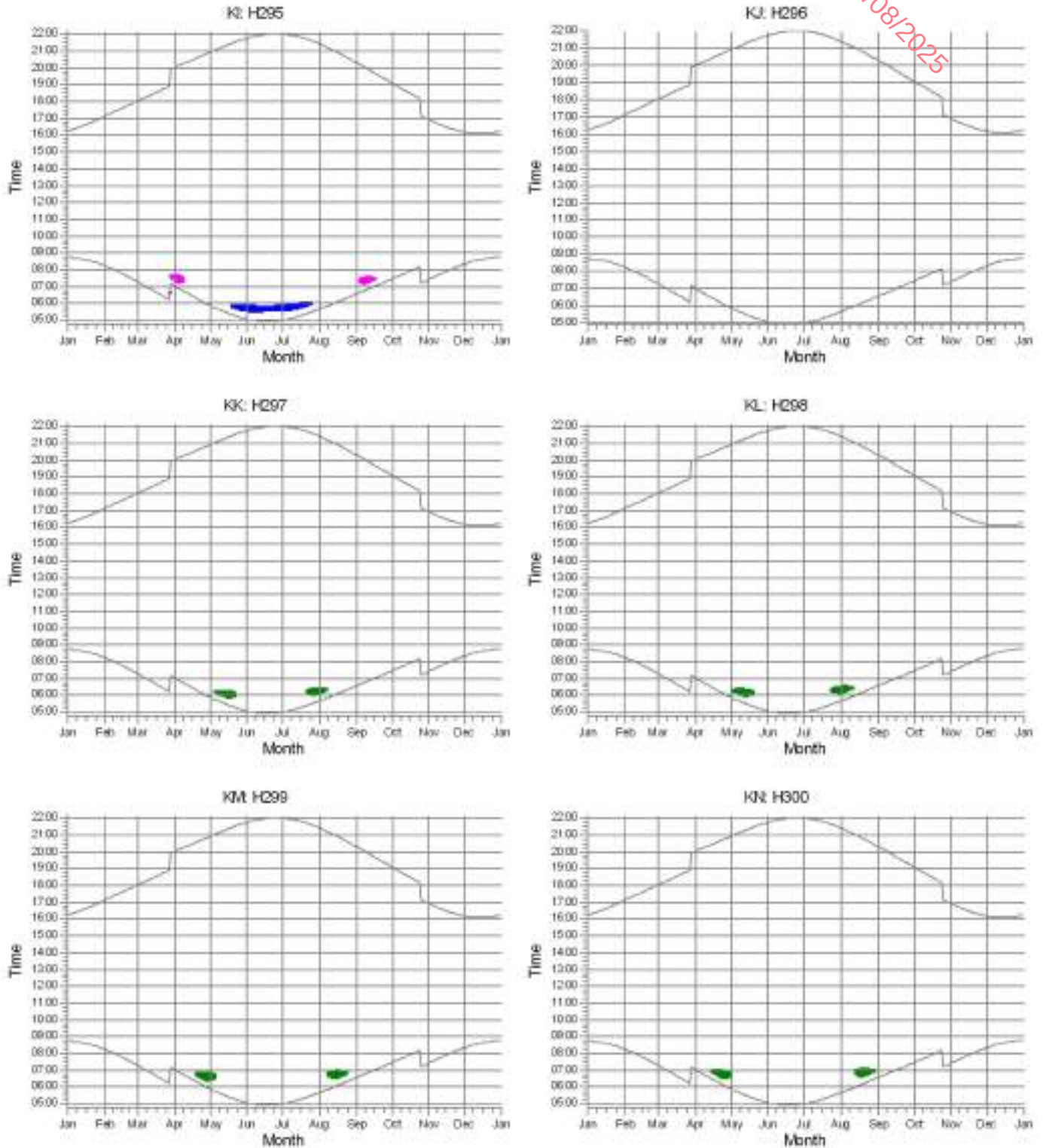


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

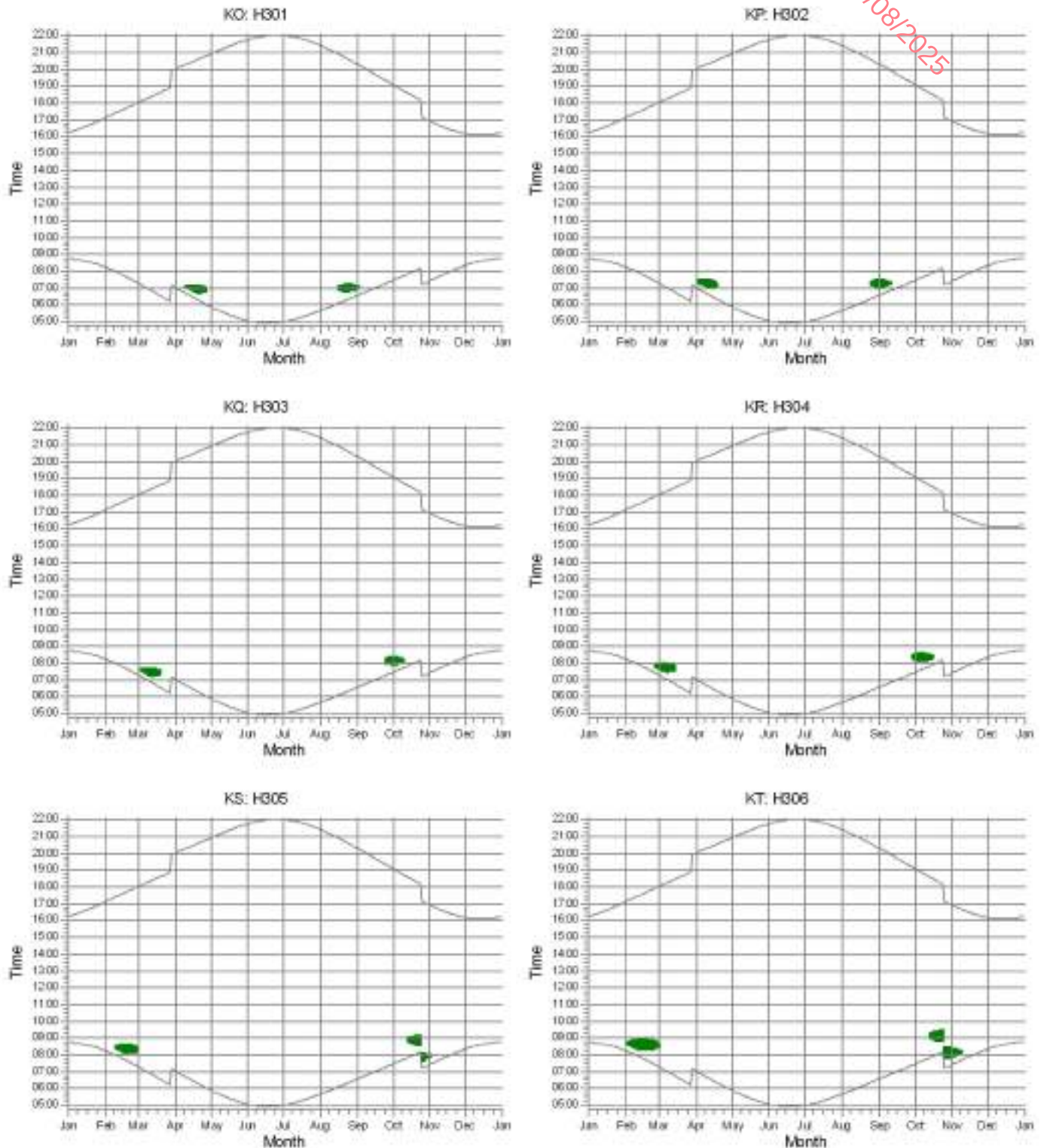


WTGs

1: T01 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

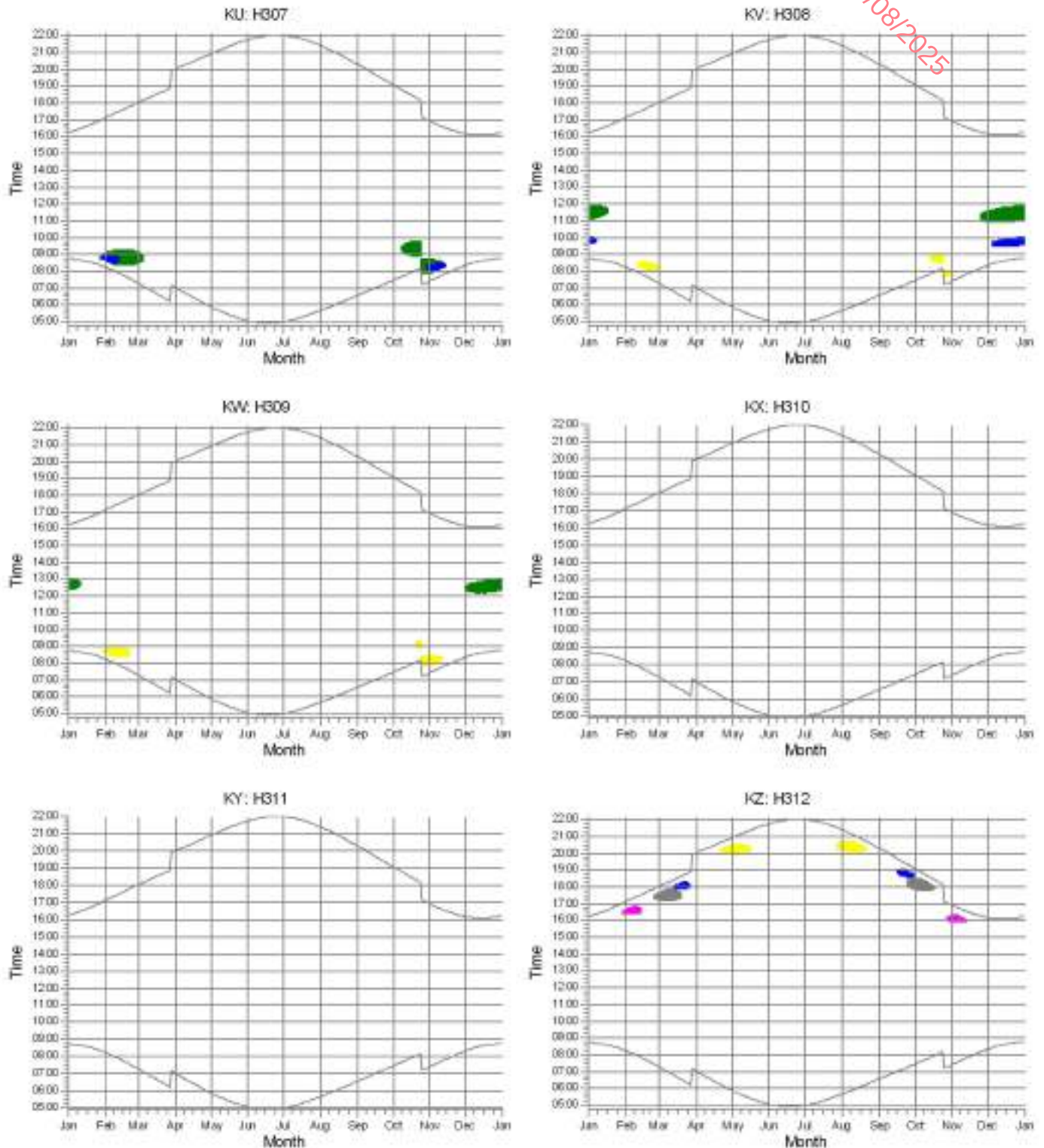


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

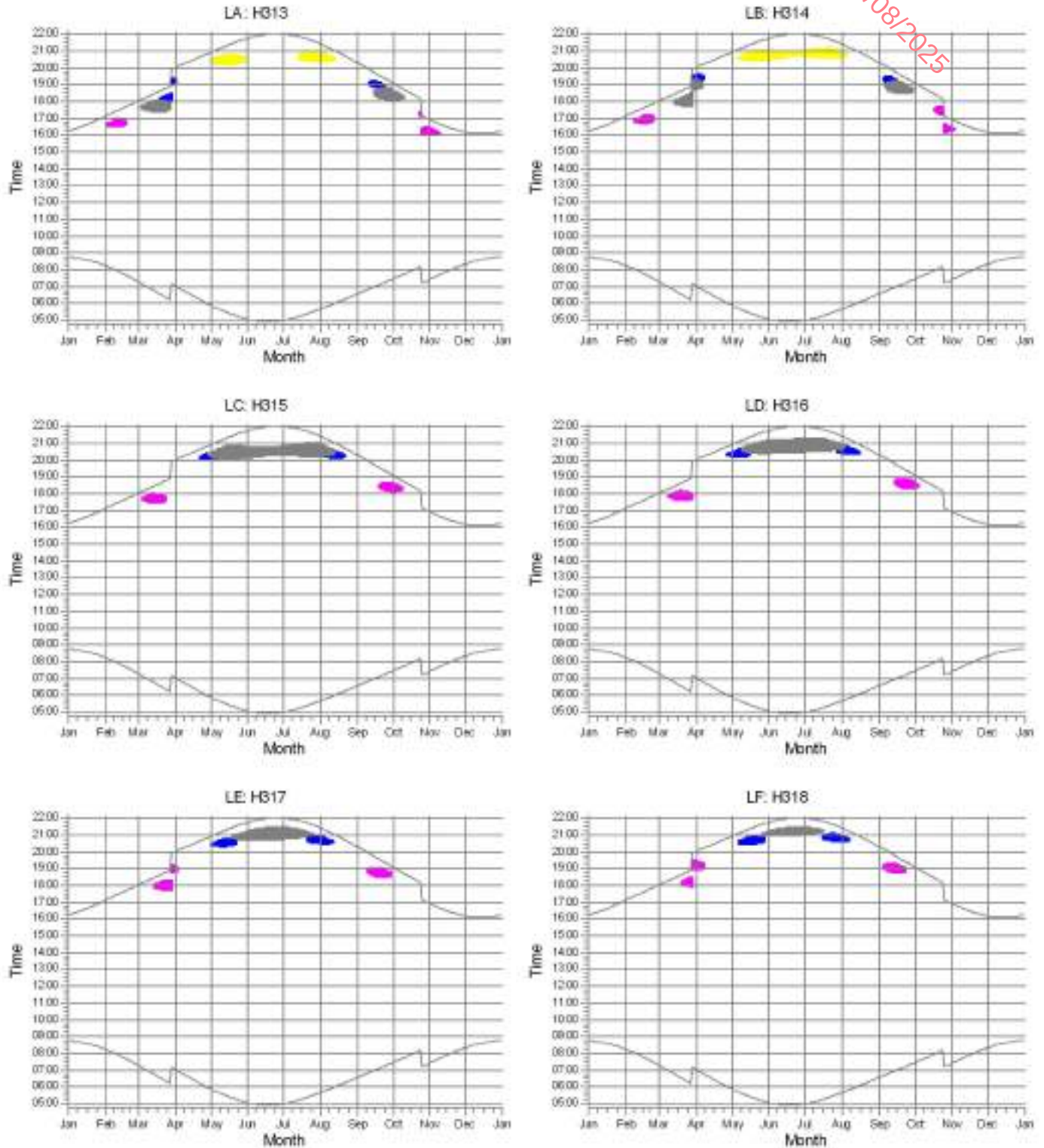


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

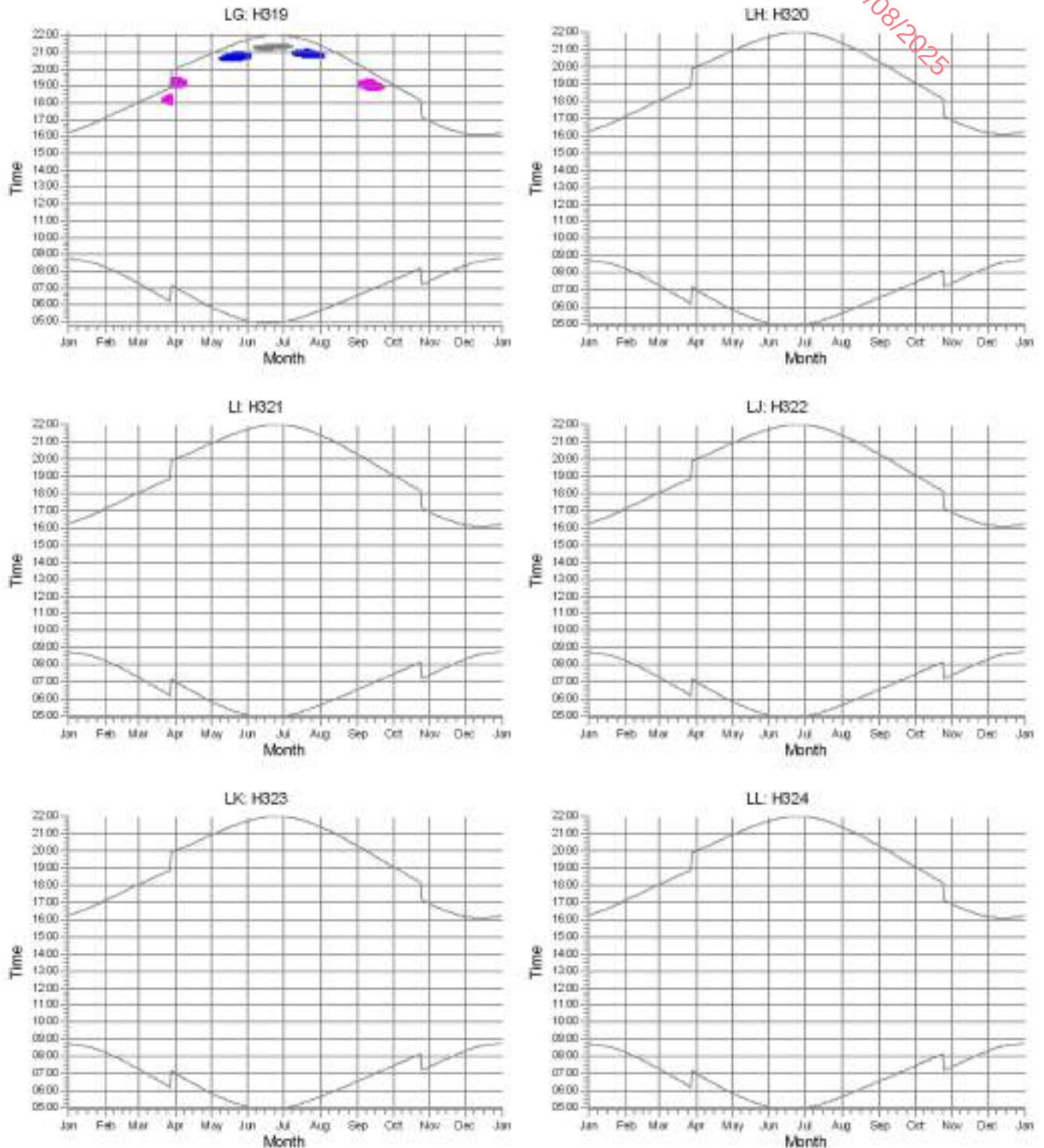


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

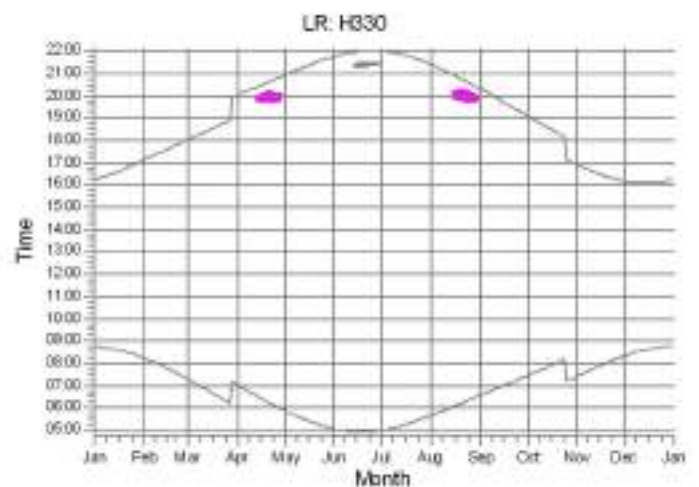
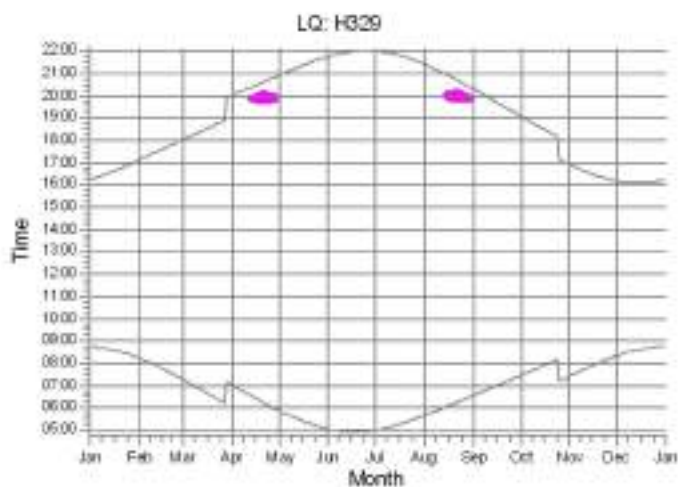
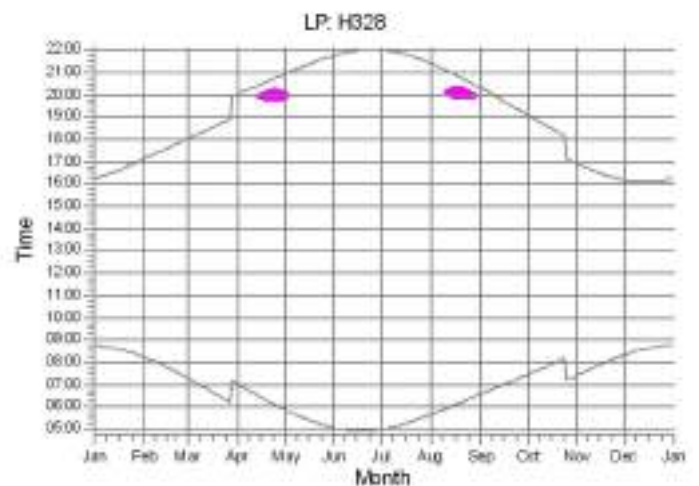
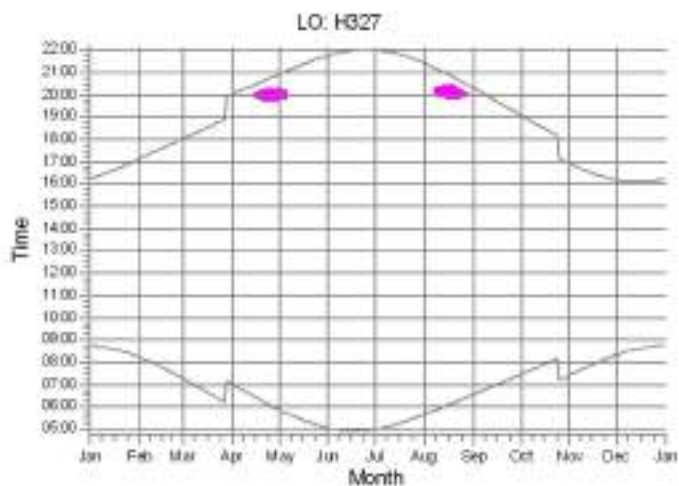
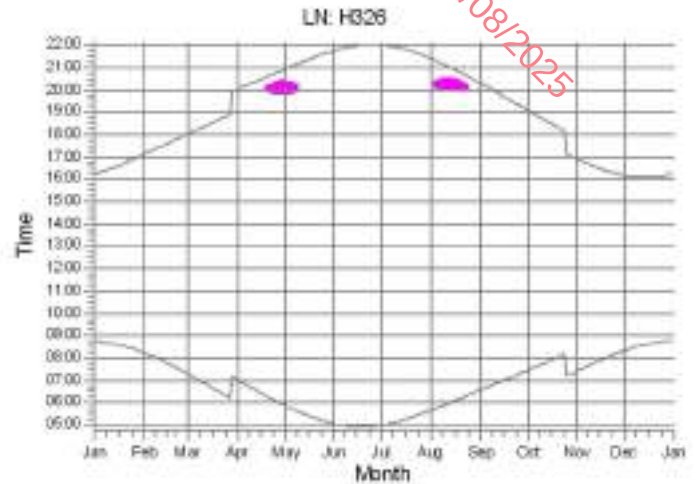
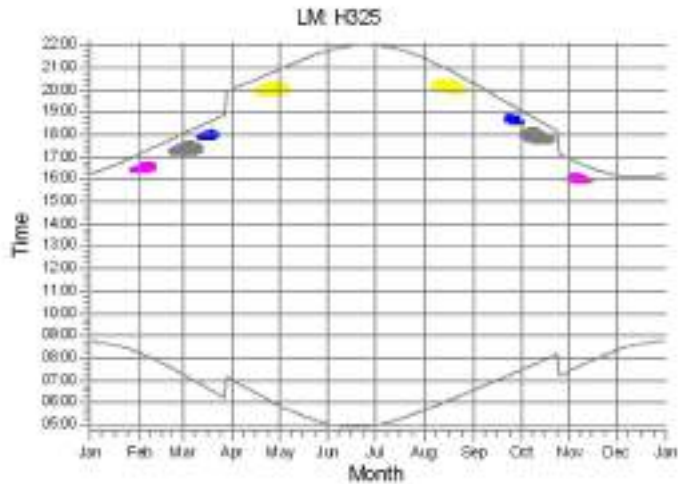


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

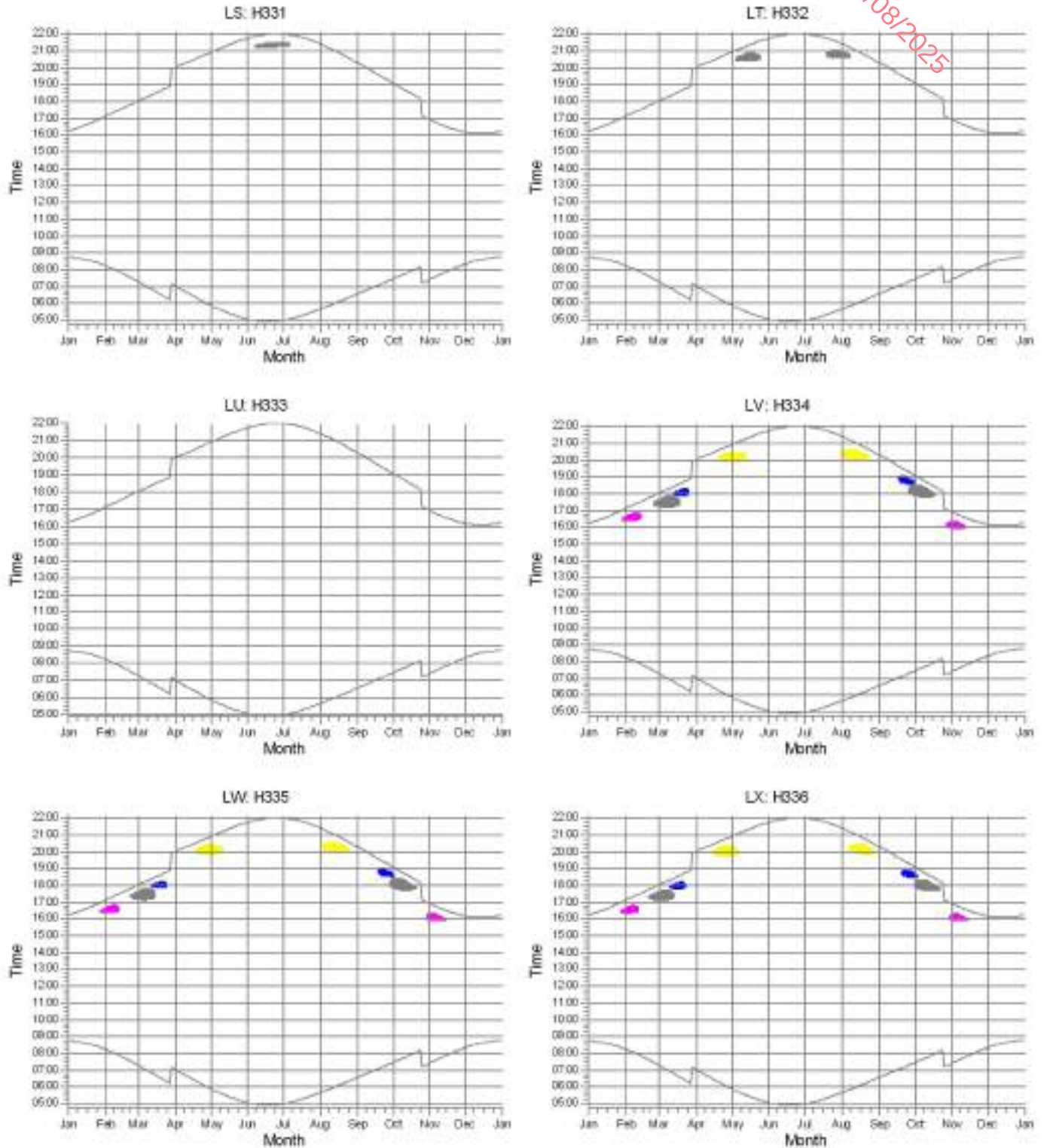


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

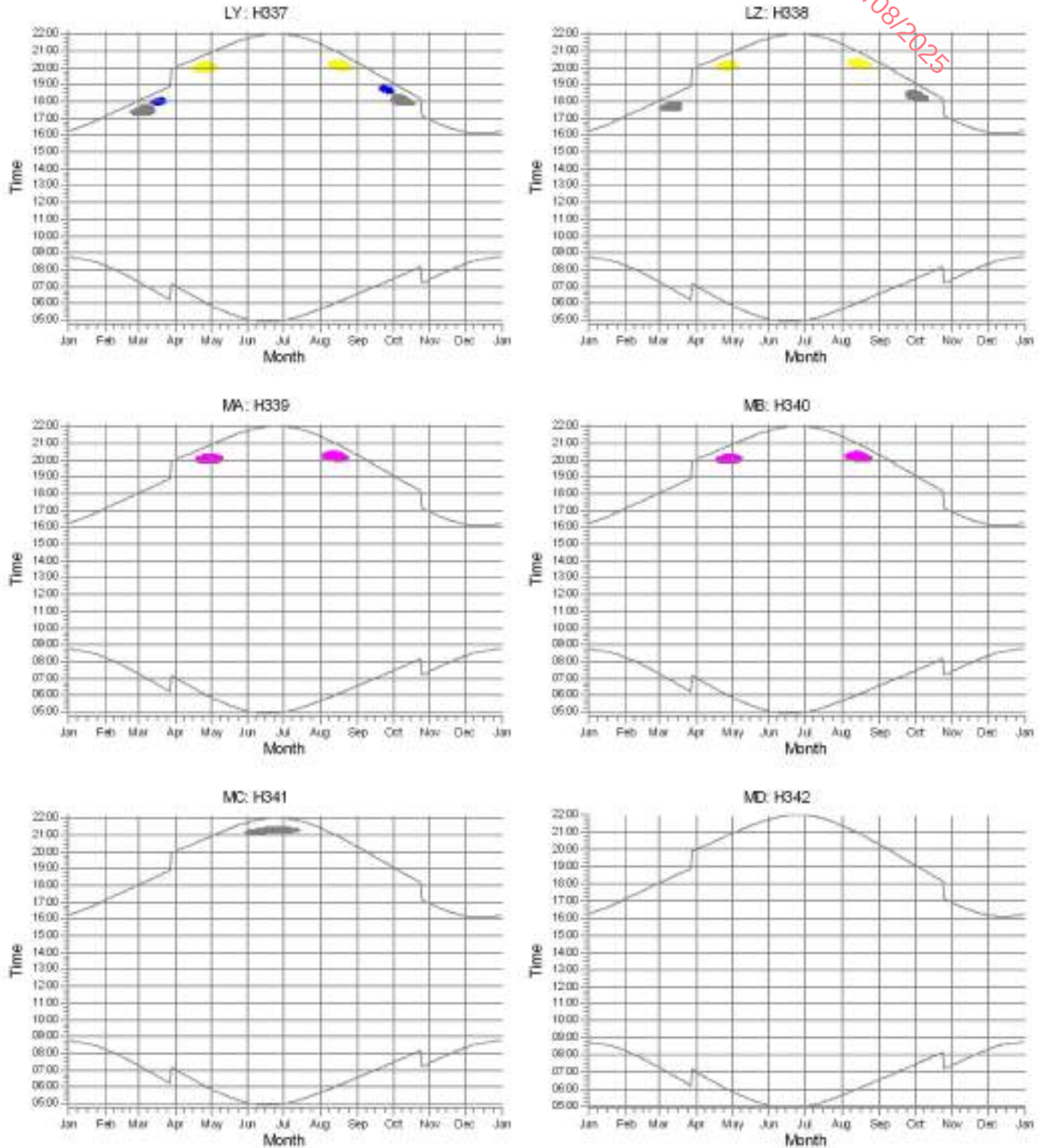


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

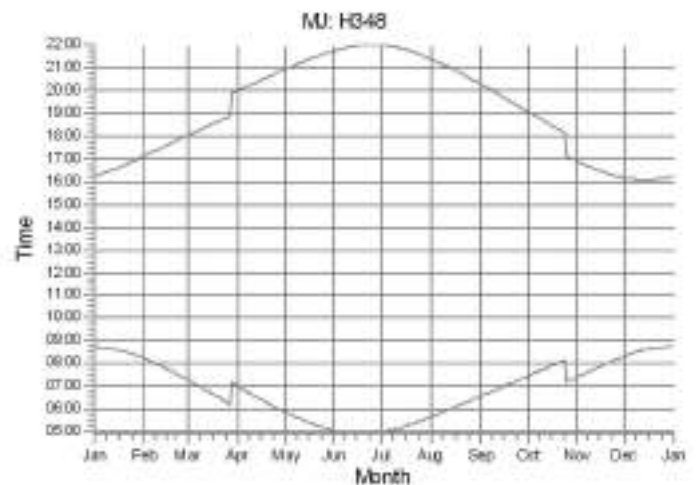
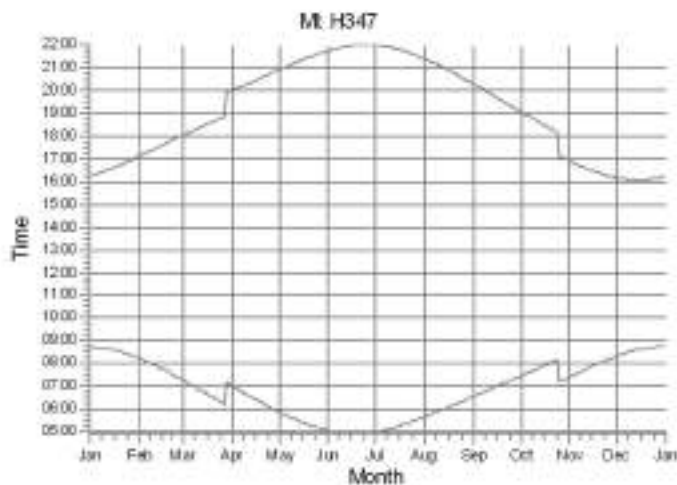
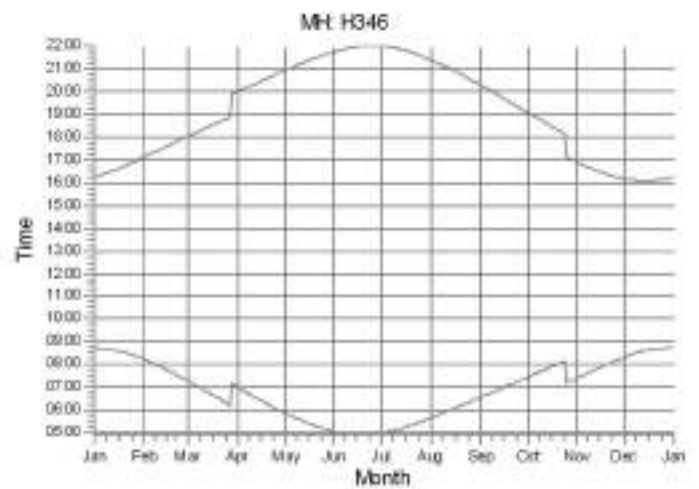
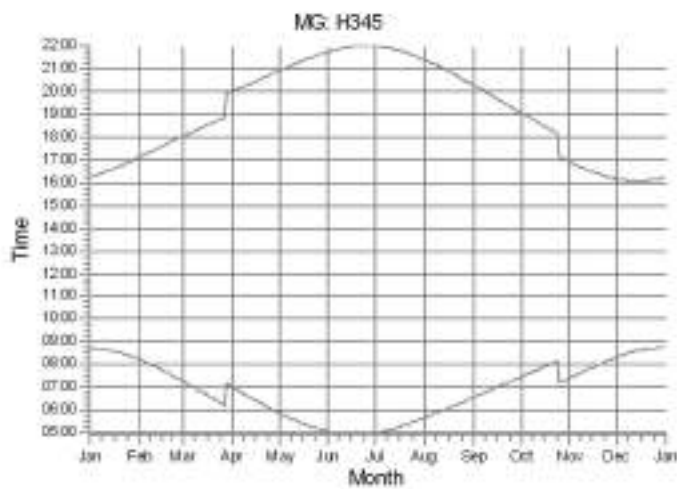
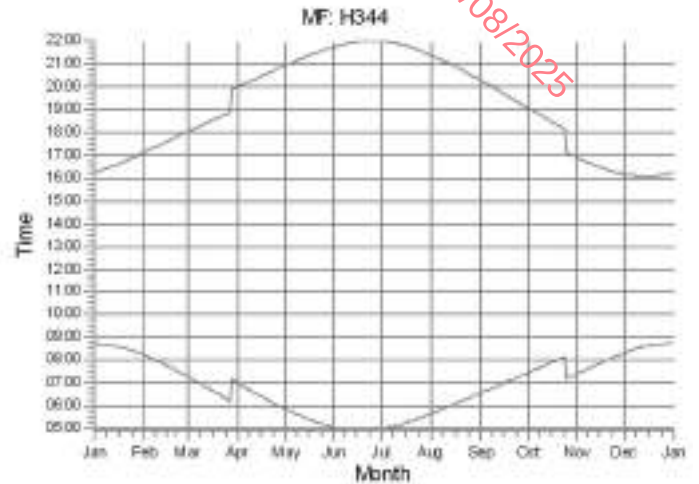
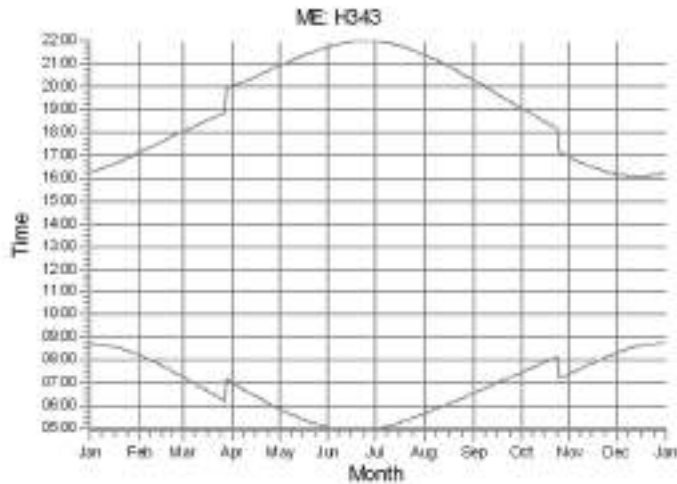


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

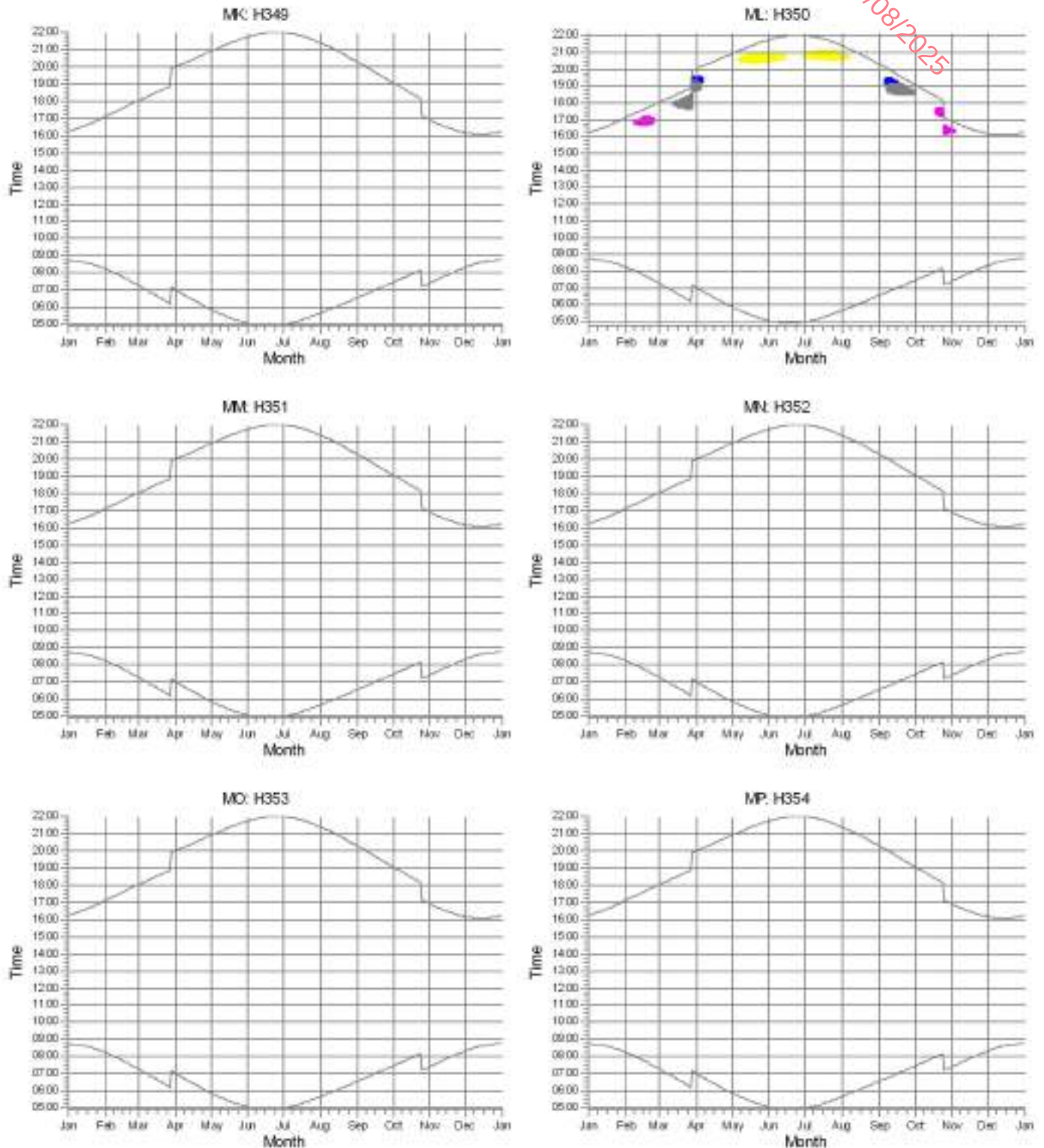
Calculation: Kellystown N163 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

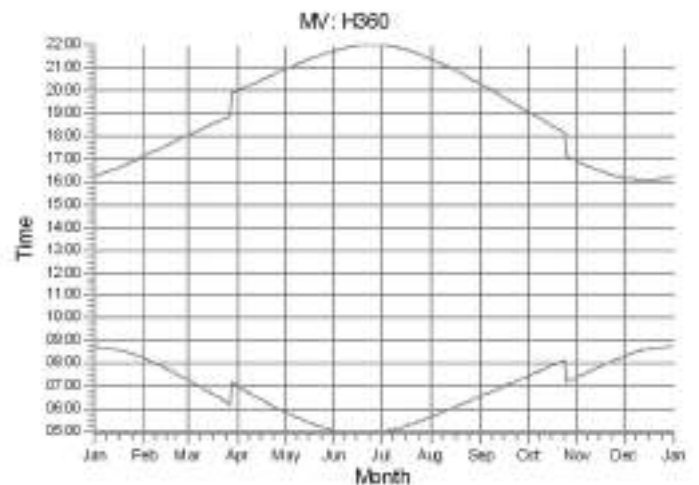
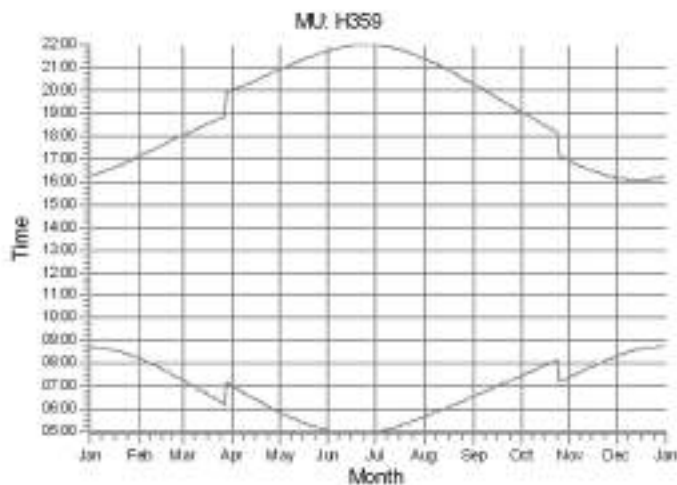
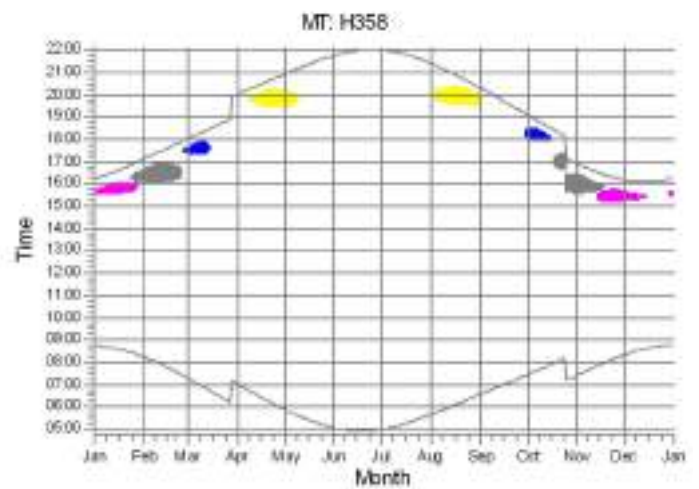
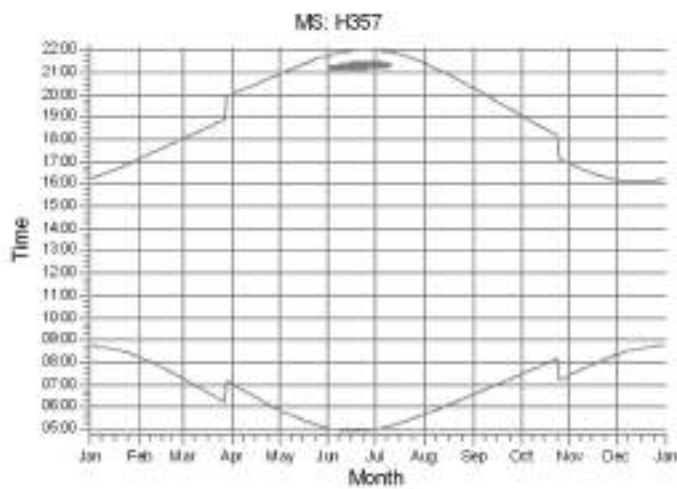
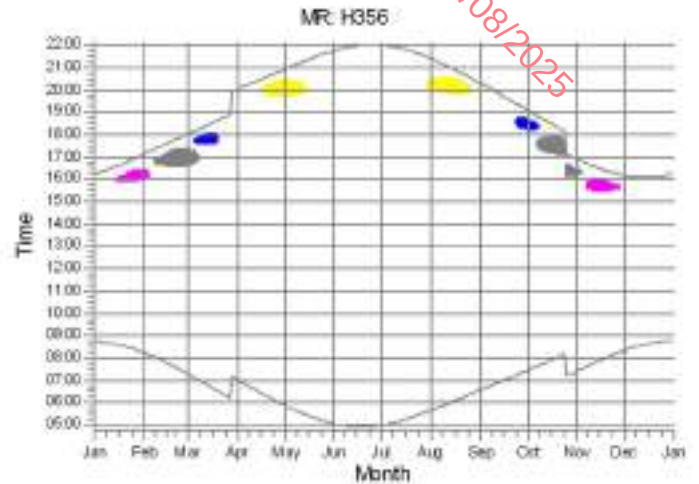
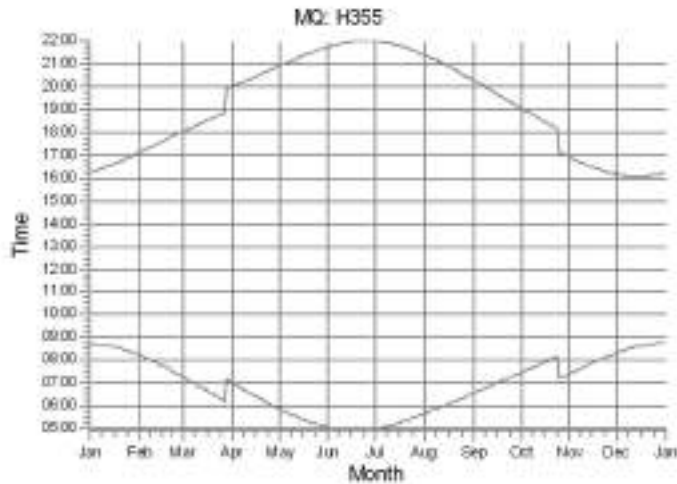


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

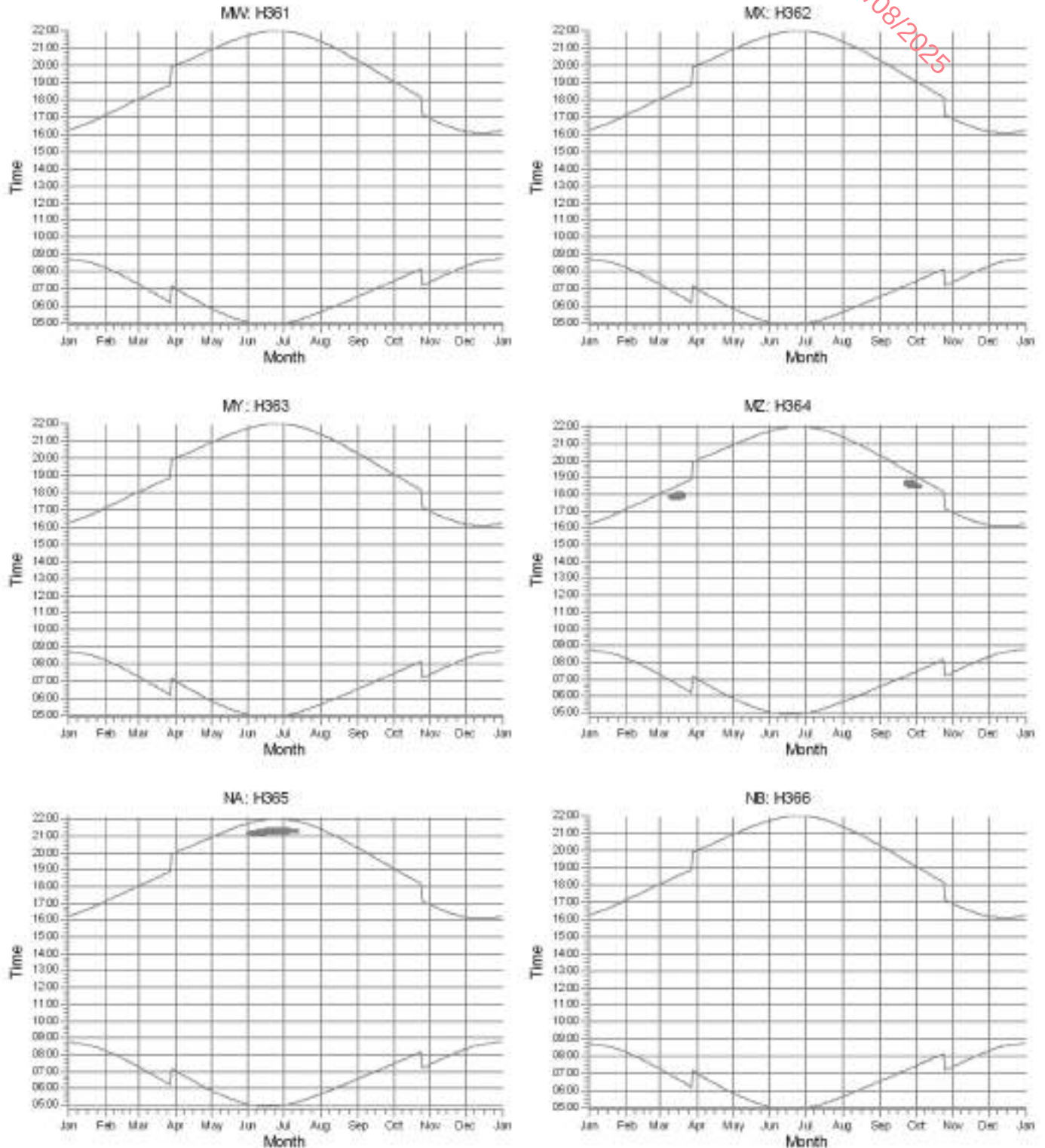


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

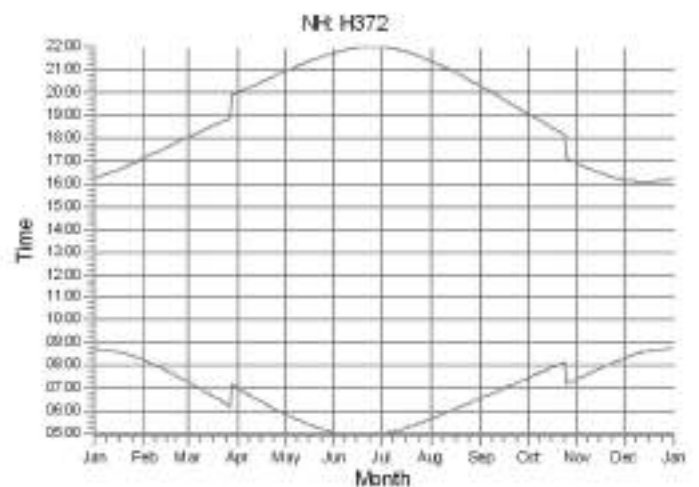
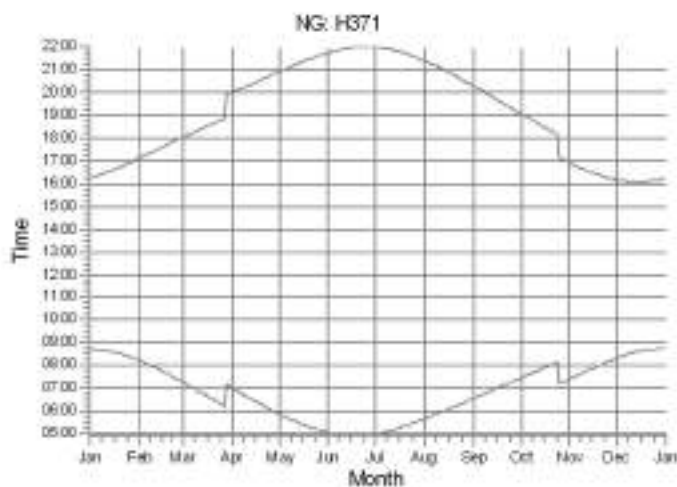
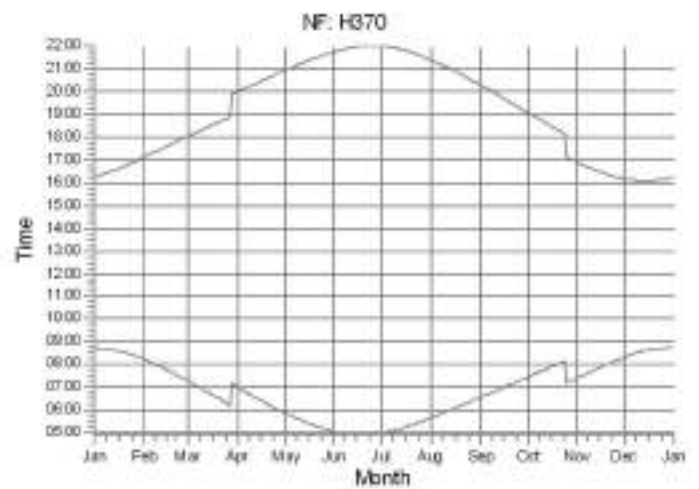
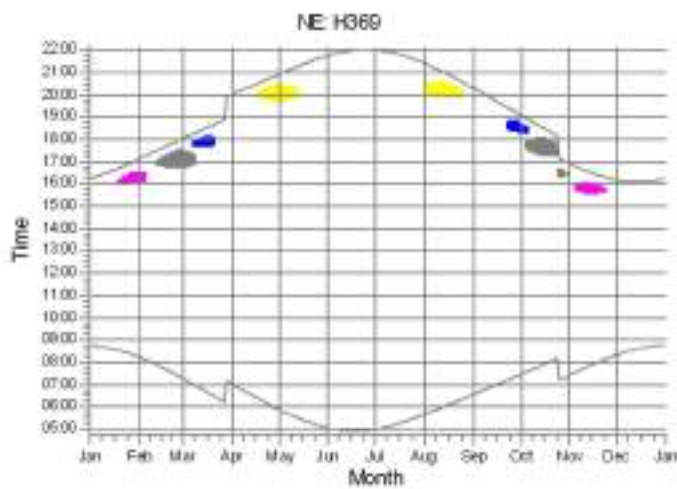
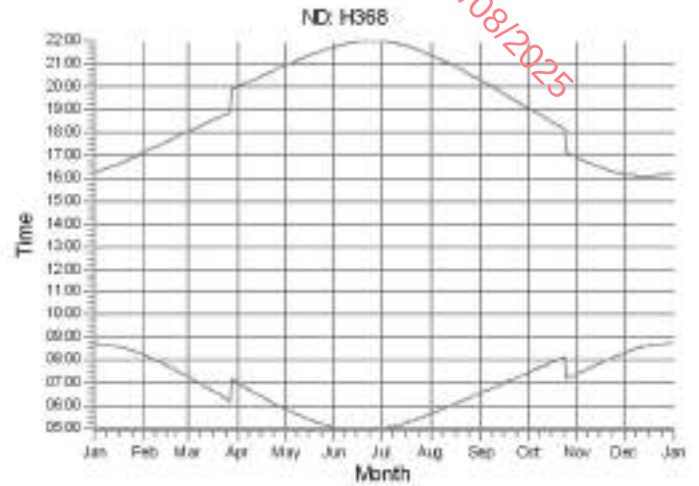
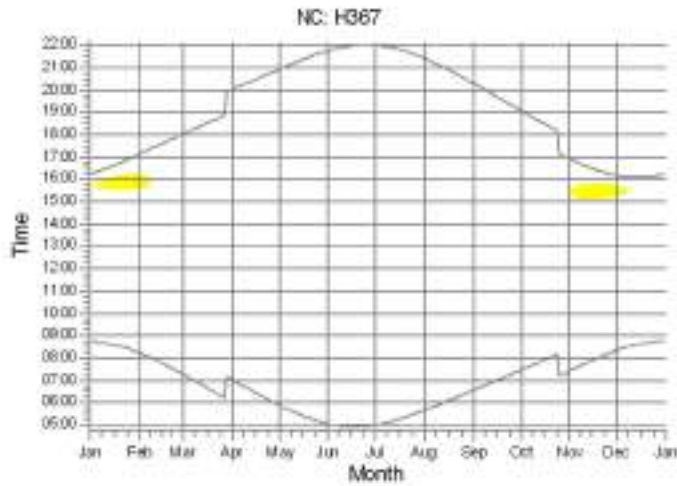


WTGs

4: T04

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case

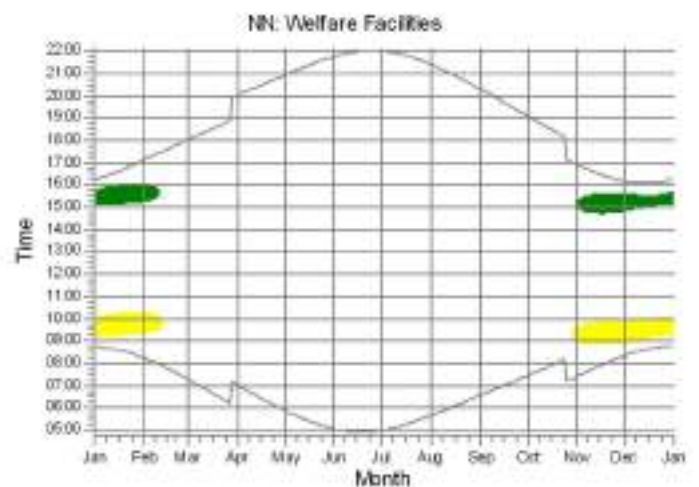
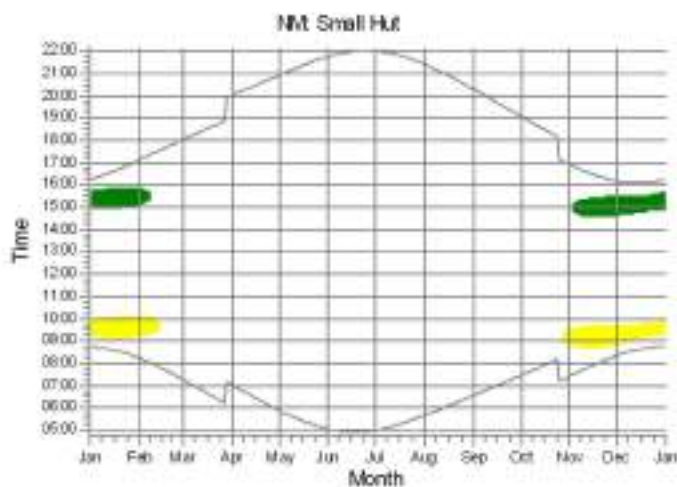
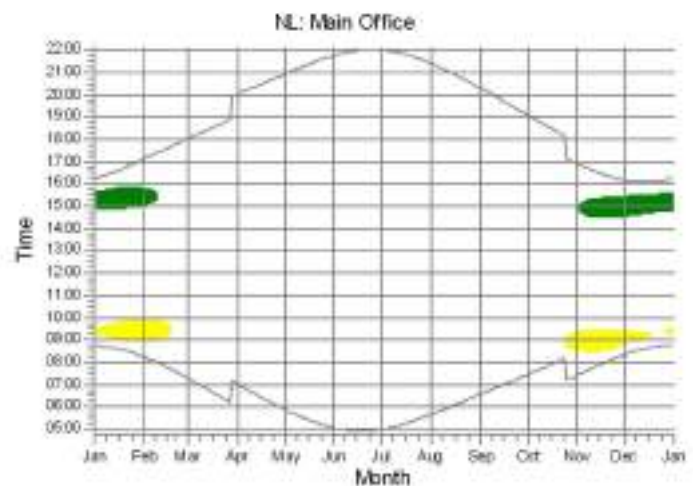
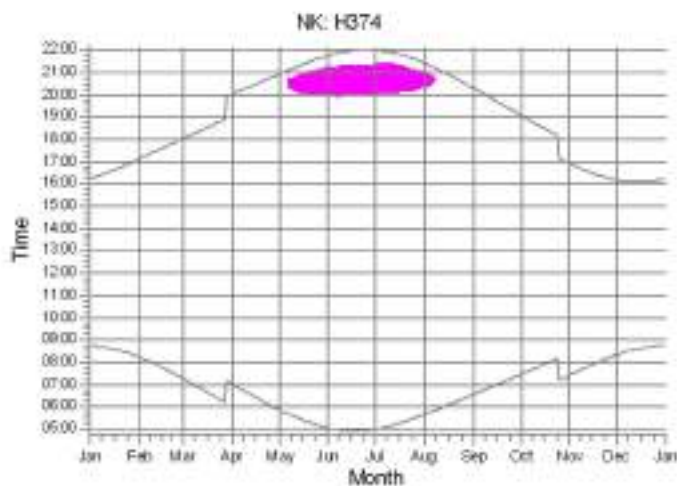
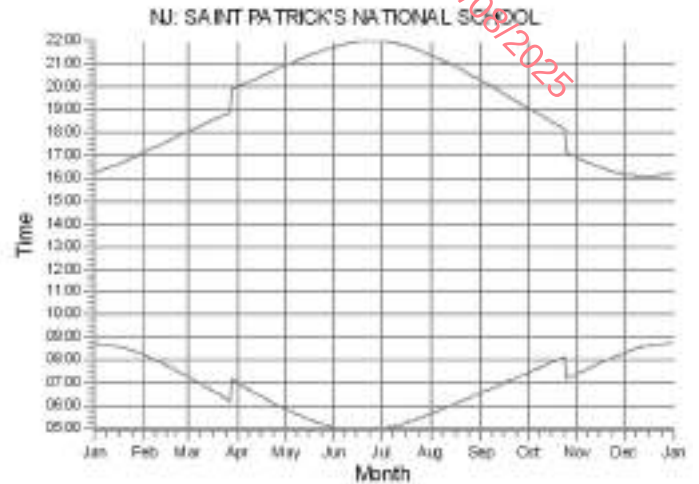
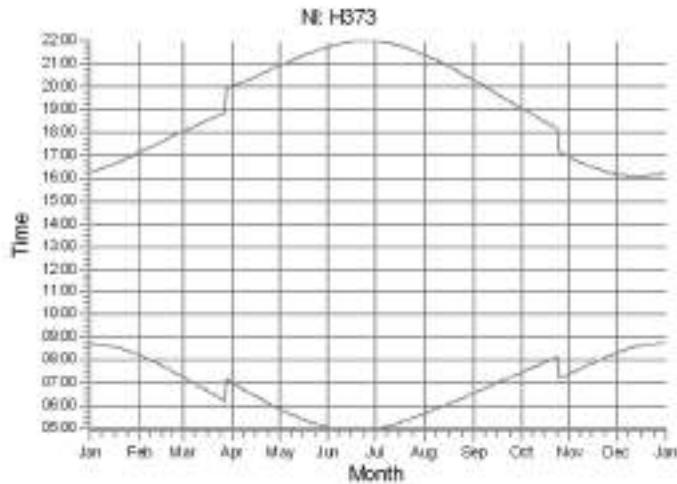


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case



WTGs

1: T01 2: T02 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown N163 Worst Case



WTGs

1: T01

2: T02

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 1 - T01 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January				February				March				April				May				June			
1	08:44	14:05-15:37/92	13:10-13:45/35		08:14	15:06-16:14/68	16:23-16:34/11		07:16	08:31-09:08/37	08:11-08:17/6		07:01	07:25-07:38/13		05:52	06:18-06:45/27		05:03	05:34-05:49/15				
	16:15	10:29-12:54/145			17:06	08:42-09:08/26			18:02	07:41-08:02/21			20:00		20:55	07:01-07:39/38		21:45	05:50-05:57/7					
2	08:44	14:06-15:39/93	13:11-13:45/34		08:12	15:07-16:13/66	16:22-16:37/15		07:14	08:33-09:06/33			06:59	07:23-07:41/18		05:50	06:16-06:44/28		05:02	05:33-05:49/16				
	16:16	10:30-12:55/145			17:08	08:40-09:09/29			18:04	07:39-08:03/24			20:02		20:57	07:02-07:37/35		21:47						
3	08:44	14:06-15:39/93	13:12-13:44/32		08:10	15:08-16:13/65	16:21-16:39/18		07:12	08:35-09:03/28			06:56	07:20-07:41/21		05:48	06:14-06:42/28		05:01	05:32-05:49/17				
	16:17	10:30-12:54/144			17:10	08:38-09:10/32			18:06	07:36-08:03/27			20:04		20:59	07:03-07:35/32		21:48						
4	08:43	14:07-15:41/94	13:13-13:44/31		08:09	15:09-16:12/63	16:20-16:41/21		07:09	08:39-09:00/21			06:54	07:18-07:43/25		05:46	06:12-06:40/28		05:00	05:31-05:48/17				
	16:18	10:31-12:54/143			17:12	08:36-09:12/36			18:08	07:34-08:03/29			20:06		21:01	07:05-07:33/28		21:49						
5	08:43	14:07-15:42/95	13:14-13:44/30		08:07	15:11-16:10/59	16:20-16:43/23		07:07	07:31-08:02/31			06:52	07:15-07:44/29		05:44	06:10-06:34/24		04:59	05:31-05:49/18				
	16:20	10:31-12:53/142			17:14	08:34-09:13/39			18:10	08:49-08:51/2			20:08		21:03	07:06-07:31/25		21:50						
6	08:43	14:08-15:44/96	13:16-13:44/28		08:05	15:13-16:08/55	16:20-16:45/25		07:05	07:29-08:02/33			06:49	07:13-07:45/32		05:42	06:09-06:34/25		04:59	05:30-05:48/18				
	16:21	10:32-12:53/141			17:16	08:32-09:14/42			18:11				20:09		21:04	07:09-07:30/21		21:51						
7	08:42	14:09-15:45/96	13:17-13:43/26		08:03	15:16-15:50/34	15:51-16:05/14		07:02	07:27-08:02/35			06:47	07:11-07:47/36		05:40	06:07-06:34/27		04:58	05:30-05:49/19				
	16:22	10:33-12:52/139			17:18	08:30-09:15/45	16:19-16:47/28		18:13				20:11		21:06	07:12-07:26/14		21:52						
8	08:42	14:10-15:46/96	13:19-13:42/23		08:01	15:21-15:48/27	16:19-16:50/31		07:00	07:24-08:01/37			06:44	07:08-07:47/39		05:38	06:05-06:33/28		04:57	05:29-05:48/19				
	16:24	10:33-12:50/137			17:20	08:28-09:15/47			18:15				20:13		21:08		21:53							
9	08:41	14:11-15:49/98	13:21-13:42/21		07:59	15:32-15:45/13	16:19-16:52/33		06:57	07:22-08:00/38			06:42	07:06-07:48/42		05:36	06:03-06:31/28		04:57	05:29-05:49/20				
	16:25	10:35-12:49/134			17:22	08:26-09:16/50			18:17				20:15		21:10		21:54							
10	08:40	14:12-15:50/98	13:24-13:40/16		07:57	08:24-09:17/53			06:55	07:19-07:59/40			06:40	07:03-07:48/45		05:34	06:02-06:31/29		04:56	05:28-05:48/20				
	16:27	10:36-12:46/130			17:24	16:20-16:54/34			18:19				20:17		21:12		21:55							
11	08:40	14:13-15:52/99	13:28-13:37/9		07:55	08:22-09:18/56			06:53	07:17-07:57/40			06:37	07:01-07:49/48		05:33	06:00-06:29/29		04:56	05:28-05:48/20				
	16:28	10:36-12:42/126			17:26	16:20-16:54/34			18:21				20:19		21:13		21:56							
12	08:39	14:14-15:54/100	12:19-12:32/13		07:53	08:20-09:18/58			06:50	07:14-07:55/41			06:35	06:59-07:49/50		05:31	05:58-06:27/29		04:55	05:28-05:49/21				
	16:30	10:37-12:18/101			17:28	16:21-16:59/38			18:23				20:21		21:15		21:56							
13	08:38	14:43-15:55/72	12:02-12:15/13		07:51	08:18-09:19/61			06:48	07:12-07:52/40			06:32	06:57-07:50/53		05:29	05:57-06:25/28		04:55	05:27-05:48/21				
	16:31	10:39-12:01/82	14:15-14:42/27		17:30	16:20-17:00/40			18:25				20:22		21:17		21:57							
14	08:37	14:43-15:57/74	14:17-14:42/25		07:49	08:15-09:18/63			06:45	07:09-07:47/38			06:30	06:54-07:49/55		05:27	05:55-06:22/27		04:55	05:27-05:48/21				
	16:33	10:40-12:00/80			17:32	16:21-17:02/41			18:27				20:24		21:18		21:58							
15	08:36	14:44-15:59/75	10:41-11:25/44		07:47	08:13-09:18/65			06:43	07:07-07:38/31			06:28	06:52-07:49/57		05:26	05:54-06:22/28		04:55	05:27-05:48/21				
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16	08:35	14:45-16:01/76	11:45-11:54/9	14:20-14:40/20		07:45	08:11-09:19/68		06:40	07:05-07:36/31			06:25	06:50-07:50/60		05:24	05:52-06:21/29		04:54	05:27-05:48/21				
	16:36	11:31-11:39/8	10:43-11:24/41		17:36	16:24-17:07/43			18:30				20:28		21:22		21:59							
17	08:34	14:45-16:02/77	14:22-14:38/16		07:43	08:09-09:19/70			06:38	07:06-07:34/28			06:23	06:47-07:49/62		05:22	05:51-06:20/29		04:54	05:27-05:48/21				
	16:38	10:43-11:22/39			17:38	16:26-17:09/43			18:32				20:30		21:23		21:59							
18	08:33	14:46-16:05/79	14:25-14:36/11		07:41	08:07-09:19/72			06:36	07:07-07:31/24			06:21	06:45-07:49/64		05:21	05:49-06:18/29		04:54	05:27-05:48/21				
	16:40	10:45-11:20/35			17:40	16:28-17:11/43			18:34				20:32		21:25		22:00							
19	08:32	14:47-16:07/80			07:39	08:04-09:18/74			06:33	07:09-07:20/11			06:18	06:43-07:49/66		05:19	05:48-06:16/28		04:54	05:27-05:48/21				
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20	08:31	14:47-16:08/81			07:37	08:02-09:18/76			06:31				06:16	06:41-07:48/67		05:18	05:46-06:08/22		04:54	05:27-05:48/21				
	16:43	10:50-11:09/19			17:44	16:36-17:13/37			18:38				20:35		21:28		22:00							
21	08:30	14:49-16:11/82			07:34	08:00-09:18/78			06:28				06:14	06:39-07:48/69		05:16	05:45-06:07/22		04:55	05:28-05:49/21				
	16:45	10:53-11:07/14			17:46	16:48-17:13/25			18:40				20:37		21:30		22:01							
22	08:29	14:49-16:12/83			07:32	07:58-09:16/78			06:26				06:12	06:36-07:47/71		05:15	05:44-06:06/22		04:55	05:28-05:49/21				
	16:47				17:48	16:47-17:12/25			18:42				20:39		21:31		22:01							
23	08:27	14:51-16:13/82			07:30	07:58-09:16/78	16:48-17:11/23		06:23				06:09	06:34-07:46/72		05:13	05:43-06:03/20		04:55	05:28-05:49/21				
	16:49				17:50	07:55-07:57/2			18:43				20:41		21:33		22:01							
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	16:51				17:52	07:53-07:58/5			18:45				20:43		21:34		22:01							
25	08:25	14:54-16:14/80			07:25	07:50-09:14/84			06:18				06:05	06:30-07:45/75		05:11	05:40-06:01/21		04:56	05:29-05:50/21				
	16:52				17:54	16:50-17:09/19			18:47				20:44		21:36		22:01							
26	08:23	14:55-16:14/79			07:23	07:48-09:13/85			06:16				06:03	06:28-07:44/76		05:09	05:39-06:01/22		04:56	05:29-05:50/21				
	16:54				17:56	16:51-17:08/17			18:49				20:46		21:37		22:01							
27	08:22	14:58-16:14/76			07:21	08:28-09:12/44	07:46-08:01/15		06:14				06:01	06:26-06:53/27		05:08	05:38-06:00/22		04:56	05:30-05:51/21				
	16:56				17:58	08:02-08:25/23	16:54-17:06/12		18:51				20:48	06:58-07:43/45		21:39		22:01						
28	08:20	15:00-16:15/75			07:19	08:29-09:10/41	08:03-08:21/18		06:11				05:58	06:24-06:51/27		05:07	05:37-06:00/23		04:57	05:30-05:51/21				
	16:58	08:49-08:56/7			18:00	07:43-08:01/18			18:53				20:50	06:59-07:42/43		21:40		22:01						
29	08:19	15:02-16:14/72			17:00	08:47-09:10/13			07:09				05:56	06:22-06:49/27		05:06	05:36-05:59/23		04:58	05:31-05:52/21				
	16:59				17:01	08:47-09:10/13			19:05				20:52	07:00-07:41/41		21:42		22:01						
30	08:17	15:03-16:14/71	16:25-16:29/4		17:02	08:45-09:03/18			07:05				05:54	06:20-06:47/27		05:05	05:35-05:58/23		04:58	05:31-05:52/21				
	17:02	08:45-09:03/18			17:02				19:56				20:54	07:00-07:40/40		21:43		22:00						
31	08:15	15:04-16:14/70	16:23-16:31/8		17:04	08:44-09:06/22			07:04	07:27-07:35/8			19:58		21:44									
	17:04																							
Potential sun hours	250				2																			

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn.Feeney@jodireland.com Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 1 - T01 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59 05:32-05:52/20	05:39 06:09-06:38/29	06:33 07:00-07:48/48	07:26 07:53-08:34/41	07:24 07:54-08:46/52	08:19 13:55-15:34/99	13:11-13:19/8	08:19 13:55-15:34/99	13:11-13:19/8	08:19 13:55-15:34/99	13:11-13:19/8
2	05:00 05:33-05:53/20	05:40 06:11-06:40/29	06:35 07:02-07:47/45	07:28 07:54-08:35/41	07:26 15:01-15:16/15	15:49-16:21/32	16:10 10:19-12:16/117	12:17-12:23/6	16:10 10:19-12:16/117	12:17-12:23/6	16:10 10:19-12:16/117
3	05:00 05:34-05:54/20	05:42 06:12-06:41/29	06:36 07:04-07:46/42	07:30 07:56-08:36/40	07:28 14:49-15:18/29	15:49-16:19/30	16:08 10:18-12:32/134	16:08 10:18-12:32/134	16:08 10:18-12:32/134	16:08 10:18-12:32/134	16:08 10:18-12:32/134
4	05:01 05:34-05:54/20	05:44 06:14-06:42/28	06:38 07:05-07:44/39	07:32 07:58-08:37/39	07:30 14:45-15:36/51	15:49-16:17/28	16:08 10:18-12:35/137	16:08 10:18-12:35/137	16:08 10:18-12:35/137	16:08 10:18-12:35/137	16:08 10:18-12:35/137
5	05:02 05:35-05:54/19	05:45 06:16-06:43/27	06:40 07:07-07:43/36	07:33 08:00-08:38/38	07:32 14:43-15:38/55	15:49-16:14/25	16:07 10:18-12:37/139	16:07 10:18-12:37/139	16:07 10:18-12:37/139	16:07 10:18-12:37/139	16:07 10:18-12:37/139
6	05:03 05:36-05:55/19	05:47 06:17-06:43/26	06:42 07:09-07:42/33	07:35 08:02-08:38/36	07:34 14:41-15:40/59	15:50-16:12/22	16:07 10:18-12:39/141	16:07 10:18-12:39/141	16:07 10:18-12:39/141	16:07 10:18-12:39/141	16:07 10:18-12:39/141
7	05:04 05:37-05:55/18	05:49 06:19-06:44/25	06:44 07:10-07:39/29	07:37 08:04-08:38/34	07:36 14:39-15:41/62	15:50-16:10/20	16:06 10:18-12:40/142	16:06 10:18-12:40/142	16:06 10:18-12:40/142	16:06 10:18-12:40/142	16:06 10:18-12:40/142
8	05:05 05:38-05:56/18	05:51 06:20-06:47/27	06:45 07:12-07:37/25	07:39 08:06-08:38/32	07:38 14:38-15:42/64	15:51-16:08/17	16:06 10:19-12:42/143	16:06 10:19-12:42/143	16:06 10:19-12:42/143	16:06 10:19-12:42/143	16:06 10:19-12:42/143
9	05:06 05:39-05:56/17	05:52 06:22-06:50/28	06:47 07:14-07:36/22	07:41 09:16-09:31/15	07:40 14:37-15:44/67	15:53-16:07/14	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
10	05:07 05:40-05:56/16	05:54 06:24-06:52/28	06:49 07:16-07:34/18	07:43 09:11-09:35/24	07:42 14:36-15:45/69	15:54-16:05/11	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
11	05:08 05:41-05:57/16	05:56 06:25-06:53/28	06:51 07:17-07:31/14	07:44 09:08-09:38/30	07:44 14:35-15:45/70	15:55-16:03/8	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
12	05:09 05:42-06:05/23	05:58 06:27-06:54/27	06:52 07:19-07:28/9	07:46 09:06-09:40/34	07:46 14:35-15:46/71	15:57-16:01/4	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
13	05:11 05:43-06:06/23	05:59 06:29-06:56/27	06:54 07:21-07:30/1	07:48 09:04-09:42/38	07:48 14:34-15:46/72	15:57-16:01/4	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
14	05:12 05:44-06:07/23	06:01 06:30-06:57/27	06:56 07:22-07:31/1	07:50 09:02-09:43/41	07:49 14:32-15:47/75	15:57-16:01/4	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
15	05:13 05:45-06:09/24	06:03 06:32-06:59/27	06:58 07:23-07:32/1	07:52 09:04-09:44/41	07:51 14:30-15:47/77	15:57-16:01/4	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
16	05:14 05:47-06:10/23	06:05 06:34-07:00/26	06:59 07:24-07:33/1	07:54 09:05-09:45/41	07:53 14:28-15:47/79	15:57-16:01/4	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
17	05:16 05:48-06:10/22	06:06 06:35-07:01/26	07:01 07:25-07:34/1	07:56 09:06-09:46/41	07:55 14:27-15:47/80	15:57-16:01/4	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
18	05:17 05:49-06:11/22	06:08 06:37-07:02/25	07:03 07:26-07:35/1	07:57 09:07-09:47/41	07:57 14:26-15:47/81	15:57-16:01/4	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
19	05:19 05:51-06:12/21	06:10 06:39-07:05/21	07:05 07:27-07:36/1	07:59 09:08-09:48/41	07:59 14:25-15:47/82	15:57-16:01/4	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
20	05:20 05:52-06:12/20	06:12 06:40-07:05/22	07:06 07:28-07:37/1	08:01 09:09-09:48/41	08:01 14:24-15:47/83	15:57-16:01/4	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
21	05:21 05:53-06:14/21	06:13 06:42-07:07/20	07:08 07:29-07:38/1	08:03 09:10-09:48/41	08:02 14:24-15:46/82	15:57-16:01/4	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
22	05:23 05:55-06:17/22	06:15 06:44-07:05/28	07:10 07:30-07:39/1	08:05 09:11-09:48/41	08:04 14:23-15:44/81	15:57-16:01/4	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
23	05:24 05:56-06:18/22	06:17 06:45-07:05/27	07:12 07:31-07:40/1	08:07 09:12-09:48/41	08:06 14:23-15:43/80	15:57-16:01/4	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
24	05:26 05:57-06:19/22	06:19 06:47-07:05/26	07:14 07:33-08:03/10	08:09 09:13-09:48/41	08:08 14:23-15:42/79	14:02-14:13/11	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
25	05:27 05:59-06:28/29	06:21 06:49-07:05/21	07:15 08:06-08:13/7	07:11 07:39-08:48/69	08:09 14:23-15:41/78	14:00-14:16/16	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
26	05:29 06:00-06:29/29	06:22 06:50-07:05/21	07:17 07:48-08:15/27	07:13 07:41-08:48/67	08:11 14:23-15:39/76	11:23-11:32/9	13:59-14:18/19	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
27	05:31 06:02-06:31/29	06:24 06:52-07:05/19	07:19 07:47-08:17/30	07:15 07:43-08:48/65	08:13 14:23-15:38/75	10:20-11:04/44	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
28	05:32 06:03-06:31/28	06:26 06:54-07:05/17	07:21 07:47-08:18/31	07:17 07:45-08:47/62	08:14 14:24-15:37/73	13:57-14:22/25	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
29	05:34 06:05-06:33/28	06:28 06:55-07:05/15	07:23 07:49-08:26/37	07:19 07:47-08:47/60	08:16 14:23-15:36/73	11:43-11:55/12	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
30	05:35 06:06-06:33/27	06:29 06:57-07:05/13	07:24 07:51-08:30/39	07:20 07:50-08:48/58	08:18 13:55-15:35/100	12:00-12:13/13	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
31	05:37 06:08-06:37/29	06:31 06:59-07:49/50	07:26 07:52-08:47/55	07:22 07:52-08:47/55	08:19 13:55-15:35/100	12:00-12:13/13	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145	16:05 10:19-12:44/145
Potential sun hours	512	460	382	328	259	8372					
Sum of minutes with flicker	699	1778	555	2438	3408						

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 12:44/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case **WTG: 2 - T02****Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 09:18-10:43/85 10:49-12:06/77 16:15 14:59-15:37/38 12:22-14:37/135	08:14 08:42-10:12/90 13:54-14:39/45 17:06 15:16-16:34/78	07:16 16:33-17:34/61 18:02	07:01 18:31-19:33/62 20:00	05:52 19:18-20:26/68 20:55	05:03 20:29-21:10/41 21:45
2	08:44 09:18-10:44/86 10:50-12:06/76 16:16 15:00-15:39/39 12:23-14:38/135	08:12 08:40-10:12/92 13:55-14:37/42 17:08 15:18-16:37/79	07:14 16:36-17:36/60 18:04	06:59 18:31-19:35/64 20:02	05:50 19:18-20:27/69 20:57	05:02 20:31-21:12/41 21:47
3	08:44 09:17-10:44/87 10:50-12:06/76 16:17 15:00-15:39/39 12:23-14:38/135	08:10 08:38-10:11/93 13:57-14:36/39 17:10 15:20-16:39/79	07:12 16:46-17:38/52 18:06	06:56 18:32-19:37/65 20:04	05:48 19:20-20:29/69 20:59	05:01 20:32-21:13/41 21:48
4	08:43 09:17-10:44/87 10:52-12:06/74 16:18 15:01-15:41/40 12:24-14:39/135	08:08 08:36-10:10/94 13:59-14:34/35 17:12 15:21-16:41/80	07:09 16:48-17:41/53 18:08	06:54 18:33-19:39/66 20:06	05:46 19:21-20:30/69 21:01	05:00 20:33-21:14/41 21:49
5	08:43 09:16-10:44/88 10:52-12:05/73 16:20 15:02-15:42/40 12:25-14:39/134	08:07 08:34-10:09/95 14:02-14:32/30 17:14 15:23-16:43/80	07:07 16:48-17:42/54 18:09	06:51 18:32-19:40/68 20:07	05:44 19:22-20:32/70 21:03	04:59 20:33-21:14/41 21:50
6	08:43 09:16-10:45/89 10:54-12:05/71 16:21 15:02-15:44/42 12:26-14:40/134	08:05 08:32-10:08/96 14:05-14:29/24 17:16 15:25-16:45/80	07:05 16:49-17:45/56 18:11	06:49 18:34-19:42/68 20:09	05:42 19:24-20:33/69 21:04	04:59 20:35-21:16/41 21:51
7	08:42 09:15-10:45/90 10:55-12:04/69 16:22 15:02-15:45/43 12:26-14:40/134	08:03 08:30-10:07/97 14:10-14:25/15 17:18 15:28-16:47/79	07:02 07:27-07:28/1 18:13 16:49-17:46/57	06:47 18:34-19:43/69 20:11	05:40 19:27-20:36/69 21:06	04:58 20:35-21:16/41 21:52
8	08:42 09:14-10:45/91 11:44-12:02/18 12:27-14:40/133 16:24 15:02-15:46/44 10:56-11:42/46	08:01 08:28-10:05/97 17:20 15:32-16:50/78	07:00 07:24-07:29/5 18:15 16:50-17:47/57	06:44 18:35-19:46/71 20:13	05:38 19:43-20:37/54 21:08	04:57 20:36-21:18/42 21:53
9	08:41 09:14-10:45/91 11:47-12:02/15 12:29-14:41/132 16:25 15:03-15:49/46 10:59-11:42/43	07:59 08:26-10:04/98 17:22 15:36-16:52/76	06:57 07:22-07:30/8 18:17 16:51-17:46/55	06:42 18:37-19:48/71 20:15	05:36 19:47-20:39/52 21:10	04:57 20:36-21:18/42 21:54
10	08:40 09:13-10:45/92 11:50-11:59/9 12:29-14:42/133 16:27 15:03-15:50/47 11:00-11:42/42	07:57 08:24-10:01/97 17:24 15:37-16:54/77	06:55 07:19-07:29/10 18:19 16:53-17:46/53	06:39 18:38-19:49/71 20:17	05:34 19:47-20:40/53 21:12	04:56 20:37-21:19/42 21:55
11	08:40 09:12-10:45/93 11:03-11:41/38 16:28 15:03-15:52/49 12:30-14:42/132	07:55 08:22-09:59/97 17:26 15:38-16:56/78	06:53 07:17-07:30/13 18:21 16:55-17:46/51	06:37 18:41-19:51/70 20:19	05:33 19:48-20:42/54 21:13	04:56 20:38-21:19/41 21:55
12	08:39 09:11-10:45/94 11:07-11:41/34 16:30 15:03-15:54/51 12:31-14:42/131	07:53 08:20-09:54/94 17:28 15:39-16:59/80	06:50 07:14-07:29/15 18:23 16:56-17:44/48	06:35 18:44-19:53/69 20:20	05:31 19:48-20:43/55 21:15	04:55 20:38-21:20/42 21:56
13	08:38 09:10-10:45/95 11:11-11:40/29 16:31 15:04-15:55/51 12:33-14:42/129	07:51 09:10-09:44/34 15:40-17:00/80 17:30 08:18-09:07/49	06:48 07:12-07:29/17 17:57-17:58/1 18:25 16:58-17:44/46	06:32 18:53-19:54/61 20:22	05:29 19:48-20:44/56 21:17	04:55 20:39-21:21/42 21:57
14	08:37 09:09-10:45/96 11:12-11:39/27 16:33 15:04-15:57/53 12:34-14:43/129	07:49 09:12-09:40/28 15:41-17:02/81 17:32 08:15-09:05/50	06:45 07:09-07:27/18 16:59-17:42/43 18:27 17:50-18:00/10	06:30 18:55-19:56/61 20:24	05:27 19:49-20:47/58 21:18	04:55 20:40-21:22/42 21:58
15	08:36 09:08-10:44/96 11:14-11:38/24 16:34 15:04-15:58/55 12:35-14:43/128	07:47 09:14-09:38/24 15:43-17:05/82 17:34 08:13-09:01/48	06:43 07:09-07:27/18 17:01-17:41/40 18:28 17:48-18:02/14	06:28 18:56-19:58/62 20:26	05:26 19:49-20:48/59 21:20	04:55 20:41-21:22/41 21:58
16	08:35 09:07-10:44/97 11:17-11:37/20 16:36 15:04-16:00/56 12:37-14:42/125	07:45 09:17-09:35/18 15:45-17:07/82 17:36 08:11-08:51/40	06:40 07:09-07:25/16 17:04-17:38/34 18:30 17:44-18:04/20	06:25 18:58-20:00/62 20:28	05:24 19:50-20:50/60 21:22	04:54 20:42-21:23/41 21:59
17	08:34 09:05-10:12/67 11:19-11:34/15 12:38-14:43/125 16:38 15:04-16:02/58 10:14-10:43/29	07:43 09:22-09:30/8 16:10-17:09/59 17:38 08:09-08:50/41 15:49-16:06/17	06:38 07:11-07:23/12 17:11-17:36/25 18:32 17:43-18:06/23	06:23 18:59-20:01/62 20:30	05:22 19:50-20:51/61 21:23	04:54 20:42-21:23/41 21:59
18	08:33 09:04-10:13/69 11:24-11:29/5 12:40-14:43/123 16:40 15:05-16:05/60 10:15-10:42/27	07:41 08:07-08:47/40 15:53-16:00/7 17:40 16:11-17:11/60	06:36 07:13-07:19/6 17:15-17:32/17 18:34 17:40-18:07/27	06:21 19:02-20:03/61 20:32	05:21 19:51-20:53/62 21:25	04:54 20:43-21:24/41 22:00
19	08:32 09:03-10:13/70 10:17-10:41/24 16:41 15:06-16:07/61 12:42-14:44/122	07:39 08:04-08:46/42 17:42 16:12-17:13/61	06:33 17:39-18:10/31 18:36	06:18 19:06-20:05/59 20:33	05:19 19:52-20:54/62 21:27	04:54 20:43-21:24/41 22:00
20	08:31 09:01-10:13/72 10:18-10:39/21 16:43 15:05-16:08/63 12:44-14:43/119	07:37 08:02-08:43/41 17:44 16:14-17:16/62	06:31 17:37-18:11/34 18:38	06:16 19:12-20:07/55 20:35	05:18 19:52-20:55/63 21:28	04:54 20:43-21:24/41 22:00
21	08:30 09:00-10:13/73 10:21-10:38/17 12:47-13:06/19 16:45 15:06-16:11/65 13:10-14:43/93	07:34 08:00-08:40/40 17:46 16:17-17:18/61	06:28 17:37-18:13/36 18:40	06:14 19:12-20:08/56 20:37	05:16 19:53-20:57/64 21:30	04:54 20:43-21:24/41 22:01
22	08:29 08:58-10:13/75 10:24-10:35/11 12:51-13:02/11 16:47 15:06-16:12/66 13:43-14:43/60 13:12-13:41/29	07:32 07:57-08:36/39 17:48 16:19-17:19/60	06:26 17:35-18:15/40 18:42	06:12 19:13-20:10/57 20:39	05:15 19:54-20:59/65 21:31	04:55 20:44-21:25/41 22:01
23	08:27 08:57-10:13/76 13:44-14:43/59 16:49 15:07-16:15/68 13:15-13:39/24	07:30 07:55-08:33/38 17:50 16:21-17:22/61	06:23 17:35-18:17/42 18:43	06:09 19:13-20:12/59 20:41	05:13 19:54-20:59/65 21:33	04:55 20:44-21:25/41 22:01
24	08:26 08:55-10:13/78 13:44-14:43/59 16:51 15:07-16:16/69 13:18-13:37/19	07:28 07:54-08:29/35 17:52 16:23-17:24/61	06:21 17:33-18:18/45 18:45	06:07 19:14-20:14/60 20:43	05:12 19:55-21:01/66 21:34	04:55 20:44-21:25/41 22:01
25	08:25 08:54-10:13/79 13:46-14:43/57 16:52 15:09-16:19/70 13:24-13:33/9	07:25 07:54-08:24/30 17:54 16:25-17:26/61	06:18 17:33-18:21/48 18:47	06:05 19:14-20:15/61 20:44	05:11 19:56-21:02/66 21:36	04:56 20:44-21:25/41 22:01
26	08:23 08:52-10:13/81 13:46-14:42/56 16:54 15:09-16:21/72	07:23 07:55-08:21/26 17:56 16:28-17:28/60	06:16 17:33-18:23/50 18:49	06:03 19:14-20:17/63 20:46	05:09 19:58-21:04/66 21:37	04:56 20:44-21:25/41 22:01
27	08:22 08:51-10:13/82 13:47-14:41/54 16:56 15:10-16:23/73	07:21 16:29-17:31/62 17:58 07:57-08:14/17	06:13 17:32-18:24/52 18:51	06:01 19:15-20:19/64 20:48	05:08 19:59-21:05/66 21:39	04:56 20:43-21:25/42 22:01
28	08:20 08:49-10:13/84 13:49-14:42/53 16:58 15:11-16:26/75	07:19 16:30-17:32/62 18:00 07:58-08:10/12	06:11 17:32-18:26/54 18:53	05:58 19:15-20:21/66 20:50	05:07 20:00-21:06/66 21:40	04:57 20:43-21:25/42 22:01
29	08:19 08:47-10:13/86 13:49-14:41/52 17:00 15:12-16:27/75		07:09 18:31-19:28/57 19:55	05:56 19:16-20:22/66 20:52	05:06 20:24-21:07/43 21:41	04:57 20:44-21:25/41 22:01
30	08:17 08:45-10:12/87 13:50-14:40/50 17:02 15:13-16:29/76		07:06 18:31-19:30/59 19:56	05:54 19:17-20:24/67 20:54	05:05 20:27-21:08/41 21:43	04:58 20:43-21:24/41 22:00
31	08:15 08:44-10:12/88 13:52-14:39/47 17:04 15:14-16:31/77		07:04 18:31-19:31/60 19:58		05:04 20:29-21:18 21:44	
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	8749	4093	1704	1916	1943	1252

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 2 - T02 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59 20:43-21:23/40	05:39 19:58-20:53/55	06:33 18:40-19:50/70	07:26 07:52-08:08/16	07:24 07:54-09:32/98	07:26 07:52-08:08/16	07:24 07:54-09:32/98	07:24 07:54-09:32/98	07:24 07:54-09:32/98	08:19 08:54-10:27/93	10:45-11:23/38
2	05:00 20:43-21:24/41	05:40 19:58-20:52/54	06:35 18:37-19:48/71	07:28 07:54-08:08/14	07:26 07:56-09:34/98	07:28 07:54-08:08/14	07:26 07:56-09:34/98	07:26 07:56-09:34/98	07:26 07:56-09:34/98	08:21 08:56-10:28/92	12:13-14:24/131
3	05:00 20:42-21:23/41	05:42 19:57-20:50/53	06:36 18:35-19:46/71	07:30 07:56-08:07/11	07:28 07:58-09:35/97	07:30 07:56-08:07/11	07:28 07:58-09:35/97	07:28 07:58-09:35/97	07:28 07:58-09:35/97	08:22 08:57-10:28/91	11:30-11:45/15 12:12-14:24/132
4	05:01 20:42-21:23/41	05:44 19:56-20:48/52	06:38 18:32-19:43/71	07:32 07:58-08:07/9	07:30 08:00-09:37/97	07:32 07:58-08:07/9	07:30 08:00-09:37/97	07:30 08:00-09:37/97	07:30 08:00-09:37/97	08:24 08:59-10:30/91	11:29-11:47/18 12:12-14:25/133
5	05:02 20:42-21:23/41	05:45 19:52-20:46/54	06:40 18:31-19:41/70	07:33 08:00-08:06/6	07:32 08:02-09:38/96	07:33 08:00-08:06/6	07:32 08:02-09:38/96	07:32 08:02-09:38/96	07:32 08:02-09:38/96	08:25 09:00-10:30/90	11:28-11:49/21 12:12-14:25/133
6	05:03 20:41-21:22/41	05:47 19:36-20:45/69	06:42 18:30-19:39/69	07:35 08:02-08:05/3	07:34 08:04-09:39/95	07:35 08:02-08:05/3	07:34 08:04-09:39/95	07:34 08:04-09:39/95	07:34 08:04-09:39/95	08:29 09:05-10:32/87	11:40-11:27/47
7	05:04 20:41-21:22/41	05:49 19:34-20:43/69	06:43 18:28-19:35/67	07:37 17:24-18:21/57	07:36 08:06-09:40/94	07:37 17:24-18:21/57	07:36 08:06-09:40/94	07:36 08:06-09:40/94	07:36 08:06-09:40/94	08:30 09:06-10:33/87	10:39-11:55/76
8	05:05 20:41-21:21/40	05:51 19:31-20:41/70	06:45 18:27-19:33/66	07:39 17:23-18:18/55	07:38 08:09-09:41/92	07:39 17:23-18:18/55	07:38 08:09-09:41/92	07:38 08:09-09:41/92	07:38 08:09-09:41/92	08:31 09:07-10:34/86	10:39-11:55/76
9	05:06 20:40-21:21/41	05:52 19:30-20:39/69	06:47 18:26-19:31/65	07:41 17:22-18:16/54	07:40 08:11-09:42/91	07:41 17:22-18:16/54	07:40 08:11-09:42/91	07:40 08:11-09:42/91	07:40 08:11-09:42/91	08:32 09:07-10:33/86	10:39-11:55/76
10	05:07 20:39-21:20/41	05:54 19:28-20:37/69	06:49 18:24-19:28/64	07:42 17:22-18:14/52	07:42 08:13-09:43/90	07:42 17:22-18:14/52	07:42 08:13-09:43/90	07:42 08:13-09:43/90	07:42 08:13-09:43/90	08:33 09:08-10:33/85	10:39-11:56/77
11	05:08 20:38-21:19/41	05:56 19:27-20:35/68	06:51 18:24-19:26/62	07:44 17:18-18:11/53	07:44 08:15-09:44/89	07:44 17:18-18:11/53	07:44 08:15-09:44/89	07:44 08:15-09:44/89	07:44 08:15-09:44/89	08:34 09:09-10:34/85	10:39-11:57/78
12	05:09 20:37-21:18/41	05:58 19:26-20:34/68	06:52 18:23-19:24/61	07:46 17:08-18:09/61	07:46 08:17-09:44/87	07:46 17:08-18:09/61	07:46 08:17-09:44/87	07:46 08:17-09:44/87	07:46 08:17-09:44/87	08:35 09:10-10:35/84	10:40-11:59/79
13	05:11 20:37-21:17/40	05:59 19:24-20:31/67	06:54 18:23-19:22/59	07:48 17:05-18:07/62	07:47 08:19-09:45/86	07:48 17:05-18:07/62	07:47 08:19-09:45/86	07:47 08:19-09:45/86	07:47 08:19-09:45/86	08:36 09:12-10:36/84	10:40-11:59/79
14	05:12 20:34-21:16/42	06:01 19:23-20:29/66	06:56 18:22-19:18/56	07:50 17:03-18:04/61	07:49 08:21-09:45/84	07:50 17:03-18:04/61	07:49 08:21-09:45/84	07:49 08:21-09:45/84	07:49 08:21-09:45/84	08:37 09:13-10:36/83	10:40-12:00/80
15	05:13 20:32-21:15/43	06:03 19:23-20:28/65	06:58 18:21-19:16/55	07:52 08:28-08:49/21	07:51 08:23-09:45/82	07:52 08:28-08:49/21	07:51 08:23-09:45/82	07:51 08:23-09:45/82	07:51 08:23-09:45/82	08:38 09:13-10:36/83	10:40-12:00/80
16	05:14 20:31-21:14/43	06:05 19:21-20:25/64	06:59 18:21-19:14/53	07:54 08:27-08:54/27	07:53 08:25-09:46/81	07:54 08:27-08:54/27	07:53 08:25-09:46/81	07:53 08:25-09:46/81	07:53 08:25-09:46/81	08:39 09:14-10:37/83	10:40-12:01/81
17	05:16 20:08-21:14/66	06:06 19:21-20:23/62	07:01 18:20-19:11/51	07:56 08:26-08:57/31	07:55 08:27-09:46/79	07:56 08:26-08:57/31	07:55 08:27-09:46/79	07:55 08:27-09:46/79	07:55 08:27-09:46/79	08:40 09:16-10:38/82	10:41-12:03/82
18	05:17 20:06-21:12/66	06:08 19:20-20:22/62	07:03 18:20-19:08/48	07:57 08:25-09:01/36	07:57 08:29-09:47/78	07:57 08:25-09:01/36	07:57 08:29-09:47/78	07:57 08:29-09:47/78	07:57 08:29-09:47/78	08:41 09:17-10:39/82	10:42-12:04/82
19	05:18 20:05-21:11/66	06:10 19:19-20:19/60	07:05 18:21-19:06/45	07:59 08:27-09:06/39	07:59 08:31-09:47/76	07:59 08:27-09:06/39	07:59 08:31-09:47/76	07:59 08:31-09:47/76	07:59 08:31-09:47/76	08:42 09:18-10:40/82	10:43-12:05/82
20	05:20 20:05-21:10/65	06:12 19:19-20:17/58	07:06 18:21-19:04/43	08:01 08:29-09:08/39	08:00 08:33-09:48/75	08:01 08:29-09:08/39	08:00 08:33-09:48/75	08:00 08:33-09:48/75	08:00 08:33-09:48/75	08:43 09:18-10:40/82	10:43-12:05/82
21	05:21 20:04-21:09/65	06:13 19:19-20:15/56	07:08 18:20-19:01/41	08:03 08:31-09:12/41	08:02 08:35-09:48/73	08:03 08:31-09:12/41	08:02 08:35-09:48/73	08:02 08:35-09:48/73	08:02 08:35-09:48/73	08:44 09:19-10:41/82	10:45-12:06/81
22	05:23 20:03-21:07/64	06:15 19:17-20:12/55	07:10 18:21-18:58/37	08:05 08:33-09:14/41	08:04 08:37-09:49/72	08:05 08:33-09:14/41	08:04 08:37-09:49/72	08:04 08:37-09:49/72	08:04 08:37-09:49/72	08:45 09:20-10:42/82	10:46-12:06/80
23	05:24 20:03-21:07/64	06:17 19:16-20:10/54	07:12 18:22-18:56/34	08:07 08:35-09:17/42	08:06 08:39-09:49/70	08:07 08:35-09:17/42	08:06 08:39-09:49/70	08:06 08:39-09:49/70	08:06 08:39-09:49/70	08:46 09:21-10:43/82	10:47-12:06/79
24	05:26 20:02-21:05/63	06:19 19:10-20:09/59	07:14 18:23-18:54/31	08:09 08:37-09:18/41	08:08 08:41-09:50/69	08:09 08:37-09:18/41	08:08 08:41-09:50/69	08:08 08:41-09:50/69	08:08 08:41-09:50/69	08:47 09:22-10:44/82	10:48-12:07/79
25	05:27 20:02-21:04/62	06:20 19:05-20:06/61	07:15 18:23-18:51/28	08:11 08:50-09:01/11	08:09 08:43-09:50/67	08:11 08:50-09:01/11	08:09 08:43-09:50/67	08:09 08:43-09:50/67	08:09 08:43-09:50/67	08:48 09:23-10:45/82	10:49-12:08/79
26	05:29 20:01-21:02/61	06:22 19:02-20:04/62	07:17 07:53-08:04/11	08:13 08:46-09:05/19	08:11 08:45-10:22/97	07:17 07:53-08:04/11	08:13 08:46-09:05/19	08:11 08:45-10:22/97	08:11 08:45-10:22/97	08:49 09:24-10:46/82	10:50-12:09/79
27	05:30 20:01-21:00/59	06:24 19:00-20:02/62	07:19 07:51-08:06/15	08:15 17:48-18:20/32	08:13 08:47-10:23/96	07:19 07:51-08:06/15	08:15 17:48-18:20/32	08:13 08:47-10:23/96	08:13 08:47-10:23/96	08:50 09:25-10:47/82	10:51-12:10/79
28	05:32 20:00-20:59/59	06:26 18:57-19:59/62	07:21 07:50-08:07/17	08:17 17:43-18:21/38	08:15 14:42-15:44/62	07:21 07:50-08:07/17	08:17 17:43-18:21/38	08:15 14:42-15:44/62	08:15 14:42-15:44/62	08:51 09:26-10:48/82	10:52-12:11/79
29	05:34 19:59-20:57/58	06:28 18:55-19:57/62	07:22 07:49-08:08/19	08:19 17:40-18:22/42	08:17 08:49-09:18/39	06:28 18:55-19:57/62	07:22 07:49-08:08/19	08:19 17:40-18:22/42	08:17 08:49-09:18/39	08:52 09:27-10:49/82	10:53-12:12/79
30	05:35 19:59-20:56/57	06:29 18:54-19:55/61	07:24 07:51-08:08/17	08:21 17:37-18:22/45	08:18 08:52-10:26/94	06:29 18:54-19:55/61	07:24 07:51-08:08/17	08:21 17:37-18:22/45	08:18 08:52-10:26/94	08:53 09:28-10:50/82	10:54-12:13/79
31	05:37 19:59-20:55/56	06:31 18:43-19:52/69	07:26 07:53-08:10/19	08:23 17:37-18:22/45	08:19 08:53-10:27/93	05:37 19:59-20:55/56	06:31 18:43-19:52/69	07:26 07:53-08:10/19	08:23 17:37-18:22/45	08:54 09:29-10:51/82	10:55-12:14/79
Potential sun hours	512	460	382	2930	7068	512	460	382	2930	7068	10330
Sum of minutes with flicker	1690	1931	1739	2930	7068	1690	1931	1739	2930	7068	10330

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 12:44/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 3 - T03
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June	
1	08:44	09:20-09:59/39	08:14	08:42-08:55/13	07:16	17:04-17:34/30	07:01	19:08-19:33/25	05:52	20:02-20:26/24	05:03	20:33-21:08/35
	16:15	15:03-15:37/34	17:06	16:04-16:34/30	18:02	07:41-07:50/9	20:00		20:55		21:45	05:33-05:51/18
2	08:44	09:21-09:59/38	08:12	08:40-08:55/15	07:14	17:04-17:36/32	06:59	19:10-19:35/25	05:50	20:02-20:27/25	05:02	20:34-21:09/35
	16:16	15:05-15:39/34	17:08	16:10-16:37/27	18:04	07:39-07:51/12	20:02		20:57		21:47	05:33-05:50/17
3	08:44	09:21-09:58/37	08:10	08:38-08:55/17	07:12	17:06-17:38/32	06:56	19:12-19:37/25	05:48	20:02-20:29/27	05:01	20:35-21:09/34
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4	08:43	09:22-09:58/36	08:08	08:36-08:55/19	07:09	17:07-17:41/34	06:54	19:14-19:39/25	05:46	20:03-20:30/27	05:00	20:36-21:08/32
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	16:20	15:06-15:42/36	17:14	16:15-16:43/28	18:09	07:31-07:49/18	20:08		21:03		21:50	20:38-21:09/31
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	16:21	15:08-15:44/36	17:16	16:16-16:45/29	18:11	07:29-07:49/20	20:09		21:04		21:51	20:39-21:08/29
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13	08:38	15:17-15:55/38	07:51	16:34-17:00/26	06:48	17:27-17:58/31	06:32	19:27-19:54/27	05:29	20:14-20:44/30	04:55	20:47-21:08/21
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14	08:37	15:20-15:57/37	07:49	16:37-17:02/25	06:45	17:27-18:00/33	06:30	19:29-19:56/27	05:27	20:15-20:47/32	04:55	20:47-21:08/21
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	16:36		17:36		18:30		20:28		21:22	05:52-05:55/3	21:59	20:47-21:08/21
17	08:34	15:26-16:02/36	07:43	16:39-17:09/30	06:38	17:35-18:06/31	06:23	19:41-20:01/20	05:22	20:16-20:51/35	04:54	20:47-21:08/21
	16:38		17:38		18:32		20:30		21:23	05:51-05:56/5	21:59	20:47-21:08/21
18	08:33	15:27-16:05/38	07:41	16:39-17:11/32	06:36	17:40-18:07/27	06:21	19:41-20:03/22	05:21	20:17-20:53/36	04:54	20:47-21:08/21
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19	08:32	15:45-16:07/22	07:39	16:40-17:13/33	06:33	17:43-18:10/27	06:18	19:41-20:05/24	05:19	20:18-20:54/36	04:54	20:47-21:08/21
	16:41	15:29-15:44/15	17:42		18:36		20:33		21:27	05:48-05:56/8	22:00	20:48-21:08/20
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	16:43	15:30-15:43/13	17:44		18:38		20:35		21:28	05:46-05:55/9	22:00	20:48-21:08/20
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	16:45	15:33-15:42/9	17:46		18:40		20:37		21:30	05:45-05:55/10	22:01	20:48-21:08/20
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	16:58	15:56-16:26/30	18:00	07:43-07:49/6	18:53		20:50		21:40	05:37-05:53/16	22:01	20:49-21:11/22
29	08:19	08:47-08:53/6			07:09	19:03-19:28/25	05:56	20:02-20:22/20	05:06	20:31-21:07/36	04:58	20:51-21:12/23
	17:00	15:58-16:28/30			19:55		20:52		21:41	05:36-05:52/16	22:01	20:50-21:12/22
30	08:17	08:45-08:53/8			07:06	19:04-19:30/26	05:54	20:02-20:24/22	05:05	20:31-21:08/37	04:58	20:51-21:12/23
	17:02	16:00-16:29/29			19:56		20:54		21:43	05:35-05:51/16	22:00	20:49-21:12/23
31	08:15	08:44-08:55/11			07:04	19:05-19:31/26			05:04	20:32-21:08/36		
	17:04	16:01-16:31/30			19:58				21:44	05:34-05:51/17		
Potential sun hours	250		273		367		420		494		510	
Sum of minutes with flicker	1434		1041		1133		688		1197		1306	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 3 - T03
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 05:32-05:52/20	05:39 20:24-20:53/29	06:33 19:24-19:50/26	07:26 18:05-18:36/31	07:24 08:03-08:21/18	08:19 14:56-15:34/38
2	22:00 20:49-21:12/23	21:25 20:23-20:52/29	20:18 19:22-19:48/26	19:05 07:58-08:13/15	16:54 15:53-16:23/30	16:10 09:11-09:28/17
3	05:00 05:33-05:52/19	05:42 20:21-20:50/29	06:36 19:19-19:45/26	07:30 18:03-18:31/28	07:28 08:01-08:23/22	08:22 14:55-15:32/37
4	21:59 20:49-21:13/24	21:21 20:19-20:48/29	20:13 19:17-19:43/26	19:00 07:56-08:21/25	16:50 15:49-16:19/30	16:08 09:10-09:31/21
5	05:01 05:34-05:53/19	05:44 20:16-20:46/30	06:38 19:15-19:41/26	07:32 18:02-18:29/27	07:30 08:00-08:24/24	08:24 14:55-15:32/37
6	21:59 20:49-21:13/24	21:19 20:15-20:45/30	20:11 19:13-19:39/26	18:57 07:58-08:23/25	16:48 15:47-16:17/30	16:08 09:10-09:33/23
7	05:02 05:35-05:54/19	05:45 20:14-20:43/29	06:40 19:10-19:35/25	07:33 18:01-18:26/25	07:32 08:02-08:24/22	08:25 09:09-09:36/27
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9	05:03 05:36-05:55/19	05:47 20:12-20:41/29	06:42 19:09-19:33/24	07:35 17:54-18:24/30	07:34 08:04-08:25/21	08:26 09:10-09:40/30
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12	21:57 20:45-21:15/30	21:14 20:10-20:34/24	20:04 18:56-19:22/26	18:50 08:04-08:25/21	16:43 15:44-16:10/26	16:06 14:53-15:29/36
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21	05:09 20:41-21:17/36	05:58 20:10-20:34/24	06:52 18:58-19:24/26	07:46 17:38-18:09/31	07:46 08:17-08:25/8	08:34 09:11-09:51/40
22	21:53 05:42-05:59/17	21:03 20:09-20:31/22	20:03 18:56-19:22/26	18:38 08:13-08:23/10	16:34 15:32-16:01/29	16:05 14:54-15:27/33
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38	21:44 05:52-06:05/13	20:46 19:49-20:06/17	19:32 18:34-19:01/27	18:20 17:14-17:48/34	16:22 15:21-15:46/25	16:06 14:57-15:27/30
39	05:21 20:31-21:09/38	06:13 20:12-20:15/3	07:08 18:34-19:01/27	08:03 17:14-17:48/34	08:02 15:21-15:46/25	08:41 09:17-10:02/45
40	21:42 05:53-06:05/12	20:44 19:48-20:07/19	19:29 18:33-18:58/25	18:17 17:12-17:45/33	16:20 15:08-15:17/9	16:06 14:58-15:28/30
41	05:23 20:30-21:07/37	06:15 19:46-20:08/22	07:10 18:33-18:58/25	08:05 17:12-17:45/33	08:04 15:21-15:44/23	08:42 09:17-10:02/45
42	21:41 05:55-06:06/11	20:42 19:46-20:08/22	19:27 18:32-18:56/24	18:15 17:10-17:43/33	16:19 15:06-15:19/13	16:07 14:58-15:28/30
43	05:24 20:30-21:07/37	06:17 19:46-20:08/22	07:12 18:32-18:56/24	08:07 17:10-17:43/33	08:06 15:21-15:43/22	08:42 09:18-10:03/45
44	21:39 05:56-06:06/10	20:39 19:45-20:09/24	19:24 18:28-18:54/26	18:13 17:09-17:41/32	16:18 15:05-15:20/15	16:07 14:59-15:29/30
45	05:26 20:28-21:05/37	06:19 19:45-20:09/24	07:14 18:28-18:54/26	08:09 17:09-17:41/32	08:08 15:04-15:42/38	08:43 09:18-10:03/45
46	21:38 05:57-06:05/8	20:37 19:44-20:06/22	19:22 18:23-18:51/28	18:11 16:08-16:38/30	16:17 15:04-15:41/37	16:08 14:59-15:29/30
47	05:27 20:28-21:04/36	06:20 19:44-20:06/22	07:15 18:23-18:51/28	07:11 16:08-16:38/30	08:09 15:04-15:41/37	08:43 09:18-10:03/45
48	21:36 05:59-06:06/7	20:35 19:44-20:06/22	19:19 18:20-18:48/28	17:09 16:07-16:36/29	16:16 15:03-15:39/36	16:08 14:59-15:30/31
49	05:29 20:27-21:02/35	06:22 19:44-20:04/20	07:17 18:20-18:48/28	07:13 16:07-16:36/29	08:11 15:03-15:39/36	08:43 09:19-10:03/44
50	21:35 06:00-06:06/6	20:32 19:44-20:02/18	19:17 18:13-18:46/33	17:07 16:07-16:34/27	16:15 15:02-15:38/36	16:09 14:59-15:30/31
51	05:31 20:27-21:01/34	06:24 19:44-20:02/18	07:19 18:13-18:46/33	07:15 16:07-16:34/27	08:13 15:02-15:38/36	08:44 09:19-10:03/44
52	21:33 06:02-06:06/4	20:30 19:32-19:40/8	19:14 18:11-18:44/33	17:04 16:06-16:31/25	16:14 15:00-15:37/37	16:10 15:01-15:32/31
53	05:32 20:26-20:59/33	06:26 19:32-19:40/8	07:21 18:11-18:44/33	07:17 16:06-16:31/25	08:14 15:00-15:37/37	08:44 09:19-10:01/42
54	21:32 06:03-06:05/2	20:28 19:43-19:59/16	19:12 18:09-18:41/32	17:02 16:02-16:29/27	16:13 09:15-09:21/6	16:11 15:01-15:33/32
55	05:34 20:26-20:58/32	06:28 19:29-19:57/28	07:22 18:09-18:41/32	07:18 16:02-16:29/27	08:16 14:57-15:36/39	08:44 09:19-10:00/41
56	21:30 06:05-06:06/1	20:25 19:28-19:55/27	19:10 18:06-18:38/32	17:00 16:08-18:14/6	16:12 09:12-09:23/11	16:12 15:02-15:34/32
57	05:35 20:25-20:56/31	06:29 19:28-19:55/27	07:24 18:06-18:38/32	07:20 16:08-18:14/6	08:18 14:57-15:35/38	08:44 09:19-10:00/41
58	21:28 20:25-20:56/31	20:23 19:25-19:52/27	19:07 08:01-08:12/11	16:58 15:59-16:27/28	16:11 09:11-09:25/14	16:12 15:03-15:35/32
59	05:37 20:25-20:56/30	06:31 19:25-19:52/27	20:21 15:57-16:25/28	16:56 15:57-16:25/28	16:11 09:11-09:25/14	08:44 09:19-09:59/40
60	21:27 20:25-20:56/30	20:21 19:25-19:52/27	16:56 15:57-16:25/28	16:56 15:57-16:25/28	16:11 09:11-09:25/14	16:13 15:02-15:35/33
Potential sun hours	512	460	382	328	259	233
Sum of minutes with flicker	1420	749	809	1202	1196	2417

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 4 - T04
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		
1	08:44 16:15	14:39-15:37/58	08:14 17:06	15:25-16:35/70	07:16 18:02	16:35-17:34/59	07:01 20:00	18:44-19:33/49	05:52 20:55	20:15-20:26/11 06:18-06:31/13	19:29-20:05/36	05:03 21:45	20:08-21:10/62 05:33-05:46/13
2	08:44 16:16	14:41-15:39/58	08:12 17:08	15:26-16:37/71	07:14 18:04	16:36-17:36/60	06:59 20:02	18:44-19:35/51	05:50 20:57	20:13-20:27/14 06:16-06:30/14	19:30-20:04/34	05:02 21:46	20:10-21:12/62 05:33-05:46/13
3	08:44 16:17	14:41-15:39/58	08:10 17:10	15:27-16:39/72	07:12 18:06	16:40-17:38/58	06:56 20:04	18:46-19:37/51	05:48 20:59	20:11-20:29/18 06:14-06:29/15	19:31-20:03/32	05:01 21:48	20:10-21:13/63 05:32-05:45/13
4	08:43 16:18	14:42-15:41/59	08:08 17:12	15:28-16:41/73	07:09 18:08	16:45-17:41/56	06:54 20:06	18:48-19:39/51	05:46 21:01	20:10-20:30/20 06:12-06:28/16	19:32-20:02/30	05:00 21:49	20:10-21:14/64 05:31-05:44/13
5	08:43 16:20	14:42-15:42/60	08:07 17:14	15:29-16:43/74	07:07 18:09	16:47-17:42/55	06:51 20:07	18:50-19:40/50	05:44 21:03	20:09-20:32/23 06:10-06:27/17	19:33-20:00/27	04:59 21:50	20:11-21:15/64 05:31-05:44/13
6	08:43 16:21	14:44-15:44/60	08:05 17:16	15:31-16:45/74	07:04 18:11	16:51-17:45/54	06:49 20:09	18:51-19:41/50	05:42 21:04	20:07-20:33/26 06:09-06:27/18	19:34-19:58/24	04:59 21:51	20:11-21:16/65 05:30-05:44/14
7	08:42 16:22	14:44-15:45/61	08:03 17:18	15:32-16:47/75	07:02 18:13	16:53-17:46/53	06:47 20:11	18:52-19:40/48	05:40 21:06	20:07-20:36/29 06:07-06:25/18	19:37-19:57/20	04:58 21:52	20:12-21:16/64 05:30-05:44/14
8	08:42 16:24	14:44-15:46/62	08:01 17:20	15:34-16:50/76	07:00 18:15	16:54-17:48/54	06:44 20:13	18:54-19:40/46	05:38 21:08	20:06-20:37/31 06:06-06:23/18	19:39-19:55/16	04:57 21:53	20:13-21:18/65 05:29-05:42/13
9	08:41 16:25	14:46-15:49/63	07:59 17:22	15:37-16:52/75	06:57 18:17	16:54-17:50/56	06:42 20:15	18:56-19:40/44	05:36 21:10	20:06-20:39/33 06:03-06:19/16	19:42-19:51/9	04:57 21:54	20:13-21:19/66 05:29-05:42/13
10	08:40 16:27	14:46-15:50/64	07:57 17:24	15:40-16:54/74	06:55 18:19	16:56-17:52/56	06:39 20:17	18:56-19:39/43	05:34 21:11	20:05-20:40/35 06:02-06:11/9		04:56 21:55	20:14-21:19/65 05:28-05:41/13
11	08:40 16:28	14:47-15:52/65	07:55 17:26	15:53-16:56/63	06:53 18:21	16:57-17:55/58	06:37 20:19	19:41-19:49/8	05:33 21:13	20:05-20:42/37 06:00-06:10/10		04:55 21:56	20:14-21:20/66 05:28-05:41/13
12	08:39 16:30	14:48-15:54/66	07:53 17:28	15:55-16:58/63	06:50 18:23	16:58-17:56/58	06:35 20:20	19:53-19:53/53	05:31 21:15	20:04-20:43/39 05:58-06:09/11		04:55 21:56	20:15-21:21/66 05:28-05:41/13
13	08:38 16:31	14:49-15:55/66	07:51 17:30	15:55-17:00/65	06:48 18:25	17:00-17:58/58	06:32 20:22	19:54-19:54/53	05:29 21:17	20:04-20:44/40 05:57-06:09/12		04:55 21:57	20:15-21:21/66 05:27-05:40/13
14	08:37 16:33	14:50-15:57/67	07:49 17:32	15:56-17:02/66	06:45 18:27	17:02-18:00/58	06:30 20:24	19:56-19:56/54	05:27 21:18	20:04-20:47/43 05:55-06:07/12		04:55 21:58	20:16-21:22/66 05:27-05:40/13
15	08:36 16:34	14:51-15:59/68	07:47 17:34	15:56-17:05/69	06:43 18:28	17:06-18:02/56	06:28 20:26	19:58-19:58/55	05:26 21:20	20:03-20:48/45 05:56-06:06/10		04:55 21:58	20:16-21:22/66 05:27-05:41/14
16	08:35 16:36	14:51-16:00/69	07:45 17:36	15:57-17:07/70	06:40 18:30	17:10-18:04/54	06:25 20:28	20:00-20:00/56	05:24 21:22	20:04-20:50/46 06:00-06:01/1		04:54 21:59	20:17-21:23/66 05:27-05:41/14
17	08:34 16:38	14:52-16:03/71	07:43 17:38	15:58-17:09/71	06:38 18:32	17:14-18:06/52	06:23 20:30	20:01-20:01/56	05:22 21:23	20:03-20:51/48		04:54 21:59	20:17-21:23/66 05:27-05:41/14
18	08:33 16:40	14:54-16:05/71	07:41 17:40	15:59-17:11/72	06:36 18:34	17:17-18:07/50	06:21 20:31	20:03-20:03/56	05:21 21:25	20:04-20:53/49		04:54 22:00	20:17-21:24/67 05:27-05:41/14
19	08:32 16:41	14:56-16:07/71	07:39 17:42	16:00-17:13/73	06:33 18:36	17:21-18:10/49	06:18 20:33	19:09-19:26/17 20:33	05:19 21:27	20:04-20:54/50		04:54 22:00	20:18-21:24/66 05:27-05:41/14
20	08:31 16:43	14:57-16:08/71	07:36 17:44	16:01-17:16/75	06:31 18:38	17:24-18:11/47	06:16 20:35	19:13-19:22/9 20:35	05:18 21:28	20:04-20:55/51		04:54 22:00	20:18-21:24/66 05:27-05:41/14
21	08:30 16:45	14:59-16:11/72	07:34 17:46	16:03-17:18/75	06:28 18:40	17:25-18:13/48	06:14 20:37	19:27-20:08/41	05:16 21:30	20:04-20:57/53 05:45-05:47/2		04:54 22:01	20:18-21:24/66 05:27-05:41/14
22	08:29 16:47	15:01-15:17/16	07:32 17:48	16:04-17:19/75	06:26 18:42	17:25-18:15/50	06:12 20:39	19:27-20:09/42	05:15 21:31	20:05-20:59/54 05:44-05:47/3		04:55 22:01	20:19-21:25/66 05:28-05:42/14
23	08:27 16:49	15:05-15:15/10	07:30 17:50	16:06-17:22/76	06:23 18:43	17:26-18:17/51	06:09 20:41	19:27-20:09/42	05:13 21:33	20:04-20:59/55 05:43-05:47/4		04:55 22:01	20:19-21:25/66 05:28-05:42/14
24	08:26 16:51	15:20-16:17/57	07:28 17:52	16:09-17:24/75	06:21 18:45	17:27-18:18/51	06:07 20:43	06:32-06:35/3 19:27-20:09/42	05:12 21:34	20:05-21:01/56 05:41-05:47/6		04:55 22:01	20:19-21:25/66 05:28-05:42/14
25	08:24 16:52	15:21-16:19/58	07:25 17:54	16:12-17:26/74	06:18 18:47	17:28-18:21/53	06:05 20:44	06:30-06:35/5 19:27-20:09/42	05:11 21:36	20:05-21:02/57 05:40-05:47/7		04:56 22:01	20:19-21:25/66 05:29-05:43/14
26	08:23 16:54	15:21-16:21/60	07:23 17:56	16:18-17:28/70	06:16 18:49	17:30-18:22/52	06:03 20:46	06:28-06:34/6 19:27-20:08/41	05:09 21:37	20:06-21:04/58 05:39-05:47/8		04:56 22:01	20:19-21:25/66 05:29-05:43/14
27	08:22 16:56	15:21-16:23/62	07:21 17:58	16:25-17:31/66	06:13 18:51	17:33-18:24/51	06:01 20:48	06:26-06:34/8 19:28-20:08/40	05:08 21:39	20:06-21:05/59 05:38-05:47/9		04:56 22:01	20:18-21:24/66 05:30-05:44/14
28	08:20 16:58	15:22-16:26/64	07:19 18:00	16:31-17:32/61	06:11 18:53	17:39-18:26/47	05:58 20:50	06:24-06:34/10 19:28-20:07/39	05:07 21:40	20:07-21:06/59 05:37-05:47/10		04:57 22:01	20:19-21:25/66 05:30-05:44/14
29	08:19 17:00	15:23-16:28/65			07:09 19:55	18:39-19:28/49	05:56 20:52	20:20-20:22/2 19:28-20:07/39 06:22-06:33/11	05:06 21:41	20:07-21:07/60 05:36-05:46/10		04:58 22:01	20:19-21:25/66 05:31-05:44/13
30	08:17 17:02	15:23-16:30/67			07:06 19:56	18:41-19:30/49	05:54 20:54	20:17-20:24/7 19:29-20:06/37 06:20-06:32/12	05:05 21:43	20:07-21:08/61 05:35-05:46/11		04:58 22:00	20:19-21:24/65 05:31-05:44/13
31	08:15 17:04	15:24-16:32/68			07:04 19:58	18:42-19:31/49			05:04 21:44	20:08-21:09/61 05:34-05:46/12			
Potential sun hours	250		273		367		420		494			510	
Sum of minutes with flicker	1996		1993		1651		1498		1841			2366	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 4 - T04
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 20:19-21:24/65	05:39 20:15-20:53/38	06:33 18:57-19:37/40	07:26 17:38-18:36/58	07:24 15:09-16:23/74	08:19 14:29-15:34/65
2	05:00 20:19-21:24/65	05:40 20:16-20:52/36	06:35 18:55-19:38/43	07:28 17:36-18:33/57	07:26 15:06-16:21/75	08:21 14:28-15:33/65
3	05:00 20:18-21:23/65	05:42 20:15-20:50/35	06:36 18:53-19:37/44	07:30 17:34-18:31/57	07:28 15:04-16:19/75	08:22 14:29-15:32/63
4	05:01 20:18-21:23/65	05:44 20:16-20:48/32	06:38 18:51-19:37/46	07:31 17:33-18:29/56	07:30 15:02-16:17/75	08:24 14:29-15:32/63
5	05:02 20:18-21:23/65	05:45 20:16-20:46/30	06:40 18:49-19:37/48	07:33 17:31-18:26/55	07:32 15:00-16:15/75	08:25 14:29-15:30/61
6	05:03 20:18-21:22/64	05:47 20:17-20:45/28	06:42 18:47-19:37/50	07:35 17:30-18:24/54	07:34 14:59-16:12/73	08:26 14:30-15:30/60
7	05:04 20:18-21:22/64	05:49 20:18-20:43/25	06:43 18:45-19:35/50	07:37 17:29-18:21/52	07:36 14:58-16:10/72	08:28 14:29-15:29/60
8	05:05 20:18-21:21/63	05:51 20:18-20:41/23	06:45 18:42-19:33/51	07:39 17:24-18:18/54	07:38 14:57-16:08/71	08:29 14:29-15:28/59
9	05:06 20:17-21:21/64	05:52 20:20-20:39/19	06:47 18:40-19:31/51	07:41 17:21-18:16/55	07:40 14:56-16:06/70	08:30 14:30-15:28/58
10	05:07 20:17-21:20/63	05:54 20:20-20:37/17	06:49 18:38-19:28/50	07:42 17:16-18:14/58	07:42 14:56-16:05/69	08:31 14:30-15:28/58
11	05:08 20:17-21:19/62	05:56 20:22-20:35/13	06:51 18:36-19:26/50	07:44 17:12-18:11/59	07:44 14:55-16:03/68	08:33 14:29-15:27/58
12	05:09 20:17-21:18/61	05:58 20:24-20:34/10	06:52 18:34-19:24/50	07:46 17:09-18:09/60	07:45 14:55-16:01/66	08:34 14:29-15:27/58
13	05:11 20:16-21:17/61	05:59 20:25-20:31/6	06:54 18:32-19:22/50	07:48 17:07-18:07/60	07:47 14:54-15:59/65	08:35 14:29-15:27/58
14	05:12 20:16-21:16/60	06:01 20:30-06:41/11	06:56 18:30-19:18/48	07:50 17:00-18:04/64	07:49 14:54-15:58/64	08:36 14:29-15:26/57
15	05:13 20:15-21:15/60	06:03 20:32-06:41/9	06:58 18:28-19:16/48	07:52 16:56-18:02/66	07:51 14:54-15:56/62	08:37 14:30-15:26/56
16	05:14 20:16-21:15/59	06:05 20:33-06:41/8	06:59 18:24-19:14/50	07:54 16:47-17:59/72	07:53 14:54-15:54/60	08:38 14:30-15:26/56
17	05:16 20:15-21:14/59	06:06 20:35-06:41/6	07:01 18:19-19:11/52	07:55 16:42-17:57/75	07:55 14:54-15:52/58	08:38 14:30-15:27/57
18	05:17 20:15-21:12/57	06:08 20:37-06:41/4	07:03 18:16-19:08/52	07:57 16:39-17:55/76	07:57 14:54-15:51/57	08:39 14:31-15:27/56
19	05:18 20:15-21:11/56	06:10 20:39-20:15/42	07:05 18:14-19:06/52	07:59 16:37-17:52/75	07:59 14:39-14:49/10	08:40 14:32-15:28/56
20	05:20 20:15-21:10/55	06:12 20:39-20:15/42	07:06 18:13-19:04/51	08:01 16:35-17:50/75	08:00 14:36-14:52/16	08:41 14:31-15:27/56
21	05:21 20:15-21:09/54	06:13 20:39-20:15/42	07:08 18:10-19:01/51	08:03 16:33-17:48/75	08:02 14:34-15:46/72	08:41 14:32-15:28/56
22	05:23 20:14-21:07/53	06:15 20:39-20:12/40	07:10 18:09-18:58/49	08:05 16:31-17:45/74	08:04 14:33-15:44/71	08:42 14:32-15:28/56
23	05:24 20:15-21:07/52	06:17 20:39-20:10/38	07:12 18:08-18:56/48	08:07 16:30-17:43/73	08:06 14:32-15:43/71	08:42 14:33-15:29/56
24	05:26 20:14-21:05/51	06:19 20:39-20:09/36	07:14 18:06-18:54/48	08:09 16:29-17:41/72	08:08 14:31-15:42/71	08:43 14:33-15:30/57
25	05:27 20:15-21:04/49	06:20 20:39-20:06/57	07:15 18:01-18:51/50	07:11 15:28-16:38/70	08:09 14:30-15:41/71	08:43 14:34-15:30/56
26	05:29 20:14-21:02/48	06:22 20:39-20:04/57	07:17 17:57-18:48/51	07:13 15:27-16:36/69	08:11 14:30-15:39/69	08:43 14:34-15:30/56
27	05:31 20:15-21:01/46	06:24 20:39-20:02/56	07:19 17:53-18:46/53	07:15 15:26-16:34/68	08:13 14:30-15:38/68	08:44 14:36-15:32/56
28	05:32 20:14-20:59/45	06:26 20:39-20:00/55	07:21 17:49-18:44/55	07:16 15:25-16:31/66	08:14 14:30-15:37/67	08:44 14:36-15:33/57
29	05:34 20:15-20:58/43	06:28 20:39-20:00/55	07:22 17:44-18:41/57	07:18 15:24-16:29/65	08:16 14:29-15:36/67	08:44 14:37-15:34/57
30	05:35 20:15-20:56/41	06:29 20:39-20:00/55	07:24 17:40-18:38/58	07:20 15:23-16:27/64	08:18 14:29-15:35/66	08:44 14:37-15:34/57
31	05:37 20:15-20:55/40	06:31 20:39-20:00/55	07:26 17:36-18:36/58	07:22 15:21-16:25/64	08:20 14:29-15:34/65	08:44 14:38-15:35/57
Potential sun hours	512	460	382	328	259	233
Sum of minutes with flicker	2026	1672	1519	2002	2057	1801

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 5 - T05
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 15:06-15:37/31 16:15 08:44 15:07-15:39/32 16:16 08:44 15:07-15:39/32 16:17 08:43 15:08-15:41/33 16:18 08:43 15:08-15:42/34 16:20 08:43 15:10-15:44/34 16:21 08:42 15:10-15:45/35 16:22 08:42 15:11-15:46/35 16:24 08:41 15:12-15:49/37 16:25 08:40 15:13-15:50/37 16:27 08:40 15:14-15:52/38 16:28 08:39 15:15-15:54/39 16:30 08:38 15:17-15:55/38 16:31 08:37 15:18-15:57/39 16:33 08:36 15:21-15:59/38 16:35 08:35 15:27-16:00/33 16:36 08:34 15:28-16:03/35 16:38 08:33 15:30-16:05/35 16:40 08:32 15:31-16:07/36 16:41 08:31 15:31-16:08/37 16:43 08:30 15:33-16:11/38 16:45 08:29 15:34-16:12/38 16:47 08:27 15:36-16:15/39 16:49 08:26 15:38-16:17/39 16:51 08:24 15:41-16:19/38 16:52 08:23 15:45-16:21/36 16:54 08:22 15:47-16:23/36 16:56 08:20 15:53-16:26/33 16:58 08:19 15:55-16:28/33 17:00 08:17 15:56-16:30/34 17:02 08:15 15:58-16:32/34 17:04	08:14 16:03-16:35/32 17:06 08:12 16:05-16:37/32 17:08 08:10 16:08-16:39/31 17:10 08:08 16:10-16:41/31 17:12 08:07 16:11-16:43/32 17:14 08:05 16:12-16:45/33 17:16 08:03 16:13-16:47/34 17:18 08:01 16:16-16:50/34 17:20 07:59 16:19-16:52/33 17:22 07:57 16:22-16:54/32 17:24 07:55 16:25-16:56/31 17:26 07:53 16:27-16:58/31 17:28 07:51 16:29-17:00/31 17:30 07:49 16:32-17:02/30 17:32 07:47 16:34-17:05/31 17:34 07:45 16:35-17:07/32 17:36 07:43 16:37-17:09/32 17:38 07:41 16:38-17:11/33 17:40 07:39 16:44-17:13/29 17:42 07:36 16:45-17:16/31 17:44 07:34 16:46-17:18/32 17:46 07:32 16:47-17:19/32 17:48 07:30 16:49-17:22/33 17:50 07:28 16:52-17:24/32 17:52 07:25 16:53-17:26/33 17:54 07:23 16:55-17:28/33 17:56 07:21 16:56-17:31/35 17:58 07:19 16:57-17:32/35 18:00	07:16 16:59-17:34/35 18:02 07:14 17:00-17:36/36 18:04 07:12 17:03-17:38/35 18:06 07:09 17:11-17:41/30 18:08 07:07 17:10-17:42/32 18:09 07:05 17:11-17:45/34 18:11 07:02 17:11-17:46/35 18:13 07:00 17:12-17:48/36 18:15 06:57 17:12-17:50/38 18:17 06:55 17:14-17:52/38 18:19 06:53 17:17-17:55/38 18:21 06:50 17:21-17:56/35 18:23 06:48 17:20-17:58/38 18:25 06:45 17:19-18:00/41 18:27 06:43 17:20-18:02/42 18:28 06:40 17:19-18:04/45 18:30 06:38 17:19-18:06/47 18:32 06:36 17:19-18:07/48 18:34 06:34 17:20-18:11/51 18:36 06:31 17:20-18:11/51 18:38 06:28 17:21-18:13/52 18:40 06:26 17:21-18:15/54 18:42 06:23 17:23-18:17/54 18:43 06:21 17:24-18:18/54 18:45 06:18 17:27-18:21/54 18:47 06:16 17:30-18:23/53 18:49 06:13 17:30-18:24/54 18:51 06:11 17:31-18:26/55 18:53 06:09 18:32-19:28/56 18:55 07:09 18:32-19:28/56 18:57 07:06 18:34-19:30/56 18:59 07:04 18:35-19:31/56 19:01 07:02 18:36-19:32/56 19:04	07:01 18:38-19:33/55 20:00 07:25-08:07/42 06:59 18:44-19:35/51 20:02 07:23-07:51/28 06:56 18:44-19:36/52 20:04 07:20-07:49/29 06:54 18:45-19:36/51 20:06 07:18-07:48/30 06:52 18:45-19:35/50 20:07 07:15-07:46/31 06:49 18:47-19:35/48 20:09 07:13-07:44/31 06:47 18:47-19:34/47 20:11 07:11-07:40/29 06:44 18:49-19:33/44 20:13 07:08-07:34/26 06:42 18:51-19:32/41 20:15 07:06-07:34/28 06:39 07:03-07:32/29 20:17 18:54-19:30/36 06:37 07:03-07:32/29 20:19 19:06-19:29/23 06:35 19:52-19:53/1 20:20 07:04-07:31/27 06:32 19:49-19:54/5 20:22 07:05-07:30/25 06:30 19:47-19:56/9 20:24 07:05-07:27/22 06:28 19:46-19:58/12 20:26 06:52-06:57/5 06:25 19:45-20:00/15 20:28 06:50-06:58/8 06:23 19:44-20:01/17 20:30 06:47-06:58/11 06:21 19:43-20:03/20 20:31 06:45-06:59/14 06:18 19:43-20:05/22 20:33 06:43-07:00/17 06:16 19:43-20:07/24 20:35 06:41-07:00/19 06:14 19:42-20:08/26 20:37 06:39-07:00/21 06:12 19:42-20:10/28 20:39 06:36-06:59/23 06:09 19:43-20:12/29 20:41 06:34-07:00/26 06:07 19:43-20:13/30 20:43 06:32-06:59/27 06:05 19:44-20:15/31 20:44 06:30-06:59/29 06:03 19:45-20:17/32 20:46 06:28-06:59/31 06:01 19:46-20:19/33 20:48 06:26-06:59/33 05:58 19:48-20:21/33 20:50 06:24-06:58/34 05:56 19:48-20:22/34 20:52 06:22-06:57/35 05:54 19:48-20:24/36 20:54 06:20-06:57/37	05:52 19:48-20:26/38 20:55 06:18-06:56/38 05:50 19:48-20:27/39 20:57 06:16-06:55/39 05:48 19:49-20:29/40 20:59 06:14-06:53/39 05:46 19:50-20:30/40 21:01 06:14-06:52/38 05:44 19:50-20:32/42 21:03 06:14-06:50/36 05:42 19:51-20:33/42 21:04 06:15-06:49/34 05:40 19:52-20:36/44 21:06 06:15-06:48/33 05:38 19:53-20:37/44 21:08 06:16-06:47/31 05:36 19:54-20:38/44 21:10 06:16-06:46/30 05:34 19:55-20:40/45 21:11 06:18-06:45/27 05:33 19:58-20:42/44 21:13 06:19-06:44/25 05:31 20:01-20:43/42 21:15 06:20-06:42/22 05:29 20:02-20:45/43 21:17 06:22-06:41/19 05:27 20:03-20:47/44 21:18 06:23-06:39/16 05:26 20:04-20:48/44 21:20 06:25-06:35/10 05:24 20:05-20:50/45 21:22 05:22 20:06-20:51/45 21:23 05:21 20:06-20:52/46 21:25 05:19 20:06-20:54/48 21:27 05:48-05:51/3 05:18 20:05-20:55/50 21:28 05:46-05:51/5 05:16 20:04-20:57/53 21:30 05:45-05:53/8 05:15 20:04-20:59/55 21:31 05:44-05:54/10 05:13 20:03-20:59/56 21:33 05:43-05:55/12 05:12 20:03-21:01/58 21:34 05:41-05:55/14 05:11 20:02-21:02/60 21:36 05:40-05:56/16 05:09 20:02-21:03/61 21:37 05:39-05:56/17 05:08 20:02-21:05/63 21:39 05:38-05:57/19 05:07 20:02-21:06/64 21:40 05:37-05:57/20 05:06 20:01-21:07/66 21:41 05:36-05:58/22 05:05 20:01-21:08/67 21:43 05:35-05:58/23 05:04 20:01-21:09/68 21:44 05:34-05:59/25	05:03 20:01-21:10/69 21:45 05:33-05:59/26 05:02 20:01-21:12/71 21:46 05:33-06:00/27 05:01 20:01-21:13/72 21:48 05:32-06:00/28 05:00 20:01-21:14/73 21:49 05:31-06:00/29 04:59 20:01-21:15/74 21:50 05:31-06:01/30 04:59 20:01-21:16/75 21:51 05:30-06:01/31 04:58 20:00-21:16/76 21:52 05:30-06:02/32 04:57 20:01-21:17/76 21:53 05:29-06:02/33 04:57 20:02-21:19/77 21:54 05:29-06:02/33 04:56 20:01-21:19/78 21:55 05:28-06:02/34 04:56 20:01-21:20/79 21:55 05:28-06:03/35 04:55 20:02-21:21/79 21:56 05:28-06:03/35 04:55 20:01-21:21/80 21:57 05:27-06:03/36 04:55 20:02-21:21/79 21:58 05:27-06:03/36 04:55 20:02-21:22/80 21:58 05:27-06:03/36 04:54 20:02-21:23/81 21:59 05:27-06:04/37 04:54 20:02-21:23/81 21:59 05:27-06:04/37 04:54 20:03-21:24/81 22:00 05:27-06:04/37 04:54 20:03-21:24/81 22:00 05:27-06:04/37 04:54 20:03-21:24/81 22:00 05:27-06:04/37 04:55 20:04-21:25/81 22:01 05:28-06:05/37 04:55 20:04-21:25/81 22:01 05:28-06:05/37 04:56 20:04-21:25/81 22:01 05:28-06:05/37 04:56 20:04-21:25/81 22:01 05:29-06:06/37 04:56 20:04-21:25/81 22:01 05:29-06:06/37 04:56 20:05-21:25/80 22:01 05:30-06:07/37 04:57 20:05-21:25/80 22:01 05:30-06:06/36 04:58 20:05-21:25/80 22:01 05:31-06:07/36 04:58 20:05-21:24/79 22:00 05:31-06:06/35

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 12:44/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown N163 Worst Case WTG: 5 - T05
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

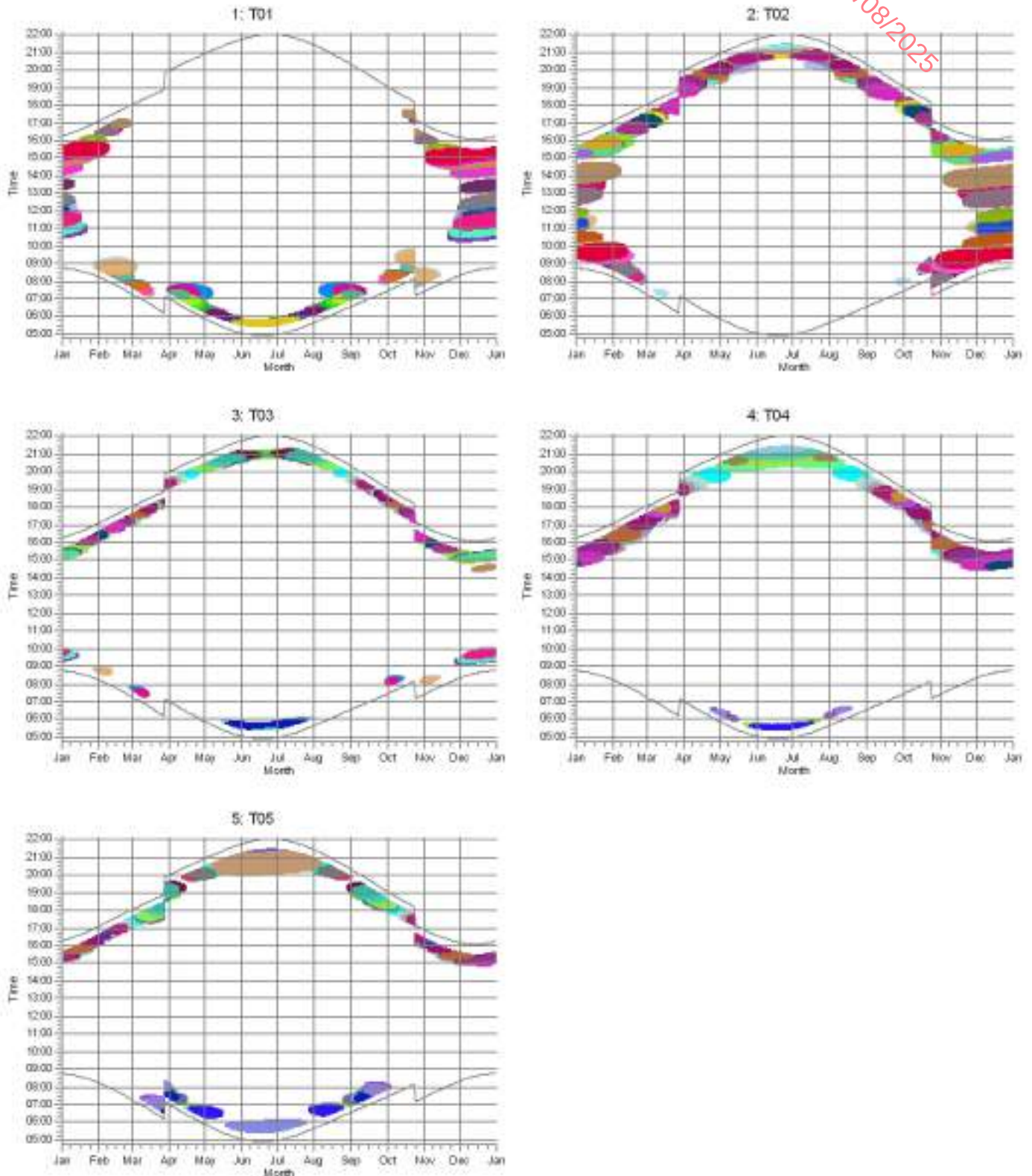
July		August		September		October		November		December	
1	04:59 20:06-21:24/78	05:39 20:10-20:53/43		06:33 07:02-07:31/29		07:26 17:59-18:36/37		07:24 15:51-16:23/32		08:19 14:56-15:34/38	
	22:00 05:32-06:07/35	21:25 06:29-06:53/24		20:18 19:05-19:28/23		19:05 07:52-08:06/14		16:54		16:10	
2	05:00 20:06-21:24/78	05:40 20:07-20:52/45		06:35 07:02-07:31/29		07:28 17:56-18:33/37		07:26 15:49-16:21/32		08:21 14:55-15:33/38	
	22:00 05:33-06:07/34	21:23 06:29-06:55/26		20:16 18:52-19:29/37		19:02 07:54-08:05/11		16:52		16:09	
3	05:00 20:06-21:23/77	05:42 20:05-20:50/45		06:36 18:49-19:30/41		07:30 17:53-18:31/38		07:28 15:45-16:19/34		08:22 14:55-15:32/37	
	21:59 05:33-06:07/34	21:21 06:27-06:55/28		20:13 07:04-07:32/28		19:00 07:56-08:03/7		16:50		16:08	
4	05:01 20:06-21:23/77	05:44 20:04-20:48/44		06:38 18:46-19:30/44		07:32 17:51-18:29/38		07:30 15:43-16:17/34		08:24 14:56-15:32/36	
	21:59 05:34-06:07/33	21:19 06:26-06:56/30		20:11 07:05-07:31/26		18:57 07:58-08:01/3		16:48		16:08	
5	05:02 20:07-21:23/76	05:45 20:02-20:46/44		06:40 18:44-19:31/47		07:33 17:49-18:26/37		07:32 15:41-16:15/34		08:25 14:55-15:30/35	
	21:58 05:35-06:07/32	21:17 06:26-06:57/31		20:09 07:07-07:36/29		18:55		16:46		16:07	
6	05:03 20:07-21:22/75	05:47 20:02-20:45/43		06:42 18:43-19:31/48		07:35 17:48-18:24/36		07:34 15:40-16:12/32		08:26 14:56-15:30/34	
	21:58 05:36-06:07/31	21:15 06:25-06:58/33		20:06 07:09-07:40/31		18:52		16:45		16:07	
7	05:04 20:08-21:22/74	05:49 20:01-20:43/42		06:43 18:41-19:30/49		07:37 17:46-18:21/35		07:36 15:39-16:10/31		08:28 14:56-15:29/33	
	21:57 05:37-06:08/31	21:14 06:24-06:59/35		20:04 07:10-07:41/31		18:50		16:43		16:06	
8	05:05 20:08-21:21/73	05:51 19:59-20:41/42		06:45 18:40-19:30/50		07:39 17:46-18:18/32		07:38 15:37-16:08/31		08:29 14:55-15:28/33	
	21:56 05:38-06:08/30	21:12 06:23-07:00/37		20:01 07:12-07:42/30		18:48		16:41		16:06	
9	05:06 20:08-21:21/73	05:52 19:59-20:39/40		06:47 18:39-19:30/51		07:41 17:45-18:16/31		07:40 15:34-16:06/32		08:30 14:56-15:29/33	
	21:55 05:39-06:08/29	21:10 06:23-07:02/39		19:59 07:14-07:44/30		18:45		16:39		16:05	
10	05:07 20:09-21:20/71	05:54 19:57-20:37/40		06:49 18:37-19:28/51	07:47-07:56/9	07:42 17:45-18:14/29		07:42 15:34-16:05/31		08:31 14:56-15:28/32	
	21:55 05:40-06:08/28	21:08 06:24-07:03/39		19:56 07:16-07:44/28		18:43		16:37		16:05	
11	05:08 20:09-21:19/70	05:56 19:57-20:35/38		06:51 18:31-19:26/55		07:44 17:35-18:11/36		07:44 15:30-16:03/33		08:33 14:56-15:27/31	
	21:54 05:41-06:07/26	21:05 06:25-07:03/38		19:54 07:17-07:59/42		18:41		16:36		16:05	
12	05:09 20:09-21:18/69	05:58 19:56-20:34/38		06:52 18:28-19:24/56		07:46 17:33-18:09/36		07:45 15:28-16:01/33		08:34 14:56-15:27/31	
	21:53 05:42-06:07/25	21:03 06:27-07:04/37		19:52 07:19-08:02/43		18:38		16:34		16:05	
13	05:11 20:09-21:17/68	05:59 19:55-20:31/36		06:54 18:25-19:22/57		07:48 17:31-18:07/36		07:47 15:27-15:59/32		08:35 14:57-15:27/30	
	21:52 05:43-06:07/24	21:01 06:29-07:05/36		19:49 07:21-08:05/44		18:36		16:32		16:05	
14	05:12 20:10-21:16/66	06:01 19:55-20:29/34		06:56 18:21-19:18/56		07:50 17:30-18:04/34		07:49 15:25-15:58/33		08:36 14:57-15:26/29	
	21:51 05:44-06:07/23	20:59 06:30-07:05/35		19:47 07:22-08:07/45		18:33		16:31		16:05	
15	05:13 20:10-21:15/65	06:03 19:55-20:28/33		06:58 18:21-19:16/55		07:52 17:28-18:02/34		07:51 15:20-15:56/36		08:37 14:57-15:26/29	
	21:50 05:45-06:06/21	20:57 06:32-07:06/34		19:44 07:24-08:08/44		18:31		16:29		16:05	
16	05:14 20:11-21:15/64	06:05 19:53-20:25/32		06:59 18:20-19:14/54		07:54 17:26-18:00/34		07:53 15:18-15:54/36		08:38 14:50-14:55/5	
	21:49 05:47-06:07/20	20:55 06:33-07:05/32		19:42 07:26-08:10/44		18:29		16:28		16:05 14:58-15:27/29	
17	05:16 20:11-21:14/63	06:06 19:51-20:23/32		07:01 18:18-19:11/53		07:56 17:24-17:57/33		07:55 15:14-15:52/38		08:38 14:50-14:56/6	
	21:47 05:48-06:06/18	20:53 06:35-07:06/31		19:39 07:28-08:11/43		18:27		16:26		16:05 14:59-15:27/28	
18	05:17 20:12-21:12/60	06:08 19:50-20:22/32		07:03 18:15-19:08/53		07:57 17:22-17:55/33		07:57 15:12-15:51/39		08:39 14:50-14:57/7	
	21:46 05:49-06:05/16	20:51 06:37-07:06/29		19:37 07:29-08:11/42		18:24		16:25		16:05 14:59-15:27/28	
19	05:19 20:12-21:11/59	06:10 19:49-20:19/30		07:05 18:12-19:06/54		07:59 17:20-17:52/32		07:59 15:10-15:49/39		08:40 14:51-14:58/7	
	21:45 05:50-06:05/15	20:48 06:38-07:05/27		19:34 07:31-08:12/41		18:22		16:23		16:05 15:00-15:28/28	
20	05:20 20:13-21:10/57	06:12 19:48-20:17/29		07:06 18:10-19:04/54		08:01 17:18-17:50/32		08:00 15:09-15:47/38		08:41 14:50-14:58/8	
	21:44 05:52-06:05/13	20:46 06:40-07:05/25		19:32 07:33-08:12/39		18:20		16:22		16:06 15:00-15:27/27	
21	05:21 20:13-21:09/56	06:13 19:48-20:15/27		07:08 18:07-19:01/54		08:03 17:16-17:48/32		08:02 15:08-15:46/38		08:41 14:51-14:59/8	
	21:42 05:53-06:04/11	20:44 06:42-07:05/23		19:29 07:35-08:13/38		18:17		16:21		16:06 15:01-15:28/27	
22	05:23 20:14-21:07/53	06:15 19:47-20:12/25		07:10 18:06-18:59/53		08:05 17:15-17:45/30		08:04 15:07-15:44/37		08:42 14:51-14:59/8	
	21:41 05:55-06:04/9	20:42 06:43-07:04/21		19:27 07:36-08:12/36		18:15		16:19		16:07 15:01-15:28/27	
23	05:24 20:15-21:07/52	06:17 19:47-20:10/23		07:12 18:05-18:56/51		08:07 17:12-17:43/31		08:06 15:07-15:43/36		08:42 14:52-15:00/8	
	21:39 05:56-06:03/7	20:39 06:45-07:04/19		19:24 07:38-08:12/34		18:13		16:18		16:07 15:02-15:29/27	
24	05:26 20:15-21:05/50	06:19 19:47-20:09/22		07:14 18:04-18:54/50		08:09 17:08-17:41/33		08:08 15:07-15:42/35		08:43 14:53-15:00/7	
	21:38 05:57-06:01/4	20:37 06:47-07:03/16		19:22 07:40-08:12/32		18:11		16:17		16:08 15:02-15:30/28	
25	05:27 20:17-21:04/47	06:21 19:46-20:06/20		07:15 18:02-18:51/49		07:11 16:06-16:38/32		08:09 15:06-15:41/35		08:43 14:53-15:00/7	
	21:36 05:59-06:01/2	20:35 06:48-07:02/14		19:19 07:42-08:12/30		17:09		16:16		16:08 15:02-15:30/28	
26	05:29 20:17-21:02/45	06:22 19:46-20:04/18	07:16-07:20/4	07:17 18:01-18:48/47		07:13 16:04-16:36/32		08:11 15:06-15:40/34		08:43 14:54-15:00/6	
	21:35	20:32 06:50-07:01/11		19:17 07:43-08:10/27		17:07		16:15		16:09 15:02-15:31/29	
27	05:31 20:17-21:01/44	06:24 19:47-20:02/15	07:11-07:25/14	07:19 18:01-18:46/45		07:15 16:03-16:34/31		08:13 15:00-15:38/38		08:44 14:56-15:01/5	
	21:33	20:30 06:52-07:00/8		19:14 07:45-08:10/25		17:04		16:14		16:10 15:04-15:32/28	
28	05:32 20:15-20:59/44	06:26 19:47-19:59/12	07:09-07:27/18	07:21 18:00-18:44/44		07:16 16:01-16:31/30		08:14 14:58-15:38/40		08:44 14:57-15:00/3	
	21:32 06:39-06:43/4	20:28 06:54-06:59/5		19:12 07:47-08:10/23		17:02		16:13		16:11 15:04-15:33/29	
29	05:34 20:15-20:58/43	06:28 19:48-19:57/9	19:13-19:22/9	07:22 18:00-18:41/41		07:18 15:58-16:29/31		08:16 14:57-15:36/39		08:44 15:05-15:34/29	
	21:30 06:36-06:48/12	20:25 07:06-07:28/22	06:55-06:56/1	19:10 07:49-08:09/20		17:00		16:12		16:12	
30	05:35 20:14-20:56/42	06:29 19:50-19:55/5	19:09-19:26/17	07:24 17:59-18:38/39		07:20 15:56-16:27/31		08:18 14:56-15:35/39		08:44 15:04-15:34/30	
	21:28 06:33-06:50/17	20:23 07:05-07:30/25		19:07 07:51-08:08/17		16:58		16:11		16:12	
31	05:37 20:13-20:55/42	06:31 19:51-19:52/1	19:06-19:27/21			07:22 15:53-16:25/32				08:44 15:05-15:35/30	
	21:27 06:31-06:52/21	20:21 07:04-07:31/27				16:56				16:13	
Potential sun hours	512	460		382		328		259		233	
Sum of minutes with flicker	2516	1860		2470		1070		1051		1036	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

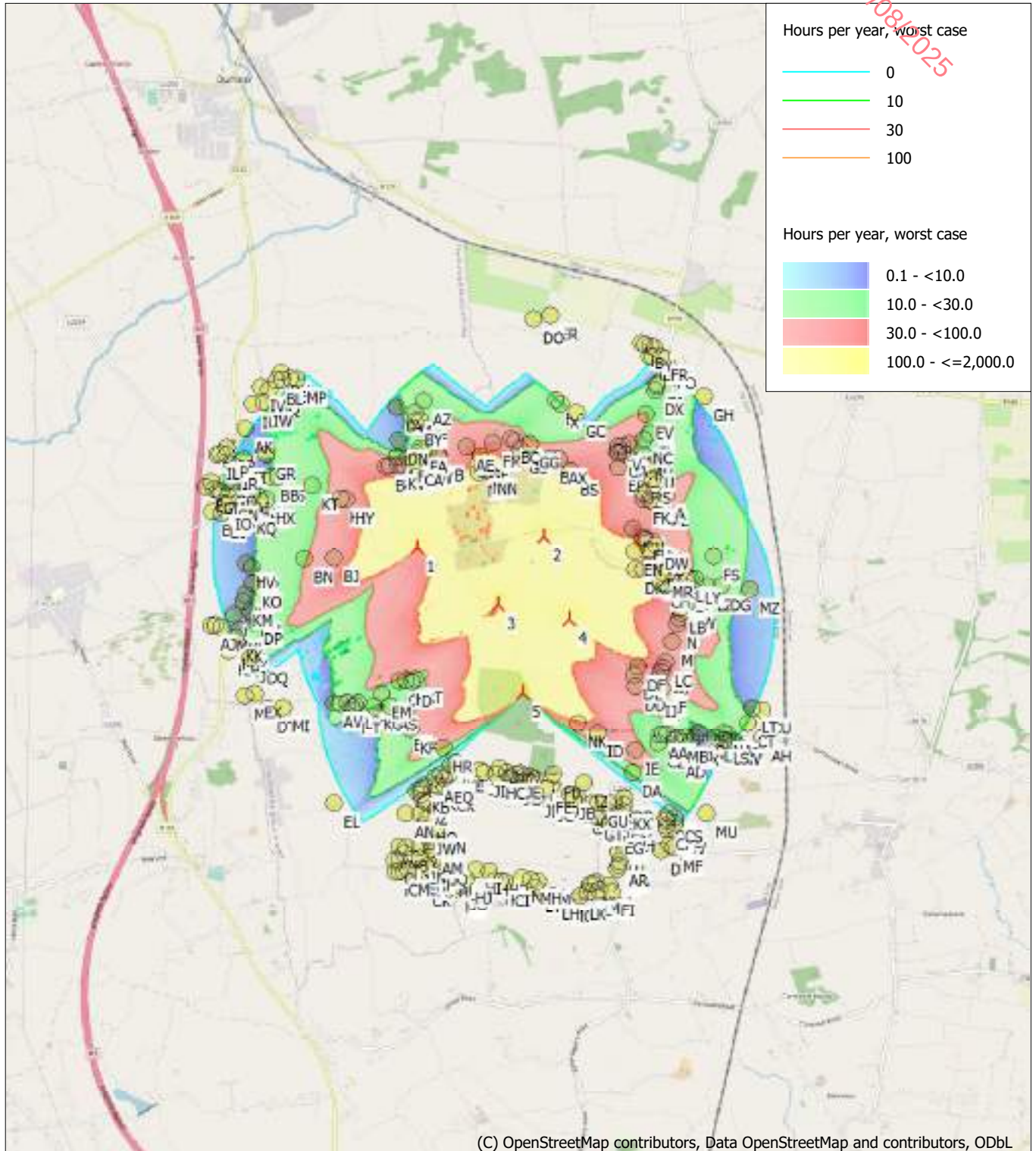
SHADOW - Calendar per WTG, graphical

Calculation: Kellystown N163 Worst Case



SHADOW - Map

Calculation: Kellystown N163 Worst Case



0 500 1000 1500 2000 m

Map: EMD OpenStreetMap , Print scale 1:50,000, Map center Irish ITM-IRENET95 (IE), geocentric, GRS80 East: 708,030 North: 783,620
 New WTG Shadow receptor
 Flicker map level: Height Contours: CONTOURLINE_6918 Kellystown_3.wpo (3)
 Time step: 2 minutes, Day step: 3 days, Map resolution: 10 m, Visibility resolution: 5 m, Eye height: 1.5 m

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

Assumptions for shadow calculations

Maximum distance for influence

Calculate only when more than 20 % of sun is covered by the blade

Please look in WTG table

Minimum sun height over horizon for influence

3 °

Day step for calculation

1 days

Time step for calculation

1 minutes

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
160	97	158	383	373	261	461	767	532	825	1,031	1,215

W	WNW	NW	NNW	Sum
766	673	581	477	8,760

Monthly aggregation of real case reduction

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:

Height contours used: Height Contours: CONTOURLINE_6918 Kellystown_3.w

Receptor grid resolution: 1.0 m

All coordinates are in

Irish ITM-IRENET95 (IE), geocentric, GRS80

WTGs

	Easting	Northing	Z	Row data/Description	WTG type		Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data	
					Valid	Manufact.					Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	707,338	784,036	115.1	T01	Yes	Siemens Gamesa	SG 6.6-155-6,600	6,600	155.0	102.5	2,007	9.3
2	708,442	784,164	104.8	T02	Yes	Siemens Gamesa	SG 6.6-155-6,600	6,600	155.0	102.5	2,007	9.3
3	708,057	783,557	98.1	T03	Yes	Siemens Gamesa	SG 6.6-155-6,600	6,600	155.0	102.5	2,007	9.3
4	708,686	783,447	90.3	T04	Yes	Siemens Gamesa	SG 6.6-155-6,600	6,600	155.0	102.5	2,007	9.3
5	708,318	782,833	109.5	T05	Yes	Siemens Gamesa	SG 6.6-155-6,600	6,600	155.0	102.5	2,007	9.3

Shadow receptor-Input

No.	Name	Easting	Northing	Z	Width	Height	Elevation	Slope of	Direction mode	Eye height
				[m]	[m]	[m]	a.g.l.	window		(ZVI) a.g.l.
							[m]	[°]		[m]
A	H1	709,505	784,550	91.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
B	H2	709,367	784,550	93.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
C	H3	707,206	782,871	130.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
D	H4	707,318	782,870	131.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
E	H5	707,444	781,961	140.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
F	H6	707,513	781,507	158.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
G	H7	707,383	781,906	145.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
H	H8	705,584	783,319	107.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
I	H9	705,744	783,414	104.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
J	H10	705,902	783,048	123.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
K	H11	708,134	781,146	127.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
L	H12	706,829	782,648	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
M	H13	709,591	783,271	84.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
N	H14	709,625	783,428	81.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
O	H15	709,647	783,479	84.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
P	H16	709,657	783,517	86.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Q	H17	709,551	783,895	97.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
R	H18	709,459	783,967	94.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
S	H19	709,386	784,693	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
T	H20	709,354	784,771	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
U	H21	709,398	784,820	73.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
V	H22	709,114	784,973	73.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

▲ New WTG

● Shadow receptor

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
W H23		709,077	784,968	73.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
X H24		708,564	785,327	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Y H25		709,371	785,841	63.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
Z H26		709,336	785,853	64.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AA H27		709,496	782,453	88.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AB H28		709,526	782,458	88.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AC H29		709,557	782,461	87.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AD H30		709,649	782,293	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AE H31		707,754	784,932	85.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AF H32		707,338	785,150	88.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AG H33		707,139	784,828	105.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AH H34		710,397	782,450	63.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AI H35		705,824	784,510	80.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AJ H36		705,550	783,314	106.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AK H37		705,812	785,050	78.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AL H38		707,240	781,305	179.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AM H39		707,528	781,402	160.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AN H40		707,291	781,712	158.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AO H41		707,540	782,027	136.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AP H42		707,674	782,146	133.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AQ H43		708,690	781,931	116.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AR H44		709,175	781,337	87.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AS H45		707,126	782,653	129.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AT H46		707,344	782,894	131.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AU H47		706,698	782,663	128.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AV H48		706,639	782,666	128.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AW H49		709,674	783,593	86.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AX H50		708,565	784,842	79.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AY H51		707,289	785,222	92.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
AZ H52		707,364	785,326	87.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BA H53		706,194	785,494	90.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BB H54		706,039	784,628	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BC H55		707,042	784,741	105.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BD H56		707,077	784,751	104.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BE H57		705,927	784,462	79.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BF H58		705,705	784,510	85.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BG H59		705,521	784,573	88.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BH H60		705,656	784,393	92.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BI H61		705,616	784,300	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BJ H62		706,612	783,934	103.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BK H63		705,816	783,140	110.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BL H64		706,071	785,473	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BM H65		706,123	785,479	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BN H66		706,349	783,922	93.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BO H67		705,540	784,312	102.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BP H68		705,596	784,822	78.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BQ H69		708,136	785,009	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BR H70		708,483	784,848	80.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BS H71		708,669	784,739	80.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BT H72		709,294	784,805	78.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BU H73		709,311	784,893	73.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BV H74		709,363	785,756	61.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BW H75		709,335	785,767	61.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BX H76		709,291	785,868	64.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BY H77		707,293	785,144	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
BZ H78		707,340	784,844	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CA H79		707,301	784,792	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CB H80		707,252	784,779	97.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CC H81		709,390	784,492	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CD H82		709,503	783,935	96.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CE H83		709,610	783,743	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CF H84		709,573	783,753	94.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CG H85		709,535	783,765	95.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CH H86		709,484	783,778	96.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation	Slope of	Direction mode	Eye height
				[m]	[m]	[m]	a.g.l.	window		(ZVI) a.g.l.
							[m]	[°]		[m]
CI H87		708,177	781,136	125.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CJ H88		707,792	781,047	132.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CK H89		707,456	781,117	152.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CL H90		707,203	781,303	180.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CM H91		707,245	781,206	170.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CN H92		707,415	781,706	152.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CO H93		709,577	781,624	78.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CP H94		709,574	781,659	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CQ H95		709,571	781,704	81.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CR H96		709,565	781,730	82.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CS H97		709,652	781,734	79.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CT H98		710,271	782,572	67.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CU H99		710,392	782,695	67.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CV H100		710,154	782,410	71.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CW H101		710,096	782,415	72.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CX H102		709,782	782,400	81.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CY H103		709,653	782,327	85.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
CZ H104		709,486	782,375	89.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DA H105		709,265	782,119	91.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DB H106		709,201	781,889	100.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DC H107		709,196	781,773	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DD H108		709,275	782,875	91.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DE H109		709,266	782,972	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DF H110		709,289	783,047	90.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DG H111		710,003	783,760	89.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DH H112		709,324	783,893	105.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DI H113		709,411	783,875	103.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DJ H114		709,463	783,861	102.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DK H115		709,255	783,893	105.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DL H116		709,467	784,495	94.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DM H117		709,282	784,741	84.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DN H118		707,145	784,976	107.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DO H119		708,308	786,067	65.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DP H120		705,922	783,376	107.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DQ H121		705,963	783,037	123.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DR H122		709,536	781,439	81.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DS H123		706,804	782,632	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DT H124		706,066	782,611	127.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DU H125		706,111	785,544	88.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DV H126		707,126	785,263	97.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DW H127		709,426	784,111	91.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DX H128		709,392	785,462	69.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DY H129		708,305	782,018	122.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
DZ H130		708,330	782,064	124.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EA H131		708,379	782,060	124.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EB H132		708,418	782,035	123.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EC H133		708,356	782,014	122.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ED H134		708,578	782,087	121.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EE H135		709,648	781,687	77.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EF H136		709,004	781,720	103.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EG H137		709,126	781,613	94.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EH H138		707,259	782,476	128.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EI H139		709,611	781,494	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EJ H140		707,668	782,062	132.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EK H141		707,304	781,411	179.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EL H142		706,657	781,789	159.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EM H143		707,054	782,762	127.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EN H144		709,238	784,049	99.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EO H145		709,146	784,894	74.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EP H146		709,081	784,786	78.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EQ H147		707,624	782,023	133.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ER H148		708,458	786,104	60.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ES H149		709,179	781,738	99.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ET H150		708,515	785,357	78.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
EU	H151	709,357	784,502	92.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EV	H152	709,311	785,254	65.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EW	H153	708,444	781,087	111.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EX	H154	705,947	782,729	126.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EY	H155	705,470	784,531	91.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
EZ	H156	707,342	784,881	98.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FA	H157	707,342	784,908	100.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FB	H158	707,196	784,755	100.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FC	H159	709,256	785,879	64.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FD	H160	708,205	782,041	121.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FE	H161	708,510	781,960	119.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FF	H162	707,719	782,168	133.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FG	H163	707,234	784,825	101.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FH	H164	709,237	781,637	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FI	H165	709,111	781,063	90.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FJ	H166	709,367	784,069	93.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FK	H167	709,307	784,515	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FL	H168	709,352	785,081	70.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FM	H169	707,979	784,969	85.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FN	H170	709,169	784,987	73.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FO	H171	709,496	785,693	59.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FP	H172	709,460	785,707	60.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FQ	H173	709,467	785,745	60.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FR	H174	709,433	785,761	62.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FS	H175	709,934	784,019	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FT	H176	709,387	784,150	92.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FU	H177	709,340	784,163	94.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FV	H178	709,318	784,178	94.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FW	H179	709,215	784,252	97.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FX	H180	709,312	784,556	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FY	H181	709,279	784,682	86.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
FZ	H182	709,116	784,922	74.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GA	H183	709,082	784,914	74.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GB	H184	709,070	784,913	74.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GC	H185	708,707	785,255	80.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GD	H186	708,216	784,924	80.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GE	H187	707,874	784,854	90.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GF	H188	708,178	784,996	82.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GG	H189	708,305	784,969	81.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GH	H190	709,818	785,414	62.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GI	H191	709,402	785,500	69.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GJ	H192	709,405	785,517	69.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GK	H193	709,453	785,665	59.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GL	H194	709,456	785,693	59.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GM	H195	705,544	784,509	90.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GN	H196	705,680	784,453	88.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GO	H197	705,657	784,572	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GP	H198	705,651	784,873	80.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GQ	H199	706,010	785,393	90.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GR	H200	705,999	784,823	97.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GS	H201	708,974	781,721	104.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GT	H202	708,947	781,729	104.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GU	H203	708,977	781,847	107.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GV	H204	708,935	781,765	106.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GW	H205	708,905	781,831	109.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GX	H206	708,838	781,781	109.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GY	H207	708,796	781,872	111.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
GZ	H208	708,636	781,939	116.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HA	H209	708,397	782,002	121.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HB	H210	708,267	782,013	120.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HC	H211	708,078	782,066	123.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HD	H212	707,212	781,200	170.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HE	H213	707,323	781,217	168.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HF	H214	707,484	781,251	162.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
HG	H215	708,081	781,151	128.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HH	H216	708,031	781,228	128.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HI	H217	707,920	781,237	134.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HJ	H218	707,831	781,155	137.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HK	H219	707,748	781,065	135.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HL	H220	707,681	781,206	148.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HM	H221	707,513	781,338	162.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HN	H222	707,561	781,590	149.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HO	H223	707,469	781,664	152.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HP	H224	707,425	781,885	142.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HQ	H225	707,542	781,969	136.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HR	H226	707,609	782,297	132.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HS	H227	707,268	782,879	130.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HT	H228	706,805	782,611	128.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HU	H229	705,896	783,448	103.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HV	H230	705,841	783,863	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HW	H231	705,887	784,175	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HX	H232	706,014	784,437	79.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HY	H233	706,701	784,453	96.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
HZ	H234	707,338	784,807	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IA	H235	707,506	784,843	97.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IB	H236	707,514	784,845	97.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IC	H237	708,102	782,128	123.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ID	H238	708,956	782,454	108.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IE	H239	709,290	782,312	91.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IF	H240	709,136	781,735	101.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IG	H241	709,182	781,682	97.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IH	H242	709,642	783,733	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
II	H243	709,515	783,040	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IJ	H244	709,454	782,822	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IK	H245	709,444	782,792	92.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IL	H246	705,567	784,809	77.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IM	H247	705,638	783,305	105.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IN	H248	705,640	784,350	95.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IO	H249	705,650	784,374	93.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IP	H250	705,583	784,500	89.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IQ	H251	705,613	784,489	89.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IR	H252	705,712	784,727	77.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IS	H253	705,654	784,815	78.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IT	H254	705,800	784,781	86.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IU	H255	705,868	785,262	73.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IV	H256	705,937	785,412	86.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IW	H257	705,962	785,280	81.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IX	H258	709,053	781,852	105.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IY	H259	709,046	781,725	102.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
IZ	H260	708,843	782,018	113.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JA	H261	708,760	781,877	112.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JB	H262	708,726	781,912	114.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JC	H263	708,535	781,883	115.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JD	H264	708,421	781,927	118.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JE	H265	708,252	782,077	123.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JF	H266	708,233	782,021	120.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JG	H267	708,187	782,044	121.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JH	H268	708,163	782,093	122.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JI	H269	707,974	782,092	127.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JJ	H270	707,933	782,103	128.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JK	H271	707,283	781,361	179.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JL	H272	707,284	781,205	168.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JM	H273	707,360	781,320	173.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JN	H274	707,423	781,321	169.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JO	H275	707,786	781,092	135.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JP	H276	707,640	781,305	151.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JQ	H277	707,609	781,309	153.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JR	H278	707,530	781,439	159.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
JS H279		707,518	781,467	159.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JT H280		707,417	781,420	170.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JU H281		707,445	781,545	160.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JV H282		707,503	781,557	155.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JW H283		707,479	781,570	157.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JX H284		707,471	781,630	157.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JY H285		707,466	781,810	141.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
JZ H286		707,440	781,835	140.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KA H287		707,401	781,915	144.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KB H288		707,430	781,935	142.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KC H289		707,570	781,956	135.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KD H290		707,588	782,057	134.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KE H291		707,733	782,121	133.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KF H292		707,320	782,445	128.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KG H293		706,989	782,647	130.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KH H294		706,850	782,679	126.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KI H295		706,756	782,676	128.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KJ H296		705,706	783,101	120.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KK H297		705,767	783,216	110.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KL H298		705,798	783,285	108.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KM H299		705,822	783,531	100.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KN H300		705,842	783,600	106.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KO H301		705,902	783,694	102.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KP H302		705,896	783,830	98.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KQ H303		705,844	784,342	88.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KR H304		705,959	784,420	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KS H305		706,102	784,637	91.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KT H306		706,407	784,566	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KU H307		706,661	784,461	96.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KV H308		707,151	784,761	103.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KW H309		707,353	784,818	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KX H310		709,200	781,828	99.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KY H311		709,179	781,595	93.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
KZ H312		709,659	783,758	95.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LA H313		709,633	783,663	85.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LB H314		709,653	783,554	87.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LC H315		709,531	783,091	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LD H316		709,503	783,005	87.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LE H317		709,478	782,944	89.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LF H318		709,508	782,861	92.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LG H319		709,450	782,849	93.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LH H320		708,598	781,027	105.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LI H321		709,088	781,130	89.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LJ H322		709,157	781,278	85.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LK H323		708,833	781,031	96.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LL H324		708,900	781,062	94.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LM H325		709,704	783,834	98.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LN H326		709,694	782,393	84.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LO H327		709,723	782,432	83.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LP H328		709,807	782,438	80.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LQ H329		709,837	782,477	78.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LR H330		709,987	782,433	75.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LS H331		710,055	782,422	73.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LT H332		710,299	782,705	69.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LU H333		709,157	781,422	89.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LV H334		709,700	783,772	96.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LW H335		709,700	783,800	98.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LX H336		709,734	783,831	97.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LY H337		709,777	783,823	96.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
LZ H338		709,888	783,758	91.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MA H339		709,626	782,417	86.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MB H340		709,655	782,420	85.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MC H341		710,093	782,469	72.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MD H342		709,164	781,301	86.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (Zv1) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
ME H343		709,597	781,764	80.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MF H344		709,643	781,469	79.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MG H345		708,679	781,011	102.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MH H346		708,399	781,162	113.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MI H347		706,194	782,621	124.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MJ H348		707,491	781,202	157.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MK H349		709,000	781,085	92.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ML H350		709,665	783,563	87.0	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MM H351		708,461	781,151	111.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MN H352		708,290	782,083	124.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MO H353		705,858	782,712	125.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MP H354		706,252	785,486	90.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MQ H355		705,733	783,152	113.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MR H356		709,492	783,870	102.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MS H357		710,128	782,412	71.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MT H358		709,404	783,965	96.8	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MU H359		709,923	781,772	70.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MV H360		709,659	781,632	75.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MW H361		709,031	781,787	106.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MX H362		707,629	781,952	131.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MY H363		709,130	781,697	99.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
MZ H364		710,258	783,747	83.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NA H365		710,059	782,479	72.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NB H366		707,240	781,420	179.5	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NC H367		709,301	785,032	71.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
ND H368		708,915	781,135	92.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NE H369		709,539	783,850	102.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NF H370		708,323	781,177	117.4	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NG H371		708,949	781,069	93.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NH H372		708,942	781,142	92.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NI H373		708,972	781,153	91.6	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NJ SAINT PATRICK'S NATIONAL SCHOOL		708,565	781,951	118.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NK H374		708,783	782,534	110.9	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NL Main Office		707,855	784,710	95.7	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NM Small Hut		707,894	784,741	94.3	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NN Welfare Facilities		707,940	784,735	94.1	2.0	2.0	0.5	90.0	"Green house mode"	2.5
NO Shipping Office		707,925	784,734	94.2	2.0	2.0	0.5	90.0	"Green house mode"	2.5

Calculation Results

Shadow receptor

No. Name		Shadow, worst case			Shadow, expected values
		Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
A	H1	42:15	122	0:32	6:53
B	H2	38:59	115	0:36	6:33
C	H3	24:47	109	0:30	5:14
D	H4	20:27	71	0:35	4:21
E	H5	0:00	0	0:00	0:00
F	H6	0:00	0	0:00	0:00
G	H7	0:00	0	0:00	0:00
H	H8	4:49	27	0:17	1:09
I	H9	6:48	32	0:21	1:38
J	H10	14:33	63	0:19	3:07
K	H11	0:00	0	0:00	0:00
L	H12	16:39	80	0:20	3:37
M	H13	40:15	109	0:40	8:45
N	H14	59:23	149	0:48	12:22
O	H15	62:55	155	0:49	13:02
P	H16	63:02	162	0:49	13:02
Q	H17	53:20	161	0:38	10:23
R	H18	66:28	184	0:40	12:40
S	H19	26:43	85	0:34	4:37

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
	T H20	29:03	87	0:34	4:54
	U H21	26:57	85	0:32	4:33
	V H22	46:32	92	0:37	7:14
	W H23	52:12	114	0:38	8:10
	X H24	12:05	52	0:22	1:58
	Y H25	0:00	0	0:00	0:00
	Z H26	0:00	0	0:00	0:00
	AA H27	19:02	67	0:30	4:21
	AB H28	19:03	74	0:30	4:19
	AC H29	19:20	79	0:29	4:19
	AD H30	15:03	49	0:27	3:26
	AE H31	75:33	88	1:09	10:48
	AF H32	14:27	52	0:26	2:13
	AG H33	26:07	67	0:44	3:37
	AH H34	12:12	64	0:19	2:32
	AI H35	7:54	29	0:23	1:25
	AJ H36	4:31	25	0:17	1:05
	AK H37	7:06	30	0:21	1:05
	AL H38	0:00	0	0:00	0:00
	AM H39	0:00	0	0:00	0:00
	AN H40	0:00	0	0:00	0:00
	AO H41	0:00	0	0:00	0:00
	AP H42	0:00	0	0:00	0:00
	AQ H43	0:00	0	0:00	0:00
	AR H44	0:00	0	0:00	0:00
	AS H45	13:29	58	0:27	3:07
	AT H46	21:45	73	0:35	4:34
	AU H47	13:19	73	0:17	2:57
	AV H48	10:16	59	0:16	2:20
	AW H49	53:49	144	0:47	11:05
	AX H50	64:46	107	0:55	9:34
	AY H51	13:01	52	0:24	1:58
	AZ H52	20:20	64	0:25	2:48
	BA H53	8:55	36	0:19	1:07
	BB H54	10:22	34	0:26	1:44
	BC H55	64:51	90	1:13	8:53
	BD H56	59:03	88	1:11	8:04
	BE H57	9:26	32	0:24	1:42
	BF H58	6:18	26	0:21	1:08
	BG H59	4:30	23	0:19	0:48
	BH H60	5:37	25	0:21	1:02
	BI H61	4:57	23	0:20	0:57
	BJ H62	52:08	102	0:50	11:51
	BK H63	9:08	43	0:20	2:07
	BL H64	14:14	50	0:21	1:52
	BM H65	12:48	44	0:21	1:39
	BN H66	27:35	72	0:36	6:10
	BO H67	4:14	22	0:19	0:48
	BP H68	5:12	24	0:19	0:52
	BQ H69	54:07	80	0:58	7:49
	BR H70	59:55	104	0:54	8:49
	BS H71	100:25	129	1:10	15:29
	BT H72	33:23	96	0:35	5:36
	BU H73	33:16	98	0:33	5:31
	BV H74	0:00	0	0:00	0:00
	BW H75	0:00	0	0:00	0:00
	BX H76	0:00	0	0:00	0:00
	BY H77	12:42	46	0:26	1:57
	BZ H78	36:11	92	0:37	5:10
	CA H79	43:36	98	0:40	6:17
	CB H80	44:20	101	0:51	6:18
	CC H81	46:41	124	0:36	7:46
	CD H82	59:40	173	0:39	11:28

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
	CE H83	52:15	146	0:37	10:34
	CF H84	56:19	152	0:39	11:21
	CG H85	61:09	163	0:40	12:17
	CH H86	68:38	176	0:42	13:44
	CI H87	0:00	0	0:00	0:00
	CJ H88	0:00	0	0:00	0:00
	CK H89	0:00	0	0:00	0:00
	CL H90	0:00	0	0:00	0:00
	CM H91	0:00	0	0:00	0:00
	CN H92	0:00	0	0:00	0:00
	CO H93	0:00	0	0:00	0:00
	CP H94	0:00	0	0:00	0:00
	CQ H95	0:00	0	0:00	0:00
	CR H96	0:00	0	0:00	0:00
	CS H97	0:00	0	0:00	0:00
	CT H98	17:28	80	0:21	3:48
	CU H99	7:14	34	0:19	1:38
	CV H100	12:24	68	0:19	2:35
	CW H101	10:08	60	0:20	2:09
	CX H102	10:29	37	0:25	2:24
	CY H103	14:26	47	0:27	3:19
	CZ H104	20:42	58	0:30	4:44
	DA H105	3:38	28	0:11	0:42
	DB H106	0:00	0	0:00	0:00
	DC H107	0:00	0	0:00	0:00
	DD H108	49:39	125	0:38	10:33
	DE H109	43:04	123	0:38	9:06
	DF H110	68:31	152	0:43	14:04
	DG H111	23:40	98	0:26	4:46
	DH H112	96:31	245	0:48	18:37
	DI H113	73:24	192	0:44	14:17
	DJ H114	64:40	180	0:41	12:40
	DK H115	123:41	274	0:52	23:40
	DL H116	46:33	125	0:34	7:40
	DM H117	33:15	95	0:36	5:37
	DN H118	7:42	32	0:23	1:11
	DO H119	0:00	0	0:00	0:00
	DP H120	10:03	40	0:24	2:24
	DQ H121	12:43	55	0:19	2:42
	DR H122	0:00	0	0:00	0:00
	DS H123	16:15	80	0:19	3:32
	DT H124	0:00	0	0:00	0:00
	DU H125	0:00	0	0:00	0:00
	DV H126	8:20	38	0:22	1:17
	DW H127	74:29	187	0:38	13:41
	DX H128	18:51	54	0:25	2:42
	DY H129	0:00	0	0:00	0:00
	DZ H130	0:00	0	0:00	0:00
	EA H131	0:00	0	0:00	0:00
	EB H132	0:00	0	0:00	0:00
	EC H133	0:00	0	0:00	0:00
	ED H134	0:00	0	0:00	0:00
	EE H135	0:00	0	0:00	0:00
	EF H136	0:00	0	0:00	0:00
	EG H137	0:00	0	0:00	0:00
	EH H138	22:09	91	0:31	5:10
	EI H139	0:00	0	0:00	0:00
	EJ H140	0:00	0	0:00	0:00
	EK H141	0:00	0	0:00	0:00
	EL H142	1:23	20	0:06	0:19
	EM H143	19:34	99	0:25	4:16
	EN H144	114:08	225	0:47	21:11
	EO H145	53:57	130	0:37	8:40

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Shadow, worst case		Shadow, expected values	
		Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
EP	H146	63:16	142	0:42	10:19
EQ	H147	0:00	0	0:00	0:00
ER	H148	0:00	0	0:00	0:00
ES	H149	0:00	0	0:00	0:00
ET	H150	15:56	68	0:22	2:29
EU	H151	45:08	123	0:37	7:34
EV	H152	29:18	72	0:28	4:26
EW	H153	0:00	0	0:00	0:00
EX	H154	0:00	0	0:00	0:00
EY	H155	4:08	22	0:18	0:45
EZ	H156	26:17	87	0:29	3:45
FA	H157	21:24	83	0:28	3:05
FB	H158	52:48	103	1:03	7:20
FC	H159	0:00	0	0:00	0:00
FD	H160	0:00	0	0:00	0:00
FE	H161	0:00	0	0:00	0:00
FF	H162	0:00	0	0:00	0:00
FG	H163	29:28	95	0:31	4:15
FH	H164	0:00	0	0:00	0:00
FI	H165	0:00	0	0:00	0:00
FJ	H166	86:13	196	0:41	15:53
FK	H167	44:16	121	0:39	7:33
FL	H168	33:04	94	0:29	5:16
FM	H169	74:21	72	1:16	10:24
FN	H170	44:23	94	0:35	6:57
FO	H171	10:10	38	0:20	1:24
FP	H172	7:23	32	0:18	1:00
FQ	H173	5:16	26	0:15	0:42
FR	H174	1:57	16	0:09	0:15
FS	H175	25:45	109	0:26	4:59
FT	H176	79:09	182	0:38	14:18
FU	H177	84:50	187	0:40	15:17
FV	H178	85:38	183	0:41	15:22
FW	H179	82:29	161	0:46	14:34
FX	H180	38:31	111	0:38	6:36
FY	H181	33:30	92	0:37	5:43
FZ	H182	54:36	123	0:37	8:40
GA	H183	56:34	122	0:39	8:57
GB	H184	57:01	122	0:39	9:00
GC	H185	8:11	36	0:21	1:22
GD	H186	56:39	96	0:46	8:19
GE	H187	102:58	90	1:23	14:52
GF	H188	50:52	84	0:49	7:27
GG	H189	37:45	96	0:35	5:35
GH	H190	8:33	38	0:20	1:26
GI	H191	16:41	50	0:24	2:21
GJ	H192	15:39	48	0:24	2:12
GK	H193	10:07	38	0:20	1:23
GL	H194	8:13	34	0:18	1:07
GM	H195	4:39	23	0:19	0:50
GN	H196	6:04	26	0:21	1:06
GO	H197	5:43	25	0:20	1:01
GP	H198	5:32	26	0:19	0:55
GQ	H199	12:52	62	0:21	1:49
GR	H200	8:41	33	0:24	1:23
GS	H201	0:00	0	0:00	0:00
GT	H202	0:00	0	0:00	0:00
GU	H203	0:00	0	0:00	0:00
GV	H204	0:00	0	0:00	0:00
GW	H205	0:00	0	0:00	0:00
GX	H206	0:00	0	0:00	0:00
GY	H207	0:00	0	0:00	0:00
GZ	H208	0:00	0	0:00	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
HA	H209	0:00	0	0:00	0:00
HB	H210	0:00	0	0:00	0:00
HC	H211	0:00	0	0:00	0:00
HD	H212	0:00	0	0:00	0:00
HE	H213	0:00	0	0:00	0:00
HF	H214	0:00	0	0:00	0:00
HG	H215	0:00	0	0:00	0:00
HH	H216	0:00	0	0:00	0:00
HI	H217	0:00	0	0:00	0:00
HJ	H218	0:00	0	0:00	0:00
HK	H219	0:00	0	0:00	0:00
HL	H220	0:00	0	0:00	0:00
HM	H221	0:00	0	0:00	0:00
HN	H222	0:00	0	0:00	0:00
HO	H223	0:00	0	0:00	0:00
HP	H224	0:00	0	0:00	0:00
HQ	H225	0:00	0	0:00	0:00
HR	H226	21:46	61	0:31	4:40
HS	H227	22:01	99	0:33	4:39
HT	H228	14:03	76	0:19	3:03
HU	H229	9:31	37	0:24	2:18
HV	H230	7:55	30	0:23	1:48
HW	H231	8:47	31	0:24	1:35
HX	H232	11:00	34	0:26	1:59
HY	H233	47:41	95	0:48	7:44
HZ	H234	34:24	83	0:37	4:58
IA	H235	47:43	92	0:55	6:43
IB	H236	47:54	94	0:54	6:45
IC	H237	0:00	0	0:00	0:00
ID	H238	48:36	75	0:52	9:57
IE	H239	40:15	81	0:35	8:26
IF	H240	0:00	0	0:00	0:00
IG	H241	0:00	0	0:00	0:00
IH	H242	49:11	141	0:36	9:58
II	H243	75:46	151	0:42	16:07
IJ	H244	29:53	105	0:32	6:35
IK	H245	33:16	113	0:32	7:17
IL	H246	5:03	24	0:19	0:50
IM	H247	5:31	28	0:18	1:20
IN	H248	5:20	24	0:20	1:00
IO	H249	5:32	25	0:21	1:01
IP	H250	4:59	24	0:19	0:54
IQ	H251	5:19	25	0:20	0:58
IR	H252	6:26	26	0:21	1:04
IS	H253	5:44	26	0:20	0:57
IT	H254	6:48	28	0:21	1:08
IU	H255	8:08	36	0:20	1:15
IV	H256	9:58	52	0:20	1:27
IW	H257	9:41	42	0:21	1:29
IX	H258	0:00	0	0:00	0:00
IY	H259	0:00	0	0:00	0:00
IZ	H260	0:00	0	0:00	0:00
JA	H261	0:00	0	0:00	0:00
JB	H262	0:00	0	0:00	0:00
JC	H263	0:00	0	0:00	0:00
JD	H264	0:00	0	0:00	0:00
JE	H265	0:00	0	0:00	0:00
JF	H266	0:00	0	0:00	0:00
JG	H267	0:00	0	0:00	0:00
JH	H268	0:00	0	0:00	0:00
JI	H269	0:00	0	0:00	0:00
JJ	H270	0:00	0	0:00	0:00
JK	H271	0:00	0	0:00	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
	JL H272	0:00	0	0:00	0:00
	JM H273	0:00	0	0:00	0:00
	JN H274	0:00	0	0:00	0:00
	JO H275	0:00	0	0:00	0:00
	JP H276	0:00	0	0:00	0:00
	JQ H277	0:00	0	0:00	0:00
	JR H278	0:00	0	0:00	0:00
	JS H279	0:00	0	0:00	0:00
	JT H280	0:00	0	0:00	0:00
	JU H281	0:00	0	0:00	0:00
	JV H282	0:00	0	0:00	0:00
	JW H283	0:00	0	0:00	0:00
	JX H284	0:00	0	0:00	0:00
	JY H285	0:00	0	0:00	0:00
	JZ H286	0:00	0	0:00	0:00
	KA H287	0:00	0	0:00	0:00
	KB H288	0:00	0	0:00	0:00
	KC H289	0:00	0	0:00	0:00
	KD H290	0:00	0	0:00	0:00
	KE H291	0:00	0	0:00	0:00
	KF H292	28:15	106	0:34	6:33
	KG H293	10:55	74	0:24	2:29
	KH H294	20:42	99	0:21	4:31
	KI H295	18:45	90	0:19	4:05
	KJ H296	5:45	33	0:17	1:20
	KK H297	7:15	35	0:20	1:42
	KL H298	7:40	35	0:20	1:49
	KM H299	8:07	33	0:23	1:55
	KN H300	7:51	32	0:23	1:50
	KO H301	9:03	32	0:25	2:07
	KP H302	8:58	33	0:24	2:03
	KQ H303	7:59	29	0:24	1:29
	KR H304	10:01	33	0:25	1:49
	KS H305	11:23	37	0:27	1:53
	KT H306	21:38	56	0:35	3:30
	KU H307	43:03	92	0:46	7:02
	KV H308	48:45	85	1:06	6:40
	KW H309	32:48	81	0:36	4:44
	KX H310	0:00	0	0:00	0:00
	KY H311	0:00	0	0:00	0:00
	KZ H312	45:14	138	0:35	9:07
	LA H313	55:58	149	0:44	11:26
	LB H314	62:04	168	0:51	12:49
	LC H315	74:45	159	0:42	16:09
	LD H316	71:42	148	0:42	15:04
	LE H317	56:13	141	0:39	11:39
	LF H318	37:47	132	0:30	7:58
	LG H319	32:04	120	0:32	6:58
	LH H320	0:00	0	0:00	0:00
	LI H321	0:00	0	0:00	0:00
	LJ H322	0:00	0	0:00	0:00
	LK H323	0:00	0	0:00	0:00
	LL H324	0:00	0	0:00	0:00
	LM H325	38:19	130	0:33	7:35
	LN H326	12:29	41	0:26	2:52
	LO H327	11:33	38	0:26	2:38
	LP H328	10:02	36	0:24	2:16
	LQ H329	9:23	35	0:24	2:06
	LR H330	7:33	38	0:21	1:41
	LS H331	8:56	55	0:21	1:56
	LT H332	13:07	60	0:21	2:57
	LU H333	0:00	0	0:00	0:00
	LV H334	40:39	133	0:34	8:10

To be continued on next page...

SHADOW - Main Result

Calculation: Kellystown SG155 Worst Case

...continued from previous page

No.	Name	Shadow, worst case			Shadow, expected values
		Shadow hours	Shadow days	Max shadow	Shadow hours
		per year [h/year]	per year [days/year]	hours per day [h/day]	per year [h/year]
LW	H335	39:14	130	0:33	7:50
LX	H336	36:20	128	0:32	7:12
LY	H337	33:49	121	0:31	6:43
LZ	H338	28:54	109	0:28	5:50
MA	H339	17:39	77	0:27	3:56
MB	H340	18:21	80	0:27	4:02
MC	H341	14:43	72	0:20	3:03
MD	H342	0:00	0	0:00	0:00
ME	H343	0:00	0	0:00	0:00
MF	H344	0:00	0	0:00	0:00
MG	H345	0:00	0	0:00	0:00
MH	H346	0:00	0	0:00	0:00
MI	H347	0:00	0	0:00	0:00
MJ	H348	0:00	0	0:00	0:00
MK	H349	0:00	0	0:00	0:00
ML	H350	57:33	155	0:49	11:54
MM	H351	0:00	0	0:00	0:00
MN	H352	0:00	0	0:00	0:00
MO	H353	0:00	0	0:00	0:00
MP	H354	6:39	30	0:17	0:49
MQ	H355	6:41	35	0:18	1:34
MR	H356	59:52	170	0:40	11:43
MS	H357	11:18	63	0:20	2:22
MT	H358	76:01	197	0:42	14:25
MU	H359	12:25	51	0:21	2:26
MV	H360	0:00	0	0:00	0:00
MW	H361	0:00	0	0:00	0:00
MX	H362	0:00	0	0:00	0:00
MY	H363	0:00	0	0:00	0:00
MZ	H364	10:45	52	0:21	2:15
NA	H365	14:02	70	0:21	2:56
NB	H366	0:00	0	0:00	0:00
NC	H367	36:29	97	0:31	5:49
ND	H368	0:00	0	0:00	0:00
NE	H369	53:42	159	0:39	10:35
NF	H370	0:00	0	0:00	0:00
NG	H371	0:00	0	0:00	0:00
NH	H372	0:00	0	0:00	0:00
NI	H373	0:00	0	0:00	0:00
NJ	SAINT PATRICK'S NATIONAL SCHOOL	0:00	0	0:00	0:00
NK	H374	47:02	65	0:57	9:27
NL	Main Office	113:59	116	1:29	17:31
NM	Small Hut	122:19	108	1:29	18:23
NN	Welfare Facilities	125:22	106	1:31	18:46
NO	Shipping Office	125:27	108	1:32	18:50

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	T01	544:09	91:01
2	T02	754:40	127:30
3	T03	248:22	45:45
4	T04	394:19	74:06
5	T05	327:21	66:02

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

The calculation of the total expected values for a given receptor assumes a weighted average directional reduction for all WTGs contributing to shadow flicker within the same day. In the case where shadow flicker from different WTGs is not concurrent within the day, the total expected time at a given receptor may deviate marginally from the individual flicker time caused by each turbine separately.

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: A - H1

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:03 (4)	08:14	16:31 (3)	07:16	17:09 (2)	07:01	05:52	05:03		
	16:15	27	15:30 (4)	17:06	3	16:34 (3)	18:02	25	17:34 (2)	20:00	21:45
2	08:44	15:04 (4)	08:12	16:30 (3)	07:14	17:08 (2)	06:59		05:50	05:02	
	16:16	27	15:31 (4)	17:08	7	16:37 (3)	18:04	28	17:36 (2)	20:02	21:46
3	08:44	15:04 (4)	08:10	16:30 (3)	07:12	17:08 (2)	06:56		05:48	05:01	
	16:17	26	15:30 (4)	17:10	9	16:39 (3)	18:06	30	17:38 (2)	20:04	21:48
4	08:43	15:05 (4)	08:08	16:29 (3)	07:09	17:08 (2)	06:54		05:46	05:00	
	16:18	26	15:31 (4)	17:12	12	16:41 (3)	18:07	32	17:40 (2)	20:06	21:49
5	08:43	15:05 (4)	08:07	16:29 (3)	07:07	17:07 (2)	06:51		05:44	04:59	
	16:19	26	15:31 (4)	17:14	14	16:43 (3)	18:09	32	17:39 (2)	20:07	21:50
6	08:43	15:06 (4)	08:05	16:30 (3)	07:04	17:07 (2)	06:49		05:42	04:58	
	16:21	26	15:32 (4)	17:16	15	16:45 (3)	18:11	32	17:39 (2)	20:09	21:51
7	08:42	15:06 (4)	08:03	16:30 (3)	07:02	17:07 (2)	06:47		05:40	04:58	
	16:22	25	15:31 (4)	17:18	17	16:47 (3)	18:13	31	17:38 (2)	20:11	21:52
8	08:42	15:07 (4)	08:01	16:30 (3)	07:00	17:07 (2)	06:44		05:38	04:57	
	16:24	24	15:31 (4)	17:20	20	16:50 (3)	18:15	31	17:38 (2)	20:13	21:53
9	08:41	15:09 (4)	07:59	16:31 (3)	06:57	17:07 (2)	06:42		05:36	04:57	
	16:25	23	15:32 (4)	17:22	19	16:50 (3)	18:17	29	17:36 (2)	20:15	21:54
10	08:40	15:09 (4)	07:57	16:32 (3)	06:55	17:08 (2)	06:39		05:34	04:56	
	16:26	23	15:32 (4)	17:24	17	16:49 (3)	18:19	28	17:36 (2)	20:17	21:55
11	08:40	15:10 (4)	07:55	16:33 (3)	06:52	17:10 (2)	06:37		05:33	04:56	
	16:28	21	15:31 (4)	17:26	15	16:48 (3)	18:21	25	17:35 (2)	20:19	21:55
12	08:39	15:11 (4)	07:53	16:35 (3)	06:50	17:10 (2)	06:35		05:31	04:55	
	16:30	20	15:31 (4)	17:28	12	16:47 (3)	18:23	23	17:33 (2)	20:20	21:56
13	08:38	15:12 (4)	07:51	16:37 (3)	06:48	17:12 (2)	06:32		05:29	04:55	
	16:31	19	15:31 (4)	17:30	6	16:43 (3)	18:25	19	17:31 (2)	20:22	21:57
14	08:37	15:14 (4)	07:49	16:45 (3)	06:45	17:14 (2)	06:30		05:27	04:55	
	16:33	16	15:30 (4)	17:32		18:27	14	17:28 (2)	20:24	21:58	
15	08:36	15:16 (4)	07:47	16:43 (3)	06:43		06:28		05:25	04:54	
	16:34	14	15:30 (4)	17:34	18:28		20:26		21:20	21:58	
16	08:35	15:17 (4)	07:45	16:40	06:40		06:25		05:24	04:54	
	16:36	10	15:27 (4)	17:36	18:30		20:28		21:22	21:59	
17	08:34	15:21 (4)	07:43	16:38	06:38		06:23		05:22	04:54	
	16:38	4	15:25 (4)	17:38	18:32		20:30		21:23	21:59	
18	08:33		07:41	16:35	06:35		06:21		05:21	04:54	
	16:40		17:40	18:34			20:31		21:25	22:00	
19	08:32		07:39	16:33	06:33		06:18		05:19	04:54	
	16:41		17:42	18:36			20:33		21:27	22:00	
20	08:31		07:36	16:31	06:31		06:16		05:18	04:54	
	16:43		17:44	18:38			20:35		21:28	22:00	
21	08:30		07:34	16:28	06:28		06:14		05:16	04:54	
	16:45		17:46	18:40			20:37		21:30	22:01	
22	08:29		07:32	16:26	06:26		06:12		05:15	04:55	
	16:47		17:48	18:42			20:39		21:31	22:01	
23	08:27		07:30	17:19 (2)	06:23		06:09		05:13	04:55	
	16:49		17:50	3	17:22 (2)	18:43		20:41	21:33	22:01	
24	08:26		07:28	17:16 (2)	06:21		06:07		05:12	04:55	
	16:50		17:52	8	17:24 (2)	18:45		20:43	21:34	22:01	
25	08:24		07:25	17:14 (2)	06:18		06:05		05:11	04:55	
	16:52		17:54	12	17:26 (2)	18:47		20:44	21:36	22:01	
26	08:23		07:23	17:12 (2)	06:16		06:03		05:09	04:56	
	16:54		17:56	16	17:28 (2)	18:49		20:46	21:37	22:01	
27	08:22		07:21	17:11 (2)	06:13		06:00		05:08	04:56	
	16:56		17:58	20	17:31 (2)	18:51		20:48	21:39	22:01	
28	08:20		07:18	17:10 (2)	06:11		05:58		05:07	04:57	
	16:58		18:00	22	17:32 (2)	18:53		20:50	21:40	22:01	
29	08:19				07:08		05:56		05:06	04:57	
	17:00				19:54		20:52		21:41	22:01	
30	08:17				07:06		05:54		05:05	04:58	
	17:02				19:56		20:54		21:43	22:00	
31	08:15	16:30 (3)			07:04				05:04		
	17:04	1	16:31 (3)		19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case	358		247		379						
Sun reduction	0.24		0.23		0.27						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.65		0.66		0.68						
Total reduction	0.16		0.15		0.18						
Total, real	57		38		70						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: A - H1

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September		October		November		December
1	04:59	05:39	06:33		07:26	17:50 (2)	07:24	16:01 (3)	08:19
	22:00	21:25	20:18		19:05	21 18:11 (2)	16:54	18 16:19 (3)	16:10
2	04:59	05:40	06:35		07:28	17:48 (2)	07:26	16:01 (3)	08:21
	22:00	21:23	20:16		19:02	24 18:12 (2)	16:52	19 16:20 (3)	16:09
3	05:00	05:42	06:36		07:30	17:47 (2)	07:28	16:00 (3)	08:22
	21:59	21:21	20:13		19:00	26 18:13 (2)	16:50	19 16:19 (3)	16:08
4	05:01	05:44	06:38		07:31	17:46 (2)	07:30	15:59 (3)	08:24
	21:59	21:19	20:11		18:57	28 18:14 (2)	16:48	18 16:17 (3)	16:08
5	05:02	05:45	06:40		07:33	17:45 (2)	07:32	15:59 (3)	08:25
	21:58	21:17	20:09		18:55	29 18:14 (2)	16:46	16 16:15 (3)	16:07
6	05:03	05:47	06:42		07:35	17:44 (2)	07:34	15:59 (3)	08:26
	21:58	21:15	20:06		18:52	31 18:15 (2)	16:44	13 16:12 (3)	16:07
7	05:04	05:49	06:43		07:37	17:42 (2)	07:36	15:59 (3)	08:28
	21:57	21:14	20:04		18:50	32 18:14 (2)	16:43	11 16:10 (3)	16:06
8	05:05	05:50	06:45		07:39	17:42 (2)	07:38	16:00 (3)	08:29
	21:56	21:12	20:01		18:48	32 18:14 (2)	16:41	8 16:08 (3)	16:06
9	05:06	05:52	06:47		07:41	17:42 (2)	07:40	16:01 (3)	08:30
	21:55	21:10	19:59		18:45	32 18:14 (2)	16:39	6 16:07 (3)	16:05
10	05:07	05:54	06:49		07:42	17:42 (2)	07:42	16:02 (3)	08:31
	21:55	21:08	19:56		18:43	31 18:13 (2)	16:37	3 16:05 (3)	16:05
11	05:08	05:56	06:50		07:44	17:42 (2)	07:44	16:02 (3)	08:33
	21:54	21:05	19:54		18:40	29 18:11 (2)	16:35	1 16:03 (3)	16:05
12	05:09	05:57	06:52		07:46	17:42 (2)	07:45		08:34
	21:53	21:03	19:51		18:38	27 18:09 (2)	16:34		16:05
13	05:10	05:59	06:54		07:48	17:42 (2)	07:47		08:35
	21:52	21:01	19:49		18:36	25 18:07 (2)	16:32		16:04
14	05:12	06:01	06:56		07:50	17:43 (2)	07:49		08:36
	21:51	20:59	19:47		18:33	21 18:04 (2)	16:31		16:04
15	05:13	06:03	06:58		07:52	17:44 (2)	07:51		08:37
	21:50	20:57	19:44		18:31	18 18:02 (2)	16:29		16:04
16	05:14	06:04	06:59		07:54	17:45 (2)	07:53		08:38
	21:49	20:55	19:42		18:29	14 17:59 (2)	16:27		16:05
17	05:16	06:06	07:01		07:55	17:46 (2)	07:55		08:38
	21:47	20:53	19:39		18:26	11 17:57 (2)	16:26		16:05
18	05:17	06:08	07:03		07:57	17:48 (2)	07:57		08:39
	21:46	20:51	19:37		18:24	7 17:55 (2)	16:24		16:05
19	05:18	06:10	07:05		07:59		07:59		08:40
	21:45	20:48	19:34		18:22		16:23		16:05
20	05:20	06:12	07:06		08:01		08:00		08:41
	21:44	20:46	19:32		18:20		16:22		16:06
21	05:21	06:13	07:08		08:03		08:02		08:41
	21:42	20:44	19:29		18:17		16:20		16:06
22	05:23	06:15	07:10		08:05		08:04		08:42
	21:41	20:42	19:27		18:15		16:19		16:06
23	05:24	06:17	07:12		08:07		08:06		08:42
	21:39	20:39	19:24		18:13		16:18		16:07
24	05:26	06:19	07:13		08:09		08:08		08:43
	21:38	20:37	19:22		18:11		16:17		16:08
25	05:27	06:20	07:15		07:11		08:09	14:59 (4)	08:43
	21:36	20:35	19:19		17:09		16:16	4 15:03 (4)	16:08
26	05:29	06:22	07:17		07:13		08:11	14:56 (4)	08:43
	21:35	20:32	19:17		17:06		16:14	10 15:06 (4)	16:09
27	05:30	06:24	07:19		07:15		08:13	14:55 (4)	08:44
	21:33	20:30	19:14		17:04		16:13	14 15:09 (4)	16:10
28	05:32	06:26	07:21		07:16		08:14	14:54 (4)	08:44
	21:32	20:28	19:12		17:02		16:12	16 15:10 (4)	16:10
29	05:34	06:27	07:22	17:57 (2)	07:18	16:06 (3)	08:16	14:53 (4)	08:44
	21:30	20:25	19:09	10 18:07 (2)	17:00	8 16:14 (3)	16:11	18 15:11 (4)	16:11
30	05:35	06:29	07:24	17:52 (2)	07:20	16:03 (3)	08:18	14:52 (4)	08:44
	21:28	20:23	19:07	17 18:09 (2)	16:58	13 16:16 (3)	16:11	20 15:12 (4)	16:12
31	05:37	06:31			07:22	16:02 (3)			08:44
	21:27	20:21			16:56	15 16:17 (3)			16:13
Potential sun hours	512	460	382		328		259		233
Total, worst case			27		474		214		836
Sun reduction			0.32		0.29		0.27		0.21
Oper. time red.			1.00		1.00		1.00		1.00
Wind dir. red.			0.68		0.68		0.65		0.65
Total reduction			0.22		0.20		0.17		0.13
Total, real			6		94		37		113

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: B - H2

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	14:46 (4)	08:14	16:18 (3)	07:16	16:56 (2)	07:01	05:52	05:03		
	16:15	20	15:06 (4)	17:06	16:34 (3)	18:02	35	17:31 (2)	20:00	20:55	21:45
2	08:44	14:48 (4)	08:12	16:18 (3)	07:14	16:55 (2)	06:59	05:50	05:02		
	16:16	18	15:06 (4)	17:08	16:37 (3)	18:04	36	17:31 (2)	20:02	20:57	21:46
3	08:44	14:48 (4)	08:10	16:19 (3)	07:12	16:55 (2)	06:56	05:48	05:01		
	16:17	18	15:06 (4)	17:10	16:39 (3)	18:06	36	17:31 (2)	20:04	20:59	21:48
4	08:43	14:50 (4)	08:08	16:19 (3)	07:09	16:55 (2)	06:54	05:46	05:00		
	16:18	16	15:06 (4)	17:12	16:41 (3)	18:07	36	17:31 (2)	20:06	21:01	21:49
5	08:43	14:50 (4)	08:07	16:19 (3)	07:07	16:55 (2)	06:51	05:44	04:59		
	16:19	15	15:05 (4)	17:14	16:40 (3)	18:09	35	17:30 (2)	20:07	21:03	21:50
6	08:43	14:53 (4)	08:05	16:20 (3)	07:04	16:56 (2)	06:49	05:42	04:58		
	16:21	12	15:05 (4)	17:16	16:40 (3)	18:11	34	17:30 (2)	20:09	21:04	21:51
7	08:42	14:54 (4)	08:03	16:21 (3)	07:02	16:55 (2)	06:47	05:40	04:58		
	16:22	10	15:04 (4)	17:18	16:39 (3)	18:13	33	17:28 (2)	20:11	21:06	21:52
8	08:42	14:57 (4)	08:01	16:23 (3)	07:00	16:57 (2)	06:44	05:38	04:57		
	16:24	4	15:01 (4)	17:20	16:38 (3)	18:15	31	17:28 (2)	20:13	21:08	21:53
9	08:41		07:59	16:25 (3)	06:57	16:57 (2)	06:42	05:36	04:57		
	16:25		17:22	16:36 (3)	18:17	17:26 (2)	20:15	21:10	21:54		
10	08:40		07:57	16:29 (3)	06:55	16:58 (2)	06:39	05:34	04:56		
	16:26		17:24	4	16:33 (3)	18:19	27	17:25 (2)	20:17	21:11	21:55
11	08:40		07:55		06:53	17:00 (2)	06:37	05:33	04:56		
	16:28		17:26		18:21	17:23 (2)	20:19	21:13	21:55		
12	08:39		07:53		06:50	17:02 (2)	06:35	05:31	04:55		
	16:30		17:28		18:23	17:21 (2)	20:20	21:15	21:56		
13	08:38		07:51		06:48	17:05 (2)	06:32	05:29	04:55		
	16:31		17:30		18:25	17:18 (2)	20:22	21:17	21:57		
14	08:37		07:49		06:45		06:30	05:27	04:55		
	16:33		17:32		18:27		20:24	21:18	21:58		
15	08:36		07:47		06:43		06:28	05:26	04:54		
	16:34		17:34		18:28		20:26	21:20	21:58		
16	08:35		07:45		06:40		06:25	05:24	04:54		
	16:36		17:36		18:30		20:28	21:22	21:59		
17	08:34		07:43		06:38		06:23	05:22	04:54		
	16:38		17:38		18:32		20:30	21:23	21:59		
18	08:33		07:41		06:35		06:21	05:21	04:54		
	16:40		17:40		18:34		20:31	21:25	22:00		
19	08:32		07:39	17:08 (2)	06:33		06:18	05:19	04:54		
	16:41		17:42	5	17:13 (2)	18:36	20:33	21:27	22:00		
20	08:31		07:36	17:05 (2)	06:31		06:16	05:18	04:54		
	16:43		17:44	11	17:16 (2)	18:38	20:35	21:28	22:00		
21	08:30		07:34	17:03 (2)	06:28		06:14	05:16	04:54		
	16:45		17:46	15	17:18 (2)	18:40	20:37	21:30	22:01		
22	08:29		07:32	17:01 (2)	06:26		06:12	05:15	04:55		
	16:47		17:48	18	17:19 (2)	18:42	20:39	21:31	22:01		
23	08:27		07:30	17:00 (2)	06:23		06:09	05:13	04:55		
	16:49		17:50	22	17:22 (2)	18:43	20:41	21:33	22:01		
24	08:26		07:28	16:59 (2)	06:21		06:07	05:12	04:55		
	16:50		17:52	25	17:24 (2)	18:45	20:43	21:34	22:01		
25	08:24		07:25	16:58 (2)	06:18		06:05	05:11	04:55		
	16:52		17:54	28	17:26 (2)	18:47	20:44	21:36	22:01		
26	08:23	16:19 (3)	07:23	16:57 (2)	06:16		06:03	05:09	04:56		
	16:54	2	16:21 (3)	17:56	31	17:28 (2)	18:49	20:46	21:37	22:01	
27	08:22	16:18 (3)	07:21	16:57 (2)	06:13		06:00	05:08	04:56		
	16:56	5	16:23 (3)	17:58	34	17:31 (2)	18:51	20:48	21:39	22:01	
28	08:20	16:18 (3)	07:18	16:56 (2)	06:11		05:58	05:07	04:57		
	16:58	8	16:26 (3)	18:00	35	17:31 (2)	18:53	20:50	21:40	22:01	
29	08:19	16:18 (3)			07:08		05:56	05:06	04:57		
	17:00	10	16:28 (3)		19:54		20:52	21:41	22:01		
30	08:17	16:18 (3)			07:06		05:54	05:05	04:58		
	17:02	11	16:29 (3)		19:56		20:54	21:43	22:00		
31	08:15	16:17 (3)			07:04			05:04			
	17:04	14	16:31 (3)		19:58			21:44			
Potential sun hours	250		273		367		420	494	510		
Total, worst case	163		390		387						
Sun reduction	0.24		0.23		0.27						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.65		0.67		0.67						
Total reduction	0.16		0.16		0.18						
Total, real	26		61		71						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: B - H2

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:42 (2) 17:58 (2)	07:24 16:54	15:57 (3) 16:03 (3)	08:19 16:10	
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:39 (2) 18:01 (2)	07:26 16:52	15:54 (3) 16:06 (3)	08:21 16:09	
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:37 (2) 18:02 (2)	07:28 16:50	15:52 (3) 16:08 (3)	08:22 16:08	
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:35 (2) 18:03 (2)	07:30 16:48	15:51 (3) 16:09 (3)	08:24 16:08	14:42 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:34 (2) 18:04 (2)	07:32 16:46	15:50 (3) 16:10 (3)	08:25 16:07	14:39 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:33 (2) 18:05 (2)	07:34 16:44	15:49 (3) 16:10 (3)	08:26 16:07	14:39 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:31 (2) 18:04 (2)	07:36 16:43	15:49 (3) 16:10 (3)	08:28 16:06	14:38 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:30 (2) 18:05 (2)	07:38 16:41	15:48 (3) 16:08 (3)	08:29 16:06	14:37 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:30 (2) 18:05 (2)	07:40 16:39	15:49 (3) 16:07 (3)	08:30 16:05	14:37 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:29 (2) 18:05 (2)	07:42 16:37	15:49 (3) 16:05 (3)	08:31 16:05	14:37 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:29 (2) 18:05 (2)	07:44 16:35	15:49 (3) 16:03 (3)	08:33 16:05	14:36 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:29 (2) 18:05 (2)	07:45 16:34	15:49 (3) 16:01 (3)	08:34 16:05	14:36 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:29 (2) 18:04 (2)	07:47 16:32	15:50 (3) 15:59 (3)	08:35 16:05	14:36 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:29 (2) 18:04 (2)	07:49 16:31	15:50 (3) 15:57 (3)	08:36 16:04	14:36 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:29 (2) 18:02 (2)	07:51 16:29	15:51 (3) 15:56 (3)	08:37 16:04	14:37 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:29 (2) 17:59 (2)	07:53 16:27	15:52 (3) 15:54 (3)	08:38 16:05	14:37 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:30 (2) 17:57 (2)	07:55 16:26	15:54 (3) 16:05	16:05 16:05	14:38 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:31 (2) 17:55 (2)	07:57 16:24	16:05 16:05	16:05 16:05	14:38 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:32 (2) 17:52 (2)	07:59 16:23	16:05 16:05	16:05 16:05	14:39 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:33 (2) 17:50 (2)	08:00 16:22	16:05 16:05	16:05 16:05	14:39 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:34 (2) 17:48 (2)	08:02 16:20	16:05 16:05	16:05 16:05	14:39 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:36 (2) 17:45 (2)	08:04 16:19	16:05 16:05	16:05 16:05	14:39 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:40 (2) 17:43 (2)	08:06 16:18	16:05 16:07	16:05 16:07	14:40 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:43 (2) 17:43 (2)	08:08 16:17	16:07 16:08	16:07 16:08	15:04 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	17:43 (2) 17:09	16:18 16:16	16:07 16:08	16:07 16:08	15:04 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	17:13 17:06	08:11 16:14	16:08 16:09	16:08 16:09	15:04 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	17:15 17:04	08:13 16:13	16:09 16:10	16:09 16:10	15:04 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	17:16 17:02	08:14 16:12	16:10 16:10	16:10 16:10	15:04 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	17:18 17:00	08:16 16:12	16:10 16:11	16:10 16:11	15:04 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:46 (2) 17:55 (2)	07:20 16:58	08:18 16:11	16:11 16:12	16:11 16:12	15:04 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56			08:44 16:13	08:44 16:13	14:45 (4)
Potential sun hours	512	460	382	328	259		233	562	
Total, worst case			9	611	217				
Sun reduction			0.32	0.29	0.27			0.21	
Oper. time red.			1.00	1.00	1.00			1.00	
Wind dir. red.			0.67	0.67	0.66			0.65	
Total reduction			0.22	0.20	0.17			0.13	
Total, real			2	121	38			75	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: C - H3

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		07:39 (5)	05:52		06:18 (4)	05:03		05:33 (3)
	16:15	17:06	18:02						20:00	21	08:00 (5)	20:55	13	06:31 (4)	21:45	5	05:38 (3)
2	08:44	08:12	07:14						06:59		07:42 (5)	05:50		06:16 (4)	05:02		05:33 (3)
	16:16	17:08	18:04						20:02	15	07:57 (5)	20:57	14	06:30 (4)	21:47	6	05:39 (3)
3	08:44	08:10	07:12						06:56		07:45 (5)	05:48		06:14 (4)	05:01		05:32 (3)
	16:17	17:10	18:06						20:04	8	07:53 (5)	20:59	15	06:29 (4)	21:48	7	05:39 (3)
4	08:43	08:09	07:09						06:54			05:46		06:16 (4)	05:00		05:31 (3)
	16:18	17:12	18:08						20:06			21:01	10	06:26 (4)	21:49	8	05:39 (3)
5	08:43	08:07	07:07						06:52			05:44		06:19 (4)	04:59		05:31 (3)
	16:20	17:14	18:10						20:08			21:03	4	06:23 (4)	21:50	10	05:41 (3)
6	08:43	08:05	07:05						06:49			05:42			04:59		05:30 (3)
	16:21	17:16	18:11						20:09			21:04			21:51	10	05:40 (3)
7	08:42	08:03	07:02						06:47			05:40			04:58		05:30 (3)
	16:22	17:18	18:13						20:11			21:06			21:52	11	05:41 (3)
8	08:42	08:01	07:00						06:44			05:38			04:57		05:29 (3)
	16:24	17:20	18:15						20:13			21:08			21:53	12	05:41 (3)
9	08:41	07:59	06:57						06:42			05:36			04:57		05:29 (3)
	16:25	17:22	18:17						20:15			21:10			21:54	13	05:42 (3)
10	08:40	07:57	06:55						06:40			05:35			04:56		05:28 (3)
	16:27	17:24	18:19						20:17			21:12			21:55	14	05:42 (3)
11	08:40	07:55	06:53						06:37			05:33			04:56		05:28 (3)
	16:28	17:26	18:21						20:19			21:13			21:55	14	05:42 (3)
12	08:39	07:53	06:50						06:35			05:31			04:56		05:28 (3)
	16:30	17:28	18:23						20:20			21:15			21:56	15	05:43 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:27 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	15	05:42 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:27 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	16	05:43 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:27 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	16	05:43 (3)
16	08:35	07:45	06:41					07:04 (5)	06:25			05:24			04:55		05:27 (3)
	16:36	17:36	18:30	1				07:05 (5)	20:28			21:22			21:59	16	05:43 (3)
17	08:34	07:43	06:38					07:02 (5)	06:23			05:22			04:54		05:27 (3)
	16:38	17:38	18:32	4				07:06 (5)	20:30			21:23			21:59	17	05:44 (3)
18	08:33	07:41	06:36					06:59 (5)	06:21			05:21			04:54		05:27 (3)
	16:40	17:40	18:34	8				07:07 (5)	20:32			21:25			22:00	17	05:44 (3)
19	08:32	07:39	06:33					06:57 (5)	06:18			05:19			04:54		05:27 (3)
	16:41	17:42	18:36	11				07:08 (5)	20:33			21:27			22:00	17	05:44 (3)
20	08:31	07:37	06:31					06:54 (5)	06:16			05:18			04:54		05:27 (3)
	16:43	17:44	18:38	14				07:08 (5)	20:35			21:28			22:00	17	05:44 (3)
21	08:30	07:34	06:28					06:52 (5)	06:14			05:16			04:55		05:27 (3)
	16:45	17:46	18:40	17				07:09 (5)	20:37			21:30			22:01	17	05:44 (3)
22	08:29	07:32	06:26					06:50 (5)	06:12			05:15			04:55		05:28 (3)
	16:47	17:48	18:42	19				07:09 (5)	20:39			21:31			22:01	17	05:45 (3)
23	08:27	07:30	06:23					06:47 (5)	06:09			05:13			04:55		05:28 (3)
	16:49	17:50	18:43	22				07:09 (5)	20:41			21:33			22:01	17	05:45 (3)
24	08:26	07:28	06:21					06:45 (5)	06:07		06:32 (4)	05:12			04:55		05:28 (3)
	16:51	17:52	18:45	24				07:09 (5)	20:43	2	06:34 (4)	21:34			22:01	17	05:45 (3)
25	08:25	07:25	06:18					06:42 (5)	06:05		06:30 (4)	05:11			04:56		05:29 (3)
	16:53	17:54	18:47	26				07:08 (5)	20:44	4	06:34 (4)	21:36			22:01	17	05:46 (3)
26	08:23	07:23	06:16					06:40 (5)	06:03		06:28 (4)	05:09			04:56		05:29 (3)
	16:54	17:56	18:49	28				07:08 (5)	20:46	6	06:34 (4)	21:37			22:01	17	05:46 (3)
27	08:22	07:21	06:14					06:37 (5)	06:01		06:26 (4)	05:08			04:57		05:30 (3)
	16:56	17:58	18:51	29				07:06 (5)	20:48	8	06:34 (4)	21:39			22:01	16	05:46 (3)
28	08:20	07:19	06:11					06:36 (5)	05:59		06:24 (4)	05:07			04:57		05:30 (3)
	16:58	18:00	18:53	30				07:06 (5)	20:50	10	06:34 (4)	21:40			22:01	16	05:46 (3)
29	08:19		07:09					07:36 (5)	05:56		06:22 (4)	05:06		05:36 (3)	04:58		05:31 (3)
	17:00		19:55	28				08:04 (5)	20:52	11	06:33 (4)	21:41	1	05:37 (3)	22:01	16	05:47 (3)
30	08:17		07:06					07:37 (5)	05:54		06:20 (4)	05:05		05:35 (3)	04:58		05:31 (3)
	17:02		19:56	26				08:03 (5)	20:54	12	06:32 (4)	21:43	2	05:37 (3)	22:00	15	05:46 (3)
31	08:15		07:04					07:38 (5)				05:04		05:34 (3)			
	17:04		19:58	23				08:01 (5)				21:44	4	05:38 (3)			
Potential sun hours	250	273	367					420				494			510		
Total, worst case						310			97						421		
Sun reduction						0.27			0.35			0.38			0.32		
Oper. time red.						1.00			1.00			1.00			1.00		
Wind dir. red.						0.67			0.67			0.67			0.66		
Total reduction						0.18			0.24			0.26			0.21		
Total, real						56			23			16			89		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: C - H3

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 15	05:32 (3) 05:47 (3) 21:25	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54
2	05:00 22:00 14	05:33 (3) 05:47 (3) 21:23	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52
3	05:00 21:59 13	05:33 (3) 05:46 (3) 21:21	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50
4	05:01 21:59 13	05:34 (3) 05:47 (3) 21:19	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48
5	05:02 21:58 12	05:35 (3) 05:47 (3) 21:17	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46
6	05:03 21:58 11	05:36 (3) 05:47 (3) 21:16	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45
7	05:04 21:57 10	05:37 (3) 05:47 (3) 21:14	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43
8	05:05 21:56 9	05:38 (3) 05:47 (3) 21:12	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41
9	05:06 21:55 8	05:39 (3) 05:47 (3) 21:10	05:52 21:10	06:47 19:59	07:40 (5) 07:46 (5)	07:40 16:39
10	05:07 21:55 7	05:40 (3) 05:47 (3) 21:08	05:54 21:08	06:49 19:57	07:35 (5) 07:50 (5)	07:42 16:37
11	05:08 21:54 5	05:41 (3) 05:46 (3) 21:06	05:56 21:06	06:51 19:54	07:32 (5) 07:52 (5)	07:44 16:36
12	05:09 21:53 4	05:42 (3) 05:46 (3) 21:03	05:58 21:03	06:52 19:52	07:30 (5) 07:53 (5)	07:46 16:34
13	05:11 21:52 3	05:43 (3) 05:46 (3) 21:01	05:59 21:01	06:54 19:49	07:29 (5) 07:55 (5)	07:47 16:32
14	05:12 21:51 1	05:44 (3) 05:45 (3) 20:59	06:01 20:59	06:56 19:47	07:27 (5) 07:55 (5)	07:49 16:31
15	05:13 21:50 16	06:03 20:57 06:05	06:03 (4) 19:44 06:33 (4)	06:58 19:44 06:59	07:26 (5) 07:55 (5) 07:54	07:51 16:29 07:53
16	05:14 21:49 17	06:05 20:55 06:06	06:33 (4) 19:42 06:35 (4)	06:59 19:42 07:01	07:26 (5) 07:56 (5) 07:56	07:53 16:28 07:55
17	05:16 21:47 18	06:06 20:53 06:08	06:35 (4) 19:39 06:37 (4)	07:01 19:39 07:03	07:28 (5) 07:56 (5) 07:57	07:55 16:26 07:57
18	05:17 21:46 19	06:08 20:51 06:10	06:37 (4) 19:37 06:38 (4)	07:03 19:37 07:05	07:29 (5) 07:55 (5) 07:31 (5)	07:57 16:25 07:59
19	05:19 21:45 20	06:10 20:48 06:12	07:05 19:34 07:06	07:05 19:34 07:33 (5)	07:31 (5) 07:55 (5) 08:01	07:59 16:23 08:01
20	05:20 21:44 21	06:12 20:46 06:13	07:06 19:32 07:08	08:01 16:22 07:35 (5)	08:01 16:22 08:03	08:41 16:06 08:02
21	05:21 21:42 22	06:13 20:44 06:15	07:08 19:29 07:10	08:03 16:21 07:55 (5)	08:03 16:21 08:05	08:41 16:06 08:04
22	05:23 21:41 23	06:15 20:42 06:17	07:10 19:27 07:12	08:05 16:19 07:53 (5)	08:05 16:19 08:07	08:42 16:07 08:06
23	05:24 21:39 24	06:17 20:39 06:19	07:12 19:24 07:14	08:07 16:18 07:53 (5)	08:07 16:18 08:09	08:42 16:07 08:08
24	05:26 21:38 25	06:19 20:37 06:21	07:14 19:22 07:15	08:09 16:17 07:40 (5)	08:09 16:17 07:52 (5)	08:43 16:08 08:11
25	05:27 21:36 26	06:21 20:35 06:22	07:15 19:19 07:17	08:11 16:16 07:43 (5)	08:11 16:16 07:43 (5)	08:43 16:08 07:13
26	05:29 21:35 27	06:22 20:32 06:24	07:17 19:17 07:19	08:13 16:15 07:45 (5)	08:13 16:15 07:15	08:44 16:09 08:13
27	05:31 21:33 28	06:24 20:30 06:26	07:19 19:15 07:21	08:15 16:14 07:47 (5)	08:15 16:14 17:05	08:44 16:10 17:05
28	05:32 21:32 29	06:26 20:28 06:28	07:21 19:12 07:23	08:17 16:13 07:17	08:17 16:13 07:18	08:44 16:11 08:16
29	05:34 21:30 30	06:28 20:25 06:29	07:23 19:10 07:24	08:18 16:12 07:20	08:18 16:12 07:20	08:44 16:12 08:18
30	05:35 21:28 31	06:29 20:23 06:31	07:24 19:07 06:31	08:19 16:11 07:22	08:19 16:11 07:22	08:44 16:13 08:44
Potential sun hours	512	460	382	328	259	233
Total, worst case	125	113	358			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.68	0.67			
Total reduction	0.21	0.23	0.22			
Total, real	27	26	77			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: D - H4

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:37 (5) 08:05 (5)	05:52 20:55	06:18 (4) 06:29 (4)	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:39 (5) 08:03 (5)	05:50 20:57	06:16 (4) 06:28 (4)	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:40 (5) 08:00 (5)	05:48 20:59	06:14 (4) 06:28 (4)	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:43 (5) 07:58 (5)	05:46 21:01	06:12 (4) 06:27 (4)	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:47 (5) 07:52 (5)	05:44 21:03	06:10 (4) 06:26 (4)	04:59 21:50	05:02 21:58	05:46 21:17	06:19 (4) 06:33 (4)	07:33 20:09	07:32 18:55	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	05:42 21:04	06:09 (4) 06:26 (4)	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	05:40 21:06	06:08 (4) 06:24 (4)	04:58 21:52	05:04 21:57	05:49 21:14	06:19 (4) 06:35 (4)	07:44 20:04	07:37 18:50	07:36 16:43
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:00 (5) 21:08	06:12 (5) 21:08	04:57 21:53	05:05 21:56	05:51 21:12	05:51 21:12	06:20 (4) 06:36 (4)	07:37 (5) 20:01	07:39 18:48	07:38 16:41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:57 20:15	06:57 21:10	06:57 21:10	06:22 (4) 06:19 (4)	04:57 21:54	05:06 21:55	05:52 21:10	06:22 (4) 06:37 (4)	07:41 19:59	07:40 18:45	08:30 16:39
10	08:40 16:27	07:57 17:24	06:55 18:19	06:55 20:17	06:55 21:12	06:55 21:12	06:24 (4) 21:55	05:07 21:55	05:54 21:08	05:54 21:08	06:24 (4) 06:37 (4)	07:43 19:57	07:43 18:43	08:32 16:37
11	08:40 16:28	07:55 17:26	06:53 18:21	06:53 20:19	06:53 21:13	06:53 21:13	06:25 (4) 21:55	05:08 21:54	05:56 21:06	05:56 21:06	06:25 (4) 06:37 (4)	07:44 19:54	07:44 18:41	08:33 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	06:50 20:20	06:50 21:15	06:50 21:15	06:27 (4) 21:56	05:58 21:53	05:58 21:03	05:58 21:03	06:27 (4) 06:38 (4)	07:46 19:52	07:46 18:38	08:34 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:48 20:22	06:48 21:17	06:48 21:17	06:28 (4) 21:57	05:59 21:52	05:59 21:01	05:59 21:01	06:28 (4) 06:37 (4)	07:48 19:59	07:48 18:32	08:35 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:45 20:24	06:45 21:18	06:45 21:18	06:30 (4) 21:58	05:56 21:51	06:06 20:59	06:06 20:59	06:30 (4) 06:37 (4)	07:49 19:47	07:49 18:34	08:36 16:31
15	08:36 16:35	07:47 17:34	06:43 18:29	06:43 20:26	06:43 21:20	06:43 21:20	06:32 (4) 21:58	05:58 21:50	06:03 20:57	06:03 20:57	06:32 (4) 06:37 (4)	07:50 19:44	07:52 18:31	08:37 16:29
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:38 20:30	06:38 21:23	06:38 21:23	06:35 (4) 21:59	06:06 21:47	06:06 20:53	06:06 20:53	06:35 (4) 06:36 (4)	07:01 19:39	07:56 18:27	08:39 16:26
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25	08:25 16:53	07:25 17:54	06:18 18:47	06:18 20:44	06:18 21:36	06:18 21:36	07:15 22:01	07:42 21:36	07:42 20:35	07:42 20:35	07:15 19:19	07:42 18:09	07:42 16:16	08:43 16:08
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case			370	120	120			149	468					
Sun reduction			0.27	0.35	0.38			0.34	0.32					
Oper. time red.			1.00	1.00	1.00			1.00	1.00					
Wind dir. red.			0.67	0.67	0.67			0.67	0.67					
Total reduction			0.18	0.24	0.26			0.23	0.22					
Total, real			67	28	31			34	101					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: E - H5

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: F - H6

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: G - H7

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:18 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** H - H8

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19
2	16:15	17:06	18:02	20:00	20:56	06:31 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10
	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:41	06:35	07:28	07:26	08:21
3	16:16	17:08	18:04	20:02	20:57	06:31 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09
	08:44	08:10	07:12	06:57	05:48	06:14 (1)	05:01	05:01	05:42	06:37	07:30	07:28	08:22
4	16:17	17:10	18:06	20:04	20:59	06:30 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09
	08:43	08:09	07:09	06:54	05:46	06:12 (1)	05:00	05:01	05:44	06:29 (1)	06:38	07:32	08:24
5	16:18	17:12	18:08	20:06	21:01	06:29 (1)	21:49	21:59	21:19	3 06:32 (1)	20:11	18:57	16:48
	08:43	08:07	07:07	06:52	05:44	06:12 (1)	05:00	05:02	05:46	06:26 (1)	06:40	07:33	08:25
6	16:20	17:14	18:10	20:08	21:03	06:28 (1)	21:50	21:58	21:18	9 06:35 (1)	20:09	18:55	16:47
	08:43	08:05	07:05	06:49	05:42	06:14 (1)	04:59	05:03	05:47	06:24 (1)	06:42	07:35	08:27
7	16:21	17:16	18:12	20:10	21:05	06:28 (1)	21:51	21:58	21:16	12 06:36 (1)	20:06	18:53	16:45
	08:42	08:03	07:02	06:47	05:40	06:15 (1)	04:58	05:04	05:49	06:23 (1)	06:44	07:37	08:28
8	16:22	17:18	18:13	20:11	21:06	06:26 (1)	21:52	21:57	21:14	15 06:38 (1)	20:04	18:50	16:43
	08:42	08:01	07:00	06:44	05:38	06:16 (1)	04:57	05:05	05:51	06:21 (1)	06:45	07:39	08:29
9	16:24	17:20	18:15	20:13	21:08	06:24 (1)	21:53	21:56	21:12	17 06:38 (1)	20:02	18:48	16:41
	08:41	07:59	06:58	06:42	05:36		04:57	05:06	05:52	06:22 (1)	06:47	07:41	08:30
10	16:25	17:22	18:17	20:15	21:10		21:54	21:56	21:10	17 06:39 (1)	19:59	18:45	16:39
	08:41	07:57	06:55	06:40	05:35		04:56	05:07	05:54	06:24 (1)	06:49	07:43	08:32
11	16:27	17:24	18:19	20:17	21:12		21:55	21:55	21:08	16 06:40 (1)	19:57	18:43	16:37
	08:40	07:55	06:53	06:37	05:33		04:56	05:08	05:56	06:25 (1)	06:51	07:44	08:33
12	16:28	17:26	18:21	20:19	21:13		21:56	21:54	21:06	14 06:39 (1)	19:54	18:41	16:36
	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	06:27 (1)	06:52	07:46	08:34
13	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	12 06:39 (1)	19:52	18:38	16:34
	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	06:29 (1)	06:54	07:48	08:35
14	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:02	11 06:40 (1)	19:49	18:36	16:32
	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:30 (1)	06:56	07:50	08:36
15	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	9 06:39 (1)	19:47	18:34	16:31
	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:32 (1)	06:58	07:52	08:37
16	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	6 06:38 (1)	19:44	18:31	16:29
	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	06:34 (1)	07:00	07:54	08:38
17	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	4 06:38 (1)	19:42	18:29	16:28
	08:35	07:43	06:38	06:23	05:22		04:55	05:16	06:07	06:35 (1)	07:01	07:56	08:39
18	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	1 06:36 (1)	19:39	18:27	16:26
	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08		07:03	07:58	08:39
19	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51		19:37	18:24	16:25
	08:32	07:39	06:33	06:19	05:19		04:54	05:19	06:10		07:05	07:59	08:40
20	16:42	17:42	18:36	20:34	21:27		22:00	21:45	20:49		19:34	18:22	16:23
	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12		07:07	08:01	08:41
21	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46		19:32	18:20	16:22
	08:30	07:34	06:28	06:14	05:16		04:55	05:22	06:14		07:08	08:03	08:42
22	16:45	17:46	18:40	20:37	21:30		22:01	21:42	20:44		19:29	18:18	16:21
	08:29	07:32	06:26	06:12	05:15		04:55	05:23	06:15		07:10	08:05	08:44
23	16:47	17:48	18:42	20:39	21:32		22:01	21:41	20:42		19:27	18:15	16:19
	08:27	07:30	06:23	06:10	05:13		04:55	05:24	06:17		07:12	08:07	08:46
24	16:49	17:50	18:44	20:41	21:33		22:01	21:40	20:40		19:24	18:13	16:18
	08:26	07:28	06:21	06:07	05:12		04:55	05:26	06:19		07:14	08:09	08:43
25	16:51	17:52	18:45	20:43	21:35		22:01	21:38	20:37		19:22	18:11	16:17
	08:25	07:26	06:19	06:05	05:11		04:56	05:28	06:21		07:15	07:11	08:09
26	16:53	17:54	18:47	20:45	21:36		22:01	21:37	20:35		19:20	17:09	16:16
	08:23	07:23	06:16	06:03	05:10	06:28 (1)	04:56	05:29	06:22		07:17	07:13	08:11
27	16:55	17:56	18:49	20:46	2 06:30 (1)	21:37	22:01	21:35	20:33		19:17	17:07	16:15
	08:22	07:21	06:14	06:01	05:08	06:26 (1)	04:57	05:31	06:24		07:19	07:15	08:13
28	16:56	17:58	18:51	20:48	4 06:30 (1)	21:39	22:01	21:33	20:30		19:15	17:05	16:14
	08:20	07:19	06:11	05:59	05:07	06:24 (1)	04:57	05:32	06:26		07:21	07:17	08:15
29	16:58	18:00	18:53	20:50	7 06:31 (1)	21:40	22:01	21:32	20:28		19:12	17:02	16:13
	08:19		07:09	05:56	06:22 (1)	05:06	04:58	05:34	06:28		07:23	07:19	08:16
30	17:00		19:55	20:52	9 06:31 (1)	21:42	22:01	21:30	20:26		19:10	17:00	16:12
	08:17		07:06	05:54	06:20 (1)	05:05	04:58	05:36	06:30		07:24	07:21	08:18
31	17:02		19:57	20:54	11 06:31 (1)	21:43	22:01	21:28	20:23		19:07	16:58	16:13
	08:15		07:04		05:04			05:37	06:31			07:22	08:14
	17:04		19:58		21:44			21:27	20:21			16:56	16:14
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259
Total, worst case						110				146			233
Sun reduction				0.35		0.38				0.34			
Oper. time red.				1.00		1.00				1.00			
Wind dir. red.				0.68		0.68				0.68			
Total reduction				0.24		0.26				0.23			
Total, real				8		28				34			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: I - H9

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	[January	[February	[March	[April	[May	[June	[July	[August	[September	[October	[November	[December				
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:56	18	06:36 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:41	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	20	06:36 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	06:57	05:48	06:15 (1)	05:01	05:01	05:42	06:37	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	20	06:35 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09		
4	08:43	08:09	07:09	06:54	05:46	06:15 (1)	05:00	05:01	05:44	6	06:32 (1)	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01	19	06:34 (1)	21:49	21:59	21:19	6	06:38 (1)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	06:16 (1)	04:59	05:02	05:46	6	06:29 (1)	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03	17	06:33 (1)	21:50	21:58	21:18	11	06:40 (1)	20:09	18:55	16:47	16:07
6	08:43	08:05	07:05	06:49	05:42	06:17 (1)	04:59	05:03	05:47	11	06:27 (1)	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:10	21:05	16	06:33 (1)	21:51	21:58	21:16	14	06:41 (1)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	06:18 (1)	04:58	05:04	05:49	14	06:26 (1)	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	13	06:31 (1)	21:52	21:57	21:14	17	06:43 (1)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	06:20 (1)	04:57	05:05	05:51	17	06:25 (1)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	9	06:29 (1)	21:53	21:56	21:12	18	06:43 (1)	20:02	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36	06:24 (1)	04:57	05:06	05:52	18	06:24 (1)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	1	06:25 (1)	21:54	21:56	21:10	20	06:44 (1)	19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35		04:56	05:07	05:54	20	06:24 (1)	06:49	07:43	07:42	08:32	
	16:27	17:24	18:19	20:17	21:12		21:55	21:55	21:08	21	06:45 (1)	19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33		04:56	05:08	05:56	21	06:25 (1)	06:51	07:44	07:44	08:33	
	16:28	17:26	18:21	20:19	21:13		21:56	21:54	21:06	19	06:44 (1)	19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	19	06:27 (1)	06:52	07:46	07:46	08:34	
	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	18	06:45 (1)	19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	16	06:29 (1)	06:54	07:48	07:48	08:35	
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	16	06:45 (1)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	14	06:30 (1)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	14	06:44 (1)	19:47	18:34	16:31	16:05	
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	12	06:32 (1)	06:58	07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	12	06:44 (1)	19:44	18:31	16:29	16:05	
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	10	06:34 (1)	07:00	07:54	07:53	08:38	
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	10	06:44 (1)	19:42	18:29	16:28	16:05	
17	08:35	07:43	06:38	06:23	05:22		04:54	05:16	06:06	7	06:35 (1)	07:01	07:56	07:55	08:39	
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18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08	4	06:37 (1)	07:03	07:58	07:57	08:39	
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19	08:32	07:39	06:33	06:19	05:19		04:54	05:19	06:10	1	06:39 (1)	07:05	07:59	07:59	08:40	
	16:42	17:42	18:36	20:34	21:27		22:00	21:45	20:49	1	06:40 (1)	19:34	18:22	16:23	16:05	
20	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12			07:07	08:01	08:01	08:41	
	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46			19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16		04:55	05:22	06:14			07:08	08:03	08:02	08:41	
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29	08:19		07:09	05:56	05:06	14	06:22 (1)	05:36	06:29			07:23	07:19	08:16	08:44	
	17:00		19:55	20:52	21:42		22:01	21:30	20:26			19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05	16	06:20 (1)	05:38	06:32			07:24	07:21	08:18	08:44	
	17:02		19:57	20:54	21:43		22:01	21:28	20:23			19:07	16:58	16:11	16:13	
31	08:15		07:04		05:04			05:37	06:31			07:22	07:22		08:44	
	17:04		19:58		21:44			21:27	20:21			16:56			16:14	
Potential sun hours	250	273	367	420	494		510	512	460		382	328		259		233
Total, worst case				67	133				208							
Sun reduction				0.35	0.38				0.34							
Oper. time red.				1.00	1.00				1.00							
Wind dir. red.				0.68	0.68				0.68							
Total reduction				0.24	0.26				0.23							
Total, real				16	34				48							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: J - H10

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	[January	[February	[March	[April	[May	[June	[July	[August	[September	[October	[November	[December
1	08:44	08:14	07:16	07:01	05:52	05:03	05:34 (1) 04:59	05:35 (1) 05:39	06:33	07:26	07:24	08:19
2	16:15	17:06	18:02	20:00	20:56	21:45	15 05:49 (1) 22:00	17 05:52 (1) 21:25	20:18	19:05	16:54	16:10
3	08:44	08:12	07:14	06:59	05:50	05:02	05:33 (1) 05:00	05:35 (1) 05:41	06:35	07:28	07:26	08:21
4	16:16	17:08	18:04	20:02	20:57	21:47	16 05:49 (1) 22:00	18 05:53 (1) 21:23	20:16	19:02	16:52	16:09
5	08:44	08:10	07:12	06:57	05:48	05:01	05:32 (1) 05:01	05:36 (1) 05:42	06:37	07:30	07:28	08:22
6	16:17	17:10	18:06	20:04	20:59	21:48	17 05:49 (1) 21:59	18 05:54 (1) 21:21	20:14	19:00	16:50	16:09
7	08:43	08:09	07:09	06:54	05:46	05:00	05:31 (1) 05:01	05:35 (1) 05:44	06:38	07:32	07:30	08:24
8	16:18	17:12	18:08	20:06	21:01	21:49	17 05:48 (1) 21:59	19 05:54 (1) 21:19	20:11	18:57	16:48	16:08
9	08:43	08:07	07:07	06:52	05:44	04:59	05:31 (1) 05:02	05:35 (1) 05:46	06:40	07:33	07:32	08:25
10	16:20	17:14	18:10	20:08	21:03	21:50	18 05:49 (1) 21:58	19 05:54 (1) 21:18	20:09	18:55	16:47	16:07
11	08:43	08:05	07:05	06:49	05:42	04:59	05:30 (1) 05:03	05:36 (1) 05:47	06:42	07:35	07:34	08:27
12	16:21	17:16	18:12	20:09	21:05	21:51	18 05:48 (1) 21:58	19 05:55 (1) 21:16	20:06	18:53	16:45	16:07
13	08:42	08:03	07:02	06:47	05:40	04:58	05:30 (1) 05:04	05:37 (1) 05:49	06:44	07:37	07:36	08:28
14	16:22	17:18	18:13	20:11	21:06	21:52	19 05:49 (1) 21:57	18 05:55 (1) 21:14	20:04	18:50	16:43	16:06
15	08:42	08:01	07:00	06:44	05:38	04:57	05:29 (1) 05:05	05:38 (1) 05:51	06:45	07:39	07:38	08:29
16	16:24	17:20	18:15	20:13	21:08	21:53	19 05:48 (1) 21:56	18 05:56 (1) 21:12	20:01	18:48	16:41	16:06
17	08:41	07:59	06:58	06:42	05:36	04:57	05:30 (1) 05:06	05:39 (1) 05:52	06:47	07:41	07:40	08:30
18	16:25	17:22	18:17	20:15	21:10	21:54	19 05:49 (1) 21:56	17 05:56 (1) 21:10	19:59	18:45	16:39	16:06
19	08:41	07:57	06:55	06:40	05:35	04:56	05:30 (1) 05:07	05:40 (1) 05:54	06:49	07:43	07:42	08:32
20	16:27	17:24	18:19	20:17	21:12	21:55	18 05:48 (1) 21:55	16 05:56 (1) 21:08	19:57	18:43	16:37	16:05
21	08:40	07:55	06:53	06:37	05:33	04:56	05:31 (1) 05:08	05:41 (1) 05:56	06:51	07:44	07:44	08:33
22	16:28	17:26	18:21	20:19	21:13	21:56	17 05:48 (1) 21:54	16 05:57 (1) 21:06	19:54	18:41	16:36	16:05
23	08:39	07:53	06:50	06:35	05:31	04:56	05:32 (1) 05:10	05:42 (1) 05:58	06:52	07:46	07:46	08:34
24	16:30	17:28	18:23	20:21	21:15	21:56	17 05:49 (1) 21:53	15 05:57 (1) 21:04	19:52	18:38	16:34	16:05
25	08:38	07:51	06:48	06:33	05:29	04:55	05:31 (1) 05:11	05:43 (1) 05:59	06:54	07:48	07:48	08:35
26	16:31	17:30	18:25	20:22	21:17	21:57	17 05:48 (1) 21:52	14 05:57 (1) 21:01	19:49	18:36	16:32	16:05
27	08:37	07:49	06:45	06:30	05:27	04:55	05:32 (1) 05:12	05:44 (1) 06:01	06:56	07:50	07:49	08:36
28	16:33	17:32	18:27	20:24	21:19	21:58	16 05:48 (1) 21:51	13 05:57 (1) 20:59	19:47	18:34	16:31	16:05
29	08:36	07:47	06:43	06:28	05:26	04:55	05:32 (1) 05:13	05:46 (1) 06:03	06:58	07:52	07:51	08:37
30	16:35	17:34	18:29	20:26	21:20	21:58	16 05:48 (1) 21:50	12 05:58 (1) 20:57	19:44	18:31	16:29	16:05
31	08:36	07:45	06:41	06:25	05:24	04:55	05:33 (1) 05:15	05:47 (1) 06:05	07:00	07:54	07:53	08:38
32	16:36	17:36	18:31	20:28	21:22	21:59	15 05:48 (1) 21:49	11 05:58 (1) 20:55	19:42	18:29	16:28	16:05
33	08:35	07:43	06:38	06:23	05:22	04:54	05:33 (1) 05:16	05:48 (1) 06:06	07:01	07:56	07:55	08:39
34	16:38	17:38	18:32	20:30	21:24	21:59	15 05:48 (1) 21:48	10 05:58 (1) 20:53	19:39	18:27	16:26	16:05
35	08:33	07:41	06:36	06:21	05:21	04:54	05:33 (1) 05:17	05:49 (1) 06:08	07:03	07:58	07:57	08:39
36	16:40	17:40	18:34	20:32	21:25	22:00	15 05:48 (1) 21:46	8 05:57 (1) 20:51	19:37	18:24	16:25	16:05
37	08:32	07:39	06:33	06:19	05:19	04:54	05:34 (1) 05:19	05:51 (1) 06:10	07:05	07:59	07:59	08:40
38	16:42	17:42	18:36	20:33	21:27	22:00	14 05:48 (1) 21:45	7 05:58 (1) 20:48	19:34	18:22	16:23	16:05
39	08:31	07:37	06:31	06:16	05:18	04:55	05:34 (1) 05:20	05:52 (1) 06:12	07:07	08:01	08:01	08:41
40	16:43	17:44	18:38	20:35	21:28	22:00	14 05:48 (1) 21:44	5 05:57 (1) 20:46	19:32	18:20	16:22	16:06
41	08:30	07:34	06:28	06:14	05:16	04:55	05:35 (1) 05:22	05:53 (1) 06:14	07:08	08:03	08:02	08:41
42	16:45	17:46	18:40	20:37	21:30	1 05:46 (1) 22:01	14 05:49 (1) 21:42	4 05:57 (1) 20:44	19:29	18:18	16:21	16:06
43	08:29	07:32	06:26	06:12	05:15	04:55	05:35 (1) 05:23	05:55 (1) 06:15	07:10	08:05	08:04	08:42
44	16:47	17:48	18:42	20:39	21:31	3 05:47 (1) 22:01	14 05:49 (1) 21:41	2 05:57 (1) 20:42	19:27	18:15	16:19	16:07
45	08:27	07:30	06:23	06:10	05:13	05:43 (1) 04:55	05:35 (1) 05:24	06:17	07:12	08:07	08:06	08:42
46	16:49	17:50	18:44	20:41	21:33	5 05:48 (1) 22:01	14 05:49 (1) 21:40	20:39	19:24	18:13	16:18	16:07
47	08:26	07:28	06:21	06:07	05:12	05:41 (1) 04:55	05:34 (1) 05:26	06:19	07:14	08:09	08:08	08:43
48	16:51	17:52	18:45	20:43	21:35	6 05:47 (1) 22:01	15 05:49 (1) 21:38	20:37	19:22	18:11	16:17	16:08
49	08:25	07:26	06:19	06:05	05:11	05:40 (1) 04:56	05:35 (1) 05:28	06:21	07:15	08:11	08:09	08:43
50	16:53	17:54	18:47	20:45	21:36	8 05:48 (1) 22:01	15 05:50 (1) 21:37	20:35	19:20	17:09	16:16	16:08
51	08:23	07:23	06:16	06:03	05:10	05:39 (1) 04:56	05:35 (1) 05:29	06:22	07:17	08:13	08:11	08:44
52	16:55	17:56	18:49	20:46	21:37	9 05:48 (1) 22:01	15 05:50 (1) 21:35	20:33	19:17	17:07	16:15	16:09
53	08:22	07:21	06:14	06:01	05:08	05:38 (1) 04:57	05:35 (1) 05:31	06:24	07:19	08:15	08:13	08:44
54	16:56	17:58	18:51	20:48	21:39	10 05:48 (1) 22:01	16 05:51 (1) 21:33	20:30	19:15	17:05	16:14	16:10
55	08:20	07:19	06:11	05:59	05:07	05:37 (1) 04:57	05:35 (1) 05:32	06:26	07:21	08:17	08:15	08:44
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57	08:19		07:09	05:56	05:06	05:36 (1) 04:58	05:35 (1) 05:34	06:28	07:23	08:19	08:16	08:44
58	17:00		19:55	20:52	21:42	12 05:48 (1) 22:01	17 05:52 (1) 21:30	20:26	19:10	17:00	16:12	16:12
59	08:17		07:06	05:54	05:05	05:35 (1) 04:58	05:35 (1) 05:36	06:29	07:24	08:21	08:18	08:44
60	17:02		19:57	20:54	21:43	13 05:48 (1) 22:00	17 05:52 (1) 21:28	20:23	19:07	16:58	16:11	16:13
61	08:15		07:04	05:04	05:04	05:34 (1) 04:58	05:37	06:31		07:22		08:44
62	17:04		19:58	21:44	21:44	14 05:48 (1) 22:01	21:27	20:21		16:56		16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					92	485	296					
Sun reduction					0.38	0.32	0.32					
Oper. time red.					1.00	1.00	1.00					
Wind dir. red.					0.66	0.66	0.66					
Total reduction					0.25	0.21	0.21					
Total, real					23	102	63					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: K - H11

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: L - H12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		07:25 (5)	05:52			05:03		05:34 (3)
	16:15	17:06	18:02						20:00	4	07:29 (5)	20:55			21:45	9	05:43 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50			05:02		05:33 (3)
	16:16	17:08	18:04						20:02	7	07:30 (5)	20:57			21:47	10	05:43 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48			05:01		05:32 (3)
	16:17	17:10	18:06						20:04	9	07:29 (5)	20:59			21:48	11	05:43 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46			05:00		05:31 (3)
	16:18	17:12	18:08						20:06	12	07:30 (5)	21:01			21:49	12	05:43 (3)
5	08:43	08:07	07:07						06:52		07:15 (5)	05:44			04:59		05:31 (3)
	16:20	17:14	18:10						20:08	14	07:29 (5)	21:03			21:50	12	05:43 (3)
6	08:43	08:05	07:05						06:49		07:13 (5)	05:42			04:59		05:30 (3)
	16:21	17:16	18:11						20:09	16	07:29 (5)	21:04			21:51	13	05:43 (3)
7	08:42	08:03	07:02						06:47		07:11 (5)	05:40			04:58		05:30 (3)
	16:22	17:18	18:13						20:11	17	07:28 (5)	21:06			21:52	14	05:44 (3)
8	08:42	08:01	07:00						06:44		07:08 (5)	05:38			04:57		05:29 (3)
	16:24	17:20	18:15						20:13	19	07:27 (5)	21:08			21:53	14	05:43 (3)
9	08:41	07:59	06:57						06:42		07:06 (5)	05:36			04:57		05:29 (3)
	16:25	17:22	18:17						20:15	20	07:26 (5)	21:10			21:54	15	05:44 (3)
10	08:40	07:57	06:55						06:40		07:06 (5)	05:35			04:56		05:28 (3)
	16:27	17:24	18:19						20:17	18	07:24 (5)	21:12			21:55	15	05:43 (3)
11	08:40	07:55	06:53						06:37		07:08 (5)	05:33			04:56		05:28 (3)
	16:28	17:26	18:21						20:19	14	07:22 (5)	21:13			21:55	16	05:44 (3)
12	08:39	07:53	06:50						06:35		07:10 (5)	05:31			04:56		05:28 (3)
	16:30	17:28	18:23						20:21	10	07:20 (5)	21:15			21:56	16	05:44 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:27 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	17	05:44 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:27 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	17	05:44 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:27 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	17	05:44 (3)
16	08:35	07:45	06:41						06:25			05:24			04:55		05:27 (3)
	16:36	17:36	18:30						20:28			21:22			21:59	17	05:44 (3)
17	08:34	07:43	06:38						06:23			05:22			04:54		05:27 (3)
	16:38	17:38	18:32						20:30			21:23			21:59	17	05:44 (3)
18	08:33	07:41	06:36						06:21			05:21			04:54		05:27 (3)
	16:40	17:40	18:34						20:32			21:25			22:00	18	05:45 (3)
19	08:32	07:39	06:33						06:19			05:19			04:54		05:27 (3)
	16:42	17:42	18:36						20:33			21:27			22:00	18	05:45 (3)
20	08:31	07:37	06:31						06:16			05:18			04:55		05:27 (3)
	16:43	17:44	18:38						20:35			21:28			22:00	18	05:45 (3)
21	08:30	07:34	06:28						06:14			05:16			04:55		05:28 (3)
	16:45	17:46	18:40						20:37			21:30			22:01	18	05:46 (3)
22	08:29	07:32	06:26						06:12			05:15			04:55		05:28 (3)
	16:47	17:48	18:42						20:39			21:31			22:01	18	05:46 (3)
23	08:27	07:30	06:23						06:09			05:13			04:55		05:28 (3)
	16:49	17:50	18:44						20:41			21:33			22:01	18	05:46 (3)
24	08:26	07:28	06:21						06:07			05:12			04:55		05:28 (3)
	16:51	17:52	18:45						20:43			21:34			22:01	18	05:46 (3)
25	08:25	07:25	06:18						06:05			05:11			04:56		05:29 (3)
	16:53	17:54	18:47						20:44			21:36			22:01	18	05:47 (3)
26	08:23	07:23	06:16						06:03			05:10			04:56		05:29 (3)
	16:54	17:56	18:49						20:46			21:37	2	05:41 (3)	22:01	17	05:46 (3)
27	08:22	07:21	06:14						06:01			05:08		05:38 (3)	04:57		05:30 (3)
	16:56	17:58	18:51						20:48			21:39	3	05:41 (3)	22:01	17	05:47 (3)
28	08:20	07:19	06:11						05:59			05:07		05:37 (3)	04:57		05:30 (3)
	16:58	18:00	18:53						20:50			21:40	4	05:41 (3)	22:01	17	05:47 (3)
29	08:19		07:09						05:56			05:06		05:36 (3)	04:58		05:31 (3)
	17:00		19:55						20:52			21:41	6	05:42 (3)	22:01	17	05:48 (3)
30	08:17		07:06						05:54			05:05		05:35 (3)	04:58		05:31 (3)
	17:02		19:56						20:54			21:43	7	05:42 (3)	22:00	16	05:47 (3)
31	08:15		07:04					07:27 (5)				05:04		05:34 (3)			
	17:04		19:58	1		07:28 (5)						21:44	8	05:42 (3)			
Potential sun hours	250	273	367					420				494			510		
Total, worst case				1				160				30			470		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.67				0.67				0.66			0.66		
Total reduction				0.18				0.24				0.25			0.21		
Total, real				0				38				8			99		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: L - H12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 16	05:32 (3) 05:48 (3) 21:25	05:39 20:18 14	07:07 (5) 07:21 (5) 19:05	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 16	05:33 (3) 05:49 (3) 21:23	05:40 20:16 18	07:05 (5) 07:23 (5) 19:02	07:28 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 15	05:33 (3) 05:48 (3) 21:21	05:42 20:14 20	07:04 (5) 07:24 (5) 19:00	07:30 16:50 16:09	08:22 16:09 16:09
4	05:01 21:59 15	05:34 (3) 05:49 (3) 21:19	05:44 20:11 19	07:05 (5) 07:24 (5) 18:57	07:32 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 14	05:35 (3) 05:49 (3) 21:17	05:46 20:09 17	07:07 (5) 07:24 (5) 18:55	07:33 16:46 16:07	08:25 16:07 16:07
6	05:03 21:58 13	05:36 (3) 05:49 (3) 21:16	05:47 20:06 16	07:09 (5) 07:25 (5) 18:53	07:35 16:45 16:07	08:26 16:07 16:07
7	05:04 21:57 13	05:37 (3) 05:50 (3) 21:14	05:49 20:04 14	07:10 (5) 07:24 (5) 18:50	07:37 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 12	05:38 (3) 05:50 (3) 21:12	05:51 20:01 12	07:12 (5) 07:24 (5) 18:48	07:39 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 11	05:39 (3) 05:50 (3) 21:10	05:52 19:59 9	07:14 (5) 07:23 (5) 18:45	07:41 16:39 16:06	08:30 16:06 16:06
10	05:07 21:55 10	05:40 (3) 05:50 (3) 21:08	05:54 19:57 7	07:16 (5) 07:23 (5) 18:43	07:43 16:37 16:05	08:32 16:05 16:05
11	05:08 21:54 9	05:41 (3) 05:50 (3) 21:06	05:56 19:54 4	07:17 (5) 07:21 (5) 18:41	07:44 16:36 16:05	08:33 16:05 16:05
12	05:10 21:53 8	05:42 (3) 05:50 (3) 21:03	05:58 19:52 1	07:19 (5) 07:20 (5) 18:38	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 7	05:43 (3) 05:50 (3) 21:01	05:59 19:49 1	07:20 (5) 18:36 16:32	07:47 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 6	05:44 (3) 05:50 (3) 20:59	06:01 19:47 1	06:56 18:34 16:31	07:49 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 5	05:45 (3) 05:50 (3) 20:57	06:03 19:44 1	06:58 18:31 16:29	07:51 16:29 16:05	08:37 16:05 16:05
16	05:15 21:49 4	05:47 (3) 05:51 (3) 20:55	06:05 19:42 1	06:59 18:29 16:28	07:53 16:28 16:05	08:38 16:05 16:05
17	05:16 21:47 2	05:48 (3) 05:50 (3) 20:53	06:06 19:39 1	07:01 18:27 16:26	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 1	05:49 (3) 05:50 (3) 20:51	06:08 19:37 1	07:03 18:24 16:25	07:57 16:25 16:05	08:39 16:05 16:05
19	05:19 21:45 1	06:10 20:48 1	07:05 19:34 1	07:05 18:22 16:23	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44 1	06:12 20:46 1	07:07 19:32 1	08:01 18:20 16:22	08:01 16:22 16:06	08:41 16:06 16:06
21	05:21 21:42 1	06:14 20:44 1	07:08 19:29 1	08:03 18:18 16:21	08:02 16:21 16:06	08:41 16:06 16:06
22	05:23 21:41 1	06:15 20:42 1	07:10 19:27 1	08:05 18:15 16:19	08:04 16:19 16:07	08:42 16:07 16:07
23	05:24 21:39 1	06:17 20:39 1	07:12 19:24 1	08:07 18:13 16:18	08:06 16:18 16:07	08:42 16:07 16:07
24	05:26 21:38 1	06:19 20:37 1	07:14 19:22 1	08:09 18:11 16:17	08:08 16:17 16:08	08:43 16:08 16:08
25	05:28 21:36 1	06:21 20:35 1	07:15 19:19 1	07:11 17:09 16:16	08:09 16:16 16:08	08:43 16:08 16:08
26	05:29 21:35 1	06:22 20:33 1	07:17 19:17 1	07:13 17:07 16:15	08:11 16:15 16:09	08:43 16:09 16:09
27	05:31 21:33 1	06:24 20:30 1	07:19 19:15 1	07:15 17:05 16:14	08:13 16:14 16:10	08:44 16:10 16:10
28	05:32 21:32 1	06:26 20:28 1	07:21 19:12 1	07:17 17:02 16:13	08:14 16:13 16:11	08:44 16:11 16:11
29	05:34 21:30 1	06:28 20:25 1	07:23 19:10 1	07:19 17:00 16:12	08:16 16:12 16:12	08:44 16:12 16:12
30	05:35 21:28 1	06:29 20:23 1	07:24 19:07 1	07:20 16:58 16:11	08:18 16:11 16:13	08:44 16:13 16:13
31	05:37 21:27 1	06:31 20:21 10	07:10 (5) 07:20 (5)	07:22 16:56 16:14	08:44 16:14 16:14	08:44 16:14 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	177	10	151			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.67	0.67			
Total reduction	0.21	0.23	0.22			
Total, real	38	2	33			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: M - H13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	17:16 (5)	07:01	05:52
	16:15	17:06	18:02	18	17:34 (5)	20:00
2	08:44	08:12	07:14	17:15 (5)	06:59	05:50
	16:16	17:08	18:04	21	17:36 (5)	20:02
3	08:43	08:10	07:11	17:15 (5)	06:56	05:48
	16:17	17:10	18:06	23	17:38 (5)	20:04
4	08:43	08:08	07:09	17:14 (5)	06:54	05:46
	16:18	17:12	18:07	27	17:41 (5)	20:06
5	08:43	08:07	07:07	17:13 (5)	06:51	05:44
	16:20	17:14	18:09	27	17:40 (5)	20:07
6	08:42	08:05	07:04	17:14 (5)	06:49	05:42
	16:21	17:16	18:11	26	17:40 (5)	20:09
7	08:42	08:03	07:02	17:13 (5)	06:47	05:40
	16:22	17:18	18:13	26	17:39 (5)	20:11
8	08:41	08:01	07:00	17:14 (5)	06:44	05:38
	16:24	17:20	18:15	25	17:39 (5)	20:13
9	08:41	07:59	06:57	17:14 (5)	06:42	05:36
	16:25	17:22	18:17	24	17:38 (5)	20:15
10	08:40	07:57	06:55	17:15 (5)	06:39	05:34
	16:26	17:24	18:19	22	17:37 (5)	20:17
11	08:40	07:55	06:52	17:16 (5)	06:37	05:33
	16:28	17:26	18:21	20	17:36 (5)	20:19
12	08:39	07:53	06:50	17:17 (5)	06:35	05:31
	16:30	17:28	18:23	17	17:34 (5)	20:20
13	08:38	07:51	06:48	17:20 (5)	06:32	05:29
	16:31	17:30	18:25	11	17:31 (5)	20:22
14	08:37	07:49	06:45	06:30	05:27	04:55
	16:33	17:32	18:27	21	19:56 (3)	21:18
15	08:36	07:47	06:43	06:28	05:26	04:55
	16:34	17:34	18:28	24	19:58 (3)	21:20
16	08:35	07:45	06:40	06:25	05:24	04:54
	16:36	17:36	18:30	27	20:00 (3)	21:22
17	08:34	07:43	06:38	06:23	05:22	04:54
	16:38	17:38	18:32	30	20:01 (3)	21:23
18	08:33	07:41	06:35	06:21	05:21	04:54
	16:40	17:40	18:34	33	20:03 (3)	21:25
19	08:32	07:39	06:33	06:18	05:19	04:54
	16:41	17:42	18:36	35	20:05 (4)	21:27
20	08:31	07:36	06:31	06:16	05:18	04:54
	16:43	17:44	18:38	38	20:07 (4)	21:28
21	08:30	07:34	06:28	06:14	05:16	04:54
	16:45	17:46	18:40	39	20:07 (4)	21:30
22	08:28	07:32	06:26	06:12	05:15	04:55
	16:47	17:48	18:41	39	20:07 (4)	21:31
23	08:27	07:30	06:23	06:09	05:13	04:55
	16:49	17:50	18:43	39	20:07 (4)	21:33
24	08:26	07:28	06:21	06:07	05:12	04:55
	16:50	17:52	18:45	40	20:07 (4)	21:34
25	08:24	07:25	17:24 (5)	06:05	05:11	04:56
	16:52	17:54	2	17:26 (5)	21:36	22:01
26	08:23	07:23	17:21 (5)	06:03	05:09	04:56
	16:54	17:56	7	17:28 (5)	21:37	22:01
27	08:22	07:21	17:19 (5)	06:01	05:08	04:56
	16:56	17:58	12	17:31 (5)	21:39	22:01
28	08:20	07:18	17:17 (5)	05:58	05:07	04:57
	16:58	18:00	15	17:32 (5)	21:40	22:01
29	08:18		07:08	05:56	05:06	04:57
	17:00		19:54	37	20:05 (4)	21:41
30	08:17		07:06	05:54	05:05	04:58
	17:02		19:56	36	20:05 (4)	21:43
31	08:15		07:04		05:04	22:00
	17:04		19:58		21:44	
Potential sun hours	250	273	367	420	494	510
Total, worst case		36	287	639	220	34
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.68	0.68	0.65	0.65	0.61
Total reduction		0.16	0.18	0.23	0.25	0.19
Total, real		6	53	147	55	7

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: M - H13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:40 (4) 19:50 (3)	07:26 19:05	17:57 (5) 16:54
2	05:00 22:00	05:40 21:23	06:35 20:16	19:44 (4) 19:48 (4)	07:28 19:02	17:55 (5) 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:53 (5) 18:15 (5)	07:28 16:50
4	05:01 21:59	05:44 21:19	19:51 (4) 20:02 (4)	06:38 20:11	07:31 18:57	17:52 (5) 18:15 (5)
5	05:02 21:58	05:45 21:17	19:47 (4) 20:04 (4)	06:40 20:09	07:33 18:55	17:51 (5) 18:16 (5)
6	05:03 21:57	05:47 21:15	19:45 (4) 20:06 (4)	06:42 20:06	07:35 18:52	17:50 (5) 18:16 (5)
7	05:04 21:57	05:49 21:13	19:44 (4) 20:08 (4)	06:43 20:04	07:37 18:50	17:49 (5) 18:15 (5)
8	05:05 21:56	05:51 21:11	19:42 (4) 20:09 (4)	06:45 20:01	07:39 18:48	17:49 (5) 18:15 (5)
9	05:06 21:55	05:52 21:09	19:41 (4) 20:10 (4)	06:47 19:59	07:41 18:45	17:48 (5) 18:15 (5)
10	05:07 21:55	05:54 21:07	19:39 (4) 20:10 (4)	06:49 19:56	07:42 18:43	17:49 (5) 18:14 (5)
11	05:08 21:54	05:56 21:05	19:38 (4) 20:11 (4)	06:50 19:54	07:44 18:40	17:49 (5) 18:11 (5)
12	05:09 21:53	05:57 21:03	19:38 (4) 20:12 (4)	06:52 19:51	07:46 18:38	17:49 (5) 18:09 (5)
13	05:11 21:52	05:59 21:01	19:36 (4) 20:12 (4)	06:54 19:49	07:48 18:36	17:50 (5) 18:07 (5)
14	05:12 21:51	06:01 20:59	19:36 (4) 20:13 (4)	06:56 19:47	07:50 18:33	17:51 (5) 18:04 (5)
15	05:13 21:50	06:03 20:57	19:36 (4) 20:14 (4)	06:58 19:44	07:52 18:31	17:52 (5) 18:02 (5)
16	05:14 21:49	06:05 20:55	19:34 (4) 20:13 (4)	06:59 19:42	07:54 18:29	17:54 (5) 18:00 (5)
17	05:16 21:47	06:06 20:53	19:34 (4) 20:13 (4)	07:01 19:39	07:55 18:26	17:55 (5) 16:26
18	05:17 21:46	06:08 20:50	19:34 (4) 20:14 (4)	07:03 19:37	07:57 18:24	16:26 16:25
19	05:18 21:45	06:10 20:48	19:33 (4) 20:13 (4)	07:05 19:34	07:59 18:22	16:25 16:23
20	05:20 21:44	06:12 20:46	19:33 (4) 20:13 (4)	07:06 19:32	08:01 18:20	16:23 16:22
21	05:21 21:42	06:13 20:44	19:33 (4) 20:13 (4)	07:08 19:29	08:03 18:17	16:22 16:20
22	05:23 21:41	06:15 20:42	19:33 (4) 20:12 (4)	07:10 19:27	08:05 18:15	16:20 16:19
23	05:24 21:39	06:17 20:39	19:33 (4) 20:10 (4)	07:12 19:24	08:07 18:13	16:19 16:18
24	05:26 21:38	06:19 20:37	19:33 (4) 20:09 (4)	07:13 19:22	08:09 18:11	16:18 16:17
25	05:27 21:36	06:20 20:35	19:33 (4) 20:06 (3)	07:15 19:19	07:11 17:09	16:17 16:16
26	05:29 21:35	06:22 20:32	19:34 (4) 20:04 (3)	07:17 19:17	07:13 17:06	16:16 16:14
27	05:30 21:33	06:24 20:30	19:35 (4) 20:02 (3)	07:19 19:14	07:14 17:04	16:14 16:13
28	05:32 21:32	06:26 20:28	19:35 (4) 19:59 (3)	07:21 19:12	07:16 17:02	16:14 16:12
29	05:34 21:30	06:27 20:25	19:36 (4) 19:57 (3)	07:22 19:09	07:18 17:00	16:16 16:12
30	05:35 21:28	06:29 20:23	19:37 (4) 19:55 (3)	07:24 19:07	07:20 16:58	16:12 16:11
31	05:37 21:26	06:31 20:21	19:38 (4) 19:52 (3)	07:22 16:56	07:22 16:56	16:12 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		855	23	321		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.66	0.68		
Total reduction		0.22	0.21	0.20		
Total, real		190	5	64		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: N - H14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14		07:16		16:59 (5)	07:01	19:05 (4)	05:52	05:03	20:49 (2)
	16:15	17:06		18:02	22	17:21 (5)	20:00	28	19:33 (4)	20:55	21:45
2	08:44	08:12		07:14		17:00 (5)	06:59		19:03 (4)	05:50	20:49 (2)
	16:16	17:08		18:04	19	17:19 (5)	20:02	32	19:35 (3)	20:57	21:46
3	08:43	08:10		07:11		17:01 (5)	06:56		19:03 (4)	05:48	20:49 (2)
	16:17	17:10		18:06	17	17:18 (5)	20:04	34	19:37 (3)	20:59	21:48
4	08:43	08:08		07:09		17:04 (5)	06:54		19:02 (4)	05:46	20:49 (2)
	16:18	17:12		18:07	12	17:16 (5)	20:06	37	19:39 (3)	21:01	21:49
5	08:43	08:07		07:07		17:07 (5)	06:51		19:01 (4)	05:44	20:48 (2)
	16:19	17:14		18:09	4	17:11 (5)	20:07	39	19:40 (3)	21:03	21:50
6	08:42	08:05		07:04			06:49		19:01 (4)	05:42	20:49 (2)
	16:21	17:16		18:11			20:09	41	19:42 (3)	21:04	21:51
7	08:42	08:03		07:02			06:47		19:00 (4)	05:40	20:49 (2)
	16:22	17:18		18:13			20:11	43	19:43 (3)	21:06	21:52
8	08:41	08:01		07:00			06:44		19:00 (4)	05:38	20:49 (2)
	16:24	17:20		18:15			20:13	46	19:46 (3)	21:08	21:53
9	08:41	07:59		06:57			06:42		19:00 (4)	05:36	20:49 (2)
	16:25	17:22		18:17			20:15	48	19:48 (3)	21:10	21:54
10	08:40	07:57		06:55			06:39		19:00 (4)	05:34	20:50 (2)
	16:26	17:24		18:19			20:17	46	19:46 (3)	21:11	21:55
11	08:40	07:55		06:52			06:37		19:00 (4)	05:33	20:50 (2)
	16:28	17:26		18:21			20:19	46	19:46 (3)	21:13	21:55
12	08:39	07:53		06:50			06:35		19:01 (4)	05:31	20:49 (2)
	16:30	17:28		18:23			20:20	44	19:45 (3)	21:15	21:56
13	08:38	07:51		06:48			06:32		19:01 (4)	05:29	20:50 (2)
	16:31	17:30		18:25			20:22	42	19:43 (3)	21:17	21:57
14	08:37	07:49		06:45			06:30		19:02 (4)	05:27	20:50 (2)
	16:33	17:32		18:27			20:24	39	19:41 (3)	21:18	21:57
15	08:36	07:47		06:43			06:28		19:03 (4)	05:26	20:51 (2)
	16:34	17:34		18:28			20:26	35	19:38 (3)	21:20	21:58
16	08:35	07:45		06:40			06:25		19:04 (4)	05:24	20:51 (2)
	16:36	17:36		18:30			20:28	28	19:32 (4)	21:22	21:59
17	08:34	07:43	17:06 (5)	06:38			06:23		19:05 (4)	05:22	20:51 (2)
	16:38	17:38	3	17:09 (5)	18:32		20:30	24	19:29 (4)	21:23	21:59
18	08:33	07:41	17:03 (5)	06:35			06:21		19:06 (4)	05:21	20:51 (2)
	16:40	17:40	8	17:11 (5)	18:34		20:31	21	19:27 (4)	21:25	22:00
19	08:32	07:39	17:02 (5)	06:33			06:18		19:09 (4)	05:19	20:52 (2)
	16:41	17:42	11	17:13 (5)	18:36		20:33	16	19:25 (4)	21:27	22:00
20	08:31	07:36	17:01 (5)	06:31			06:16		19:13 (4)	05:18	20:52 (2)
	16:43	17:44	15	17:16 (5)	18:38		20:35	8	19:21 (4)	21:28	22:00
21	08:30	07:34	17:00 (5)	06:28			06:14			05:16	20:56 (2)
	16:45	17:46	18	17:18 (5)	18:40		20:37		1	20:57 (2)	22:01
22	08:28	07:32	16:59 (5)	06:26			06:12			05:15	20:55 (2)
	16:47	17:48	20	17:19 (5)	18:41		20:39		4	20:59 (2)	22:01
23	08:27	07:30	16:59 (5)	06:23			06:09			05:13	20:53 (2)
	16:49	17:50	23	17:22 (5)	18:43		20:41		6	20:59 (2)	22:01
24	08:26	07:28	16:59 (5)	06:21			06:07			05:12	20:52 (2)
	16:50	17:52	25	17:24 (5)	18:45		20:42		9	21:01 (2)	22:01
25	08:24	07:25	16:58 (5)	06:18			06:05			05:11	20:51 (2)
	16:52	17:54	25	17:23 (5)	18:47		20:44		11	21:02 (2)	22:01
26	08:23	07:23	16:58 (5)	06:16		18:19 (4)	06:03			05:09	20:51 (2)
	16:54	17:56	25	17:23 (5)	18:49	3	18:22 (4)		13	21:04 (2)	22:01
27	08:22	07:21	16:59 (5)	06:13		18:15 (4)	06:01			05:08	20:50 (2)
	16:56	17:58	24	17:23 (5)	18:51	9	18:24 (4)		15	21:05 (2)	22:01
28	08:20	07:18	16:58 (5)	06:11		18:12 (4)	05:58			05:07	20:50 (2)
	16:58	18:00	24	17:22 (5)	18:53	14	18:26 (4)		16	21:06 (2)	22:01
29	08:18			07:08		19:09 (4)	05:56			05:06	20:50 (2)
	17:00			19:54	19	19:28 (4)	20:52		17	21:07 (2)	22:01
30	08:17			07:06		19:08 (4)	05:54			05:05	20:49 (2)
	17:02			19:56	22	19:30 (4)	20:53		19	21:08 (2)	22:00
31	08:15			07:04		19:06 (4)				05:04	20:49 (2)
	17:04			19:58	25	19:31 (4)			20	21:09 (2)	
Potential sun hours	250	273		367		420		494		510	
Total, worst case			221		166		697		131		819
Sun reduction			0.23		0.27		0.35		0.38		0.32
Oper. time red.			1.00		1.00		1.00		1.00		1.00
Wind dir. red.			0.67		0.67		0.67		0.62		0.62
Total reduction			0.16		0.18		0.24		0.23		0.20
Total, real			35		30		165		31		161

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: N - H14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:54 (2)	05:39	06:33	18:59 (4)	07:26		07:24	08:19		
	22:00	28	21:22 (2)	21:25	20:18	46	19:45 (3)	19:05	16:54	16:10	
2	05:00	20:55 (2)	05:40	06:35	18:59 (4)	07:28		07:26	08:21		
	22:00	28	21:23 (2)	21:23	20:16	46	19:45 (3)	19:02	16:52	16:09	
3	05:00	20:54 (2)	05:42	06:36	18:57 (4)	07:30		07:28	08:22		
	21:59	28	21:22 (2)	21:21	20:13	48	19:45 (3)	19:00	16:50	16:08	
4	05:01	20:55 (2)	05:44	06:38	18:57 (4)	07:31		07:30	08:24		
	21:59	28	21:23 (2)	21:19	20:11	46	19:43 (3)	18:57	16:48	16:08	
5	05:02	20:55 (2)	05:45	06:40	18:57 (4)	07:33		07:32	08:25		
	21:58	28	21:23 (2)	21:17	20:09	44	19:41 (3)	18:55	16:46	16:07	
6	05:03	20:55 (2)	05:47	06:42	18:57 (4)	07:35		07:34	08:26		
	21:57	27	21:22 (2)	21:15	20:06	42	19:39 (3)	18:52	16:44	16:07	
7	05:04	20:56 (2)	05:49	06:43	18:56 (4)	07:37		07:36	08:28		
	21:57	26	21:22 (2)	21:13	20:04	39	19:35 (3)	18:50	16:43	16:06	
8	05:05	20:56 (2)	05:51	06:45	18:57 (4)	07:39		07:38	08:29		
	21:56	25	21:21 (2)	21:11	20:01	36	19:33 (3)	18:48	16:41	16:06	
9	05:06	20:56 (2)	05:52	06:47	18:57 (4)	07:41		07:40	08:30		
	21:55	25	21:21 (2)	21:09	19:59	34	19:31 (3)	18:45	16:39	16:05	
10	05:07	20:57 (2)	05:54	06:49	18:56 (4)	07:42	9	17:49 (5)	16:39	16:05	
	21:55	23	21:20 (2)	21:07	19:56	32	19:28 (3)	18:43	17:37 (5)	07:42	08:31
11	05:08	20:57 (2)	05:56	06:50	18:57 (4)	07:44	14	17:51 (5)	16:37	16:05	
	21:54	22	21:19 (2)	21:05	19:54	29	19:26 (3)	18:40	17:35 (5)	07:44	08:33
12	05:09	20:57 (2)	05:57	06:52	18:58 (4)	07:46	18	17:53 (5)	16:35	16:05	
	21:53	21	21:18 (2)	21:03	19:51	26	19:24 (4)	18:38	17:33 (5)	07:45	08:34
13	05:10	20:58 (2)	05:59	06:54	18:59 (4)	07:48	21	17:54 (5)	16:34	16:05	
	21:52	19	21:17 (2)	21:01	19:49	23	19:22 (4)	18:36	17:32 (5)	07:47	08:35
14	05:12	20:58 (2)	06:01	06:56	18:59 (4)	07:50	23	17:55 (5)	16:32	16:05	
	21:51	18	21:16 (2)	20:59	19:47	19	19:18 (4)	18:33	17:31 (5)	07:49	08:36
15	05:13	20:58 (2)	06:03	06:58	19:01 (4)	07:52	24	17:55 (5)	16:31	16:05	
	21:50	17	21:15 (2)	20:57	19:44	15	19:16 (4)	18:31	17:31 (5)	07:51	08:37
16	05:14	20:59 (2)	06:04	06:59	19:03 (4)	07:54	24	17:55 (5)	16:29	16:05	
	21:49	15	21:14 (2)	20:55	19:42	11	19:14 (4)	18:29	17:30 (5)	07:53	08:38
17	05:16	21:00 (2)	06:06	07:01	19:06 (4)	07:55	25	17:55 (5)	16:27	16:05	
	21:47	14	21:14 (2)	20:53	19:39	5	19:11 (4)	18:26	17:30 (5)	07:55	08:38
18	05:17	21:00 (2)	06:08	07:03	19:07	18:26	25	17:55 (5)	16:26	16:05	
	21:46	12	21:12 (2)	20:50	19:37	18:24	25	17:55 (5)	16:26	16:05	
19	05:18	21:01 (2)	06:10	07:05	19:09	18:24	25	17:55 (5)	16:24	16:05	
	21:45	10	21:11 (2)	20:48	19:34	18:22	22	17:52 (5)	16:23	16:05	
20	05:20	21:03 (2)	06:12	07:06	19:08	18:20	20	17:50 (5)	16:22	16:06	
	21:44	7	21:10 (2)	20:46	19:32	18:20	20	17:50 (5)	16:22	16:06	
21	05:21	21:04 (2)	06:13	07:08	19:10	18:20	17	17:48 (5)	16:20	16:06	
	21:42	5	21:09 (2)	20:44	19:29	18:17	17	17:48 (5)	16:20	16:06	
22	05:23	21:05 (2)	06:15	07:10	19:12	18:15	13	17:45 (5)	16:19	16:06	
	21:41	2	21:07 (2)	20:42	19:27	18:15	13	17:45 (5)	16:19	16:06	
23	05:24		06:17	19:16 (4)	07:12	18:07	10	17:43 (5)	16:18	16:07	
	21:39		20:39	19:25 (4)	19:24	18:13	10	17:43 (5)	16:18	16:07	
24	05:26		06:19	19:12 (4)	07:13	18:09	7	17:41 (5)	16:17	16:08	
	21:38		20:37	19:29 (4)	19:22	18:11	7	17:41 (5)	16:17	16:08	
25	05:27		06:20	19:09 (4)	07:15	17:11	1	16:37 (5)	16:16	16:08	
	21:36		20:35	19:30 (4)	19:19	17:09	1	16:38 (5)	16:16	16:08	
26	05:29		06:22	19:07 (4)	07:17	17:13			16:11	16:09	
	21:35		20:32	19:32 (4)	19:17	17:06			16:14	16:09	
27	05:30		06:24	19:06 (4)	07:19	17:14			16:13	16:10	
	21:33		20:30	19:34 (4)	19:14	17:04			16:13	16:10	
28	05:32		06:26	19:03 (4)	07:21	17:16			16:12	16:11	
	21:32		20:28	19:39 (3)	19:12	17:02			16:12	16:11	
29	05:34		06:27	19:02 (4)	07:22	17:18			16:12	16:11	
	21:30		20:25	19:42 (3)	19:09	17:00			16:12	16:11	
30	05:35		06:29	19:02 (4)	07:24	17:20			16:18	16:12	
	21:28		20:23	19:44 (3)	19:07	16:58			16:11	16:12	
31	05:37		06:31	19:00 (4)		17:22				16:13	
	21:26		20:21	19:44 (3)		16:56				16:13	
Potential sun hours	512		460	382		328		259	233		
Total, worst case	428		262	541		298					
Sun reduction	0.32		0.34	0.32		0.29					
Oper. time red.	1.00		1.00	1.00		1.00					
Wind dir. red.	0.62		0.67	0.67		0.67					
Total reduction	0.20		0.23	0.22		0.20					
Total, real	85		60	116		59					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: O - H15

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14		07:16	16:59 (5)	07:01	18:54 (4)	05:52		05:03	20:40 (2)
	16:15	17:06		18:02	14 17:13 (5)	20:00	39 19:33 (3)	20:55		21:45	28 21:08 (2)
2	08:44	08:12		07:14	17:02 (5)	06:59	18:53 (4)	05:50		05:02	20:41 (2)
	16:16	17:08		18:04	7 17:09 (5)	20:02	42 19:35 (3)	20:57		21:46	28 21:09 (2)
3	08:43	08:10		07:11		06:56	18:53 (4)	05:48		05:01	20:41 (2)
	16:17	17:10		18:06		20:04	44 19:37 (3)	20:59		21:48	27 21:08 (2)
4	08:43	08:08		07:09		06:54	18:54 (4)	05:46		05:00	20:41 (2)
	16:18	17:12		18:07		20:06	45 19:39 (3)	21:01		21:49	27 21:08 (2)
5	08:43	08:07		07:07		06:51	18:53 (4)	05:44		04:59	20:40 (2)
	16:19	17:14		18:09		20:07	47 19:40 (3)	21:03		21:50	28 21:08 (2)
6	08:42	08:05		07:04		06:49	18:54 (4)	05:42		04:59	20:41 (2)
	16:21	17:16		18:11		20:09	48 19:42 (3)	21:04		21:51	28 21:09 (2)
7	08:42	08:03		07:02		06:47	18:53 (4)	05:40		04:58	20:41 (2)
	16:22	17:18		18:13		20:11	48 19:41 (3)	21:06		21:52	27 21:08 (2)
8	08:42	08:01		07:00		06:44	18:54 (4)	05:38		04:57	20:42 (2)
	16:24	17:20		18:15		20:13	46 19:40 (3)	21:08		21:53	27 21:09 (2)
9	08:41	07:59		06:57		06:42	18:56 (4)	05:36		04:57	20:42 (2)
	16:25	17:22		18:17		20:15	43 19:39 (3)	21:10		21:54	26 21:08 (2)
10	08:40	07:57		06:55		06:39	18:56 (4)	05:34		04:56	20:42 (2)
	16:26	17:24		18:19		20:17	41 19:37 (3)	21:11		21:55	27 21:09 (2)
11	08:40	07:55		06:52		06:37	18:58 (4)	05:33		04:56	20:43 (2)
	16:28	17:26		18:21		20:19	34 19:35 (3)	21:13		21:55	26 21:09 (2)
12	08:39	07:53		06:50		06:35	19:00 (4)	05:31		04:55	20:43 (2)
	16:30	17:28		18:23		20:20	20 19:20 (4)	21:15		21:56	26 21:09 (2)
13	08:38	07:51		06:48		06:32	19:01 (4)	05:29		04:55	20:43 (2)
	16:31	17:30		18:25		20:22	16 19:17 (4)	21:17		21:57	26 21:09 (2)
14	08:37	07:49		06:45		06:30	19:06 (4)	05:27		04:55	20:44 (2)
	16:33	17:32		18:27		20:24	6 19:12 (4)	21:18		21:57	25 21:09 (2)
15	08:36	07:47	17:00 (5)	06:43		06:28		05:26		04:55	20:44 (2)
	16:34	17:34	5 17:05 (5)	18:28		20:26		21:20		21:58	25 21:09 (2)
16	08:35	07:45	16:59 (5)	06:40		06:25		05:24		04:54	20:44 (2)
	16:36	17:36	8 17:07 (5)	18:30		20:28		21:22	4 20:50 (2)	21:59	26 21:10 (2)
17	08:34	07:43	16:58 (5)	06:38		06:23		05:22		20:44 (2)	04:54 20:45 (2)
	16:38	17:38	11 17:09 (5)	18:32		20:30		21:23	7 20:51 (2)	21:59	25 21:10 (2)
18	08:33	07:41	16:56 (5)	06:35		06:21		05:21		20:43 (2)	04:54 20:45 (2)
	16:40	17:40	15 17:11 (5)	18:34		20:31		21:25	10 20:53 (2)	22:00	25 21:10 (2)
19	08:32	07:39	16:55 (5)	06:33		06:18		05:19		20:43 (2)	04:54 20:45 (2)
	16:41	17:42	18 17:13 (5)	18:36		20:33		21:27	11 20:54 (2)	22:00	25 21:10 (2)
20	08:31	07:36	16:55 (5)	06:31		06:16		05:18		20:42 (2)	04:54 20:45 (2)
	16:43	17:44	21 17:16 (5)	18:38		20:35		21:28	13 20:55 (2)	22:00	25 21:10 (2)
21	08:30	07:34	16:55 (5)	06:28		06:14		05:16		20:41 (2)	04:54 20:45 (2)
	16:45	17:46	23 17:18 (5)	18:40		20:37		21:30	16 20:57 (2)	22:01	25 21:10 (2)
22	08:28	07:32	16:54 (5)	06:26	18:07 (4)	06:12		05:15		20:41 (2)	04:55 20:46 (2)
	16:47	17:48	25 17:19 (5)	18:41	8 18:15 (4)	20:39		21:31	18 20:59 (2)	22:01	25 21:11 (2)
23	08:27	07:30	16:54 (5)	06:23	18:05 (4)	06:09		05:13		20:40 (2)	04:55 20:46 (2)
	16:49	17:50	25 17:19 (5)	18:43	12 18:17 (4)	20:41		21:33	19 20:59 (2)	22:01	25 21:11 (2)
24	08:26	07:28	16:55 (5)	06:21	18:02 (4)	06:07		05:12		20:40 (2)	04:55 20:46 (2)
	16:50	17:52	24 17:19 (5)	18:45	16 18:18 (4)	20:42		21:34	21 21:01 (2)	22:01	25 21:11 (2)
25	08:24	07:25	16:55 (5)	06:18	18:01 (4)	06:05		05:11		20:40 (2)	04:55 20:47 (2)
	16:52	17:54	23 17:18 (5)	18:47	20 18:21 (4)	20:44		21:36	22 21:02 (2)	22:01	25 21:12 (2)
26	08:23	07:23	16:55 (5)	06:16	17:58 (4)	06:03		05:09		20:40 (2)	04:56 20:47 (2)
	16:54	17:56	22 17:17 (5)	18:49	24 18:22 (4)	20:46		21:37	24 21:04 (2)	22:01	25 21:12 (2)
27	08:22	07:21	16:57 (5)	06:13	17:58 (4)	06:01		05:08		20:40 (2)	04:56 20:46 (2)
	16:56	17:58	20 17:17 (5)	18:51	26 18:24 (4)	20:48		21:39	25 21:05 (2)	22:01	25 21:11 (2)
28	08:20	07:18	16:57 (5)	06:11	17:57 (4)	05:58		05:07		20:40 (2)	04:57 20:47 (2)
	16:58	18:00	17 17:14 (5)	18:53	29 18:26 (4)	20:50		21:40	26 21:06 (2)	22:01	25 21:12 (2)
29	08:18			07:08	18:56 (4)	05:56		05:06		20:40 (2)	04:57 20:47 (2)
	17:00			19:54	32 19:28 (4)	20:52		21:41	27 21:07 (2)	22:01	26 21:13 (2)
30	08:17			07:06	18:55 (4)	05:54		05:05		20:40 (2)	04:58 20:47 (2)
	17:02			19:56	35 19:30 (3)	20:53		21:43	28 21:08 (2)	22:00	26 21:13 (2)
31	08:15			07:04	18:54 (4)			05:04		20:40 (2)	
	17:04			19:58	37 19:31 (3)			21:44	28 21:08 (2)		
Potential sun hours	250	273		367		420		494		510	
Total, worst case			257		260		519		299		779
Sun reduction			0.23		0.27		0.35		0.38		0.32
Oper. time red.			1.00		1.00		1.00		1.00		1.00
Wind dir. red.			0.67		0.67		0.67		0.62		0.62
Total reduction			0.16		0.18		0.24		0.24		0.20
Total, real			40		48		123		71		155

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: O - H15

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:47 (2)	05:39	06:33	18:56 (4)	07:26		07:24	08:19		
	22:00	26	21:13 (2)	21:25	20:18	35	19:34 (3)	19:05	16:54	16:10	
2	04:59	20:48 (2)	05:40	06:35	18:55 (4)	07:28		07:26	08:21		
	22:00	26	21:14 (2)	21:23	20:16	41	19:36 (3)	19:02	16:52	16:09	
3	05:00	20:47 (2)	05:42	06:36	18:53 (4)	07:30		07:28	08:22		
	21:59	26	21:13 (2)	21:21	20:13	44	19:37 (3)	19:00	16:50	16:08	
4	05:01	20:47 (2)	05:44	06:38	18:51 (4)	07:31		07:30	08:24		
	21:59	27	21:14 (2)	21:19	20:11	46	19:37 (3)	18:57	16:48	16:08	
5	05:02	20:48 (2)	05:45	06:40	18:51 (4)	07:33		07:32	08:25		
	21:58	26	21:14 (2)	21:17	20:09	47	19:38 (3)	18:55	16:46	16:07	
6	05:03	20:48 (2)	05:47	06:42	18:50 (4)	07:35		07:34	08:26		
	21:57	27	21:15 (2)	21:15	20:06	49	19:39 (3)	18:52	16:44	16:07	
7	05:04	20:48 (2)	05:49	06:43	18:48 (4)	07:37		07:36	08:28		
	21:57	27	21:15 (2)	21:13	20:04	47	19:35 (3)	18:50	16:43	16:06	
8	05:05	20:48 (2)	05:51	06:45	18:48 (4)	07:39		07:38	08:29		
	21:56	28	21:16 (2)	21:11	20:01	45	19:33 (3)	18:48	16:41	16:06	
9	05:06	20:48 (2)	05:52	06:47	18:48 (4)	07:41		07:40	08:30		
	21:55	28	21:16 (2)	21:09	19:59	43	19:31 (3)	18:45	16:39	16:05	
10	05:07	20:48 (2)	05:54	06:49	18:46 (4)	07:42		07:42	08:31		
	21:55	28	21:16 (2)	21:07	19:56	42	19:28 (3)	18:43	16:37	16:05	
11	05:08	20:48 (2)	05:56	06:50	18:46 (4)	07:44		07:44	08:33		
	21:54	28	21:16 (2)	21:05	19:54	40	19:26 (3)	18:40	16:35	16:05	
12	05:09	20:48 (2)	05:57	06:52	18:46 (4)	07:46		17:34 (5)	07:45	08:34	
	21:53	28	21:16 (2)	21:03	19:51	38	19:24 (3)	18:38	17:45 (5)	16:34	16:05
13	05:10	20:48 (2)	05:59	06:54	18:46 (4)	07:48	11	17:32 (5)	07:47	08:35	
	21:52	28	21:16 (2)	21:01	19:49	36	19:22 (3)	18:36	17:47 (5)	16:32	16:05
14	05:12	20:48 (2)	06:01	06:56	18:46 (4)	07:50	15	17:30 (5)	07:49	08:36	
	21:51	28	21:16 (2)	20:59	19:47	32	19:18 (4)	18:33	17:48 (5)	16:31	16:05
15	05:13	20:48 (2)	06:03	06:58	18:46 (4)	07:52	18	17:28 (5)	07:51	08:37	
	21:50	27	21:15 (2)	20:57	19:44	30	19:16 (4)	18:31	17:49 (5)	16:29	16:05
16	05:14	20:48 (2)	06:04	06:59	18:47 (4)	07:54	21	17:27 (5)	07:53	08:38	
	21:49	26	21:14 (2)	20:55	19:42	27	19:14 (4)	18:29	17:50 (5)	16:27	16:05
17	05:16	20:49 (2)	06:06	07:01	18:47 (4)	07:55	23	17:27 (5)	07:55	08:38	
	21:47	25	21:14 (2)	20:53	19:39	24	19:11 (4)	18:26	17:50 (5)	16:26	16:05
18	05:17	20:49 (2)	06:08	07:03	18:48 (4)	07:57	23	17:26 (5)	07:57	08:39	
	21:46	23	21:12 (2)	20:50	19:37	20	19:08 (4)	18:24	17:50 (5)	16:24	16:05
19	05:18	20:49 (2)	06:10	07:05	18:49 (4)	07:59	24	17:26 (5)	07:59	08:40	
	21:45	22	21:11 (2)	20:48	19:34	17	19:06 (4)	18:22	17:50 (5)	16:23	16:05
20	05:20	20:50 (2)	06:12	07:06	18:51 (4)	08:01	25	17:25 (5)	08:00	08:41	
	21:44	20	21:10 (2)	20:46	19:32	13	19:04 (4)	18:20	17:50 (5)	16:22	16:06
21	05:21	20:51 (2)	06:13	07:08	18:52 (4)	08:03	23	17:25 (5)	08:02	08:41	
	21:42	18	21:09 (2)	20:44	19:29	9	19:01 (4)	18:17	17:48 (5)	16:20	16:06
22	05:23	20:51 (2)	06:15	07:10	18:55 (4)	08:05	19	17:26 (5)	08:04	08:42	
	21:41	16	21:07 (2)	20:42	19:27	3	18:58 (4)	18:15	17:45 (5)	16:19	16:06
23	05:24	20:52 (2)	06:17	07:12	18:58 (4)	08:07	17	17:26 (5)	08:06	08:42	
	21:39	15	21:07 (2)	20:39	19:24		18:13	17:43 (5)	16:18	16:07	
24	05:26	20:52 (2)	06:19	07:13	18:59	14	18:09	17:27 (5)	08:08	08:43	
	21:38	13	21:05 (2)	20:37	19:22		18:11	17:41 (5)	16:17	16:08	
25	05:27	20:54 (2)	06:20	07:15	18:57	11	18:11	16:27 (5)	08:09	08:43	
	21:36	10	21:04 (2)	20:35	19:19		17:09	16:38 (5)	16:16	16:08	
26	05:29	20:54 (2)	06:22	07:17	18:57	7	17:13	16:29 (5)	08:11	08:43	
	21:35	8	21:02 (2)	20:32	19:17		17:06	16:36 (5)	16:14	16:09	
27	05:30	20:55 (2)	06:24	07:19	18:54	4	17:14	16:30 (5)	08:13	08:44	
	21:33	5	21:00 (2)	20:30	19:14		17:04	16:34 (5)	16:13	16:10	
28	05:32	20:57 (2)	06:26	07:21	18:53		17:16		08:14	08:44	
	21:32	2	20:59 (2)	20:28	19:12		17:02		16:12	16:11	
29	05:34		06:27	19:07 (4)	07:22		17:18		08:16	08:44	
	21:30		20:25	6	19:13 (4)	19:09	17:00		16:12	16:11	
30	05:35		06:29	19:02 (4)	07:24		17:20		08:18	08:44	
	21:28		20:23	16	19:18 (4)	19:07	16:58		16:11	16:12	
31	05:37		06:31	18:58 (4)			07:22			08:44	
	21:26		20:21	21	19:19 (4)		16:56			16:13	
Potential sun hours	512		460		382		328		259	233	
Total, worst case		611		43	728		279				
Sun reduction		0.32		0.34	0.32		0.29				
Oper. time red.		1.00		1.00	1.00		1.00				
Wind dir. red.		0.62		0.68	0.67		0.67				
Total reduction		0.20		0.23	0.22		0.20				
Total, real		123		10	157		55				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: P - H16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	18:48 (4)	05:52
	16:15	17:06	18:02	20:00	45	19:33 (3)
2	08:44	08:12	07:14	06:59	18:48 (4)	05:50
	16:16	17:08	18:04	20:02	47	19:35 (3)
3	08:43	08:10	07:11	06:56	18:49 (4)	05:48
	16:17	17:10	18:06	20:04	48	19:37 (3)
4	08:43	08:08	07:09	06:54	18:50 (4)	05:46
	16:18	17:12	18:07	20:06	49	19:39 (3)
5	08:43	08:07	07:07	06:51	18:50 (4)	05:44
	16:19	17:14	18:09	20:07	47	19:37 (3)
6	08:42	08:05	07:04	06:49	18:51 (4)	05:42
	16:21	17:16	18:11	20:09	46	19:37 (3)
7	08:42	08:03	07:02	06:47	18:52 (4)	05:40
	16:22	17:18	18:13	20:11	41	19:35 (3)
8	08:42	08:01	07:00	06:44	18:54 (4)	05:38
	16:24	17:20	18:15	20:13	33	19:33 (3)
9	08:41	07:59	06:57	06:42	18:57 (4)	05:36
	16:25	17:22	18:17	20:15	21	19:30 (3)
10	08:40	07:57	06:55	06:39	19:03 (4)	05:34
	16:26	17:24	18:19	20:17	1	19:04 (4)
11	08:40	07:55	06:52	06:37		05:33
	16:28	17:26	18:21	20:19		21:13
12	08:39	07:53	06:50	06:35		05:31
	16:30	17:28	18:23	20:20		21:15
13	08:38	07:51	16:56 (5)	06:48		05:29
	16:31	17:30	4	17:00 (5)		21:17
14	08:37	07:49	16:55 (5)	06:45		05:27
	16:33	17:32	7	17:02 (5)		21:18
15	08:36	07:47	16:54 (5)	06:43		05:26
	16:34	17:34	11	17:05 (5)		21:20
16	08:35	07:45	16:53 (5)	06:40		05:24
	16:36	17:36	14	17:07 (5)		21:22
17	08:34	07:43	16:53 (5)	06:38		05:22
	16:38	17:38	16	17:09 (5)		21:23
18	08:33	07:41	16:51 (5)	06:35	18:03 (4)	05:21
	16:40	17:40	20	17:11 (5)	4	18:07 (4)
19	08:32	07:39	16:51 (5)	06:33	18:00 (4)	05:19
	16:41	17:42	22	17:13 (5)	10	18:10 (4)
20	08:31	07:36	16:51 (5)	06:31	17:57 (4)	05:18
	16:43	17:44	25	17:16 (5)	14	18:11 (4)
21	08:30	07:34	16:52 (5)	06:28	17:56 (4)	05:16
	16:45	17:46	24	17:16 (5)	17	18:13 (4)
22	08:28	07:32	16:51 (5)	06:26	17:54 (4)	05:15
	16:47	17:48	24	17:15 (5)	21	18:15 (4)
23	08:27	07:30	16:52 (5)	06:23	17:53 (4)	05:13
	16:49	17:50	23	17:15 (5)	24	18:17 (4)
24	08:26	07:28	16:53 (5)	06:21	17:51 (4)	05:12
	16:50	17:52	21	17:14 (5)	27	18:18 (4)
25	08:24	07:25	16:53 (5)	06:18	17:51 (4)	05:11
	16:52	17:54	19	17:12 (5)	30	18:21 (4)
26	08:23	07:23	16:55 (5)	06:16	17:49 (4)	05:09
	16:54	17:56	16	17:11 (5)	33	18:22 (4)
27	08:22	07:21	16:57 (5)	06:13	17:49 (4)	05:08
	16:56	17:58	12	17:09 (5)	35	18:24 (4)
28	08:20	07:18	17:00 (5)	06:11	17:49 (4)	05:07
	16:58	18:00	5	17:05 (5)	37	18:26 (3)
29	08:18			07:08	18:48 (4)	05:06
	17:00			19:54	40	19:28 (3)
30	08:17			07:06	18:48 (4)	05:05
	17:02			19:56	42	19:30 (3)
31	08:15			07:04	18:48 (4)	05:04
	17:04			19:58	43	19:31 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case		263		377		641
Sun reduction		0.23		0.27		0.32
Oper. time red.		1.00		1.00		1.00
Wind dir. red.		0.67		0.68		0.63
Total reduction		0.16		0.18		0.20
Total, real		41		69		129

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: P - H16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July			August			September			October			November		December	
1	04:59	20:44 (2)	05:39	20:52 (2)	06:33		07:26		07:24	08:19					
	22:00	22	21:06 (2)	21:25	1	20:53 (2)	20:18		16:54	16:10					
2	04:59	20:44 (2)	05:40		06:35		19:01 (4)	07:28		07:26	08:21				
	22:00	22	21:06 (2)	21:23		20:16	2	19:03 (4)	19:02		16:52	16:09			
3	05:00	20:44 (2)	05:42		06:36		18:54 (4)	07:30		07:28	08:22				
	21:59	22	21:06 (2)	21:21		20:13	21	19:27 (3)	19:00		16:50	16:08			
4	05:01	20:44 (2)	05:44		06:38		18:51 (4)	07:31		07:30	08:24				
	21:59	23	21:07 (2)	21:19		20:11	33	19:30 (3)	18:57		16:48	16:08			
5	05:02	20:44 (2)	05:45		06:40		18:49 (4)	07:33		07:32	08:25				
	21:58	23	21:07 (2)	21:17		20:09	41	19:32 (3)	18:55		16:46	16:07			
6	05:03	20:44 (2)	05:47		06:42		18:47 (4)	07:35		07:34	08:26				
	21:58	24	21:08 (2)	21:15		20:06	46	19:33 (3)	18:52		16:44	16:07			
7	05:04	20:44 (2)	05:49		06:43		18:45 (4)	07:37		07:36	08:28				
	21:57	24	21:08 (2)	21:13		20:04	48	19:33 (3)	18:50		16:43	16:06			
8	05:05	20:44 (2)	05:51		06:45		18:44 (4)	07:39		07:38	08:29				
	21:56	25	21:09 (2)	21:11		20:01	49	19:33 (3)	18:48		16:41	16:06			
9	05:06	20:44 (2)	05:52		06:47		18:43 (4)	07:41		07:40	08:30				
	21:55	25	21:09 (2)	21:09		19:59	48	19:31 (3)	18:45		16:39	16:05			
10	05:07	20:44 (2)	05:54		06:49		18:41 (4)	07:42		07:42	08:31				
	21:55	26	21:10 (2)	21:07		19:56	47	19:28 (3)	18:43		16:37	16:05			
11	05:08	20:44 (2)	05:56		06:50		18:41 (4)	07:44		07:44	08:33				
	21:54	26	21:10 (2)	21:05		19:54	45	19:26 (3)	18:40		16:35	16:05			
12	05:09	20:43 (2)	05:57		06:52		18:40 (4)	07:46		07:45	08:34				
	21:53	27	21:10 (2)	21:03		19:51	44	19:24 (3)	18:38		16:34	16:05			
13	05:10	20:43 (2)	05:59		06:54		18:40 (4)	07:48		07:47	08:35				
	21:52	27	21:10 (2)	21:01		19:49	42	19:22 (3)	18:36		16:32	16:05			
14	05:12	20:43 (2)	06:01		06:56		18:39 (4)	07:50		17:31 (5)	07:49	08:36			
	21:51	27	21:10 (2)	20:59		19:47	39	19:18 (3)	18:33	9	17:40 (5)	16:31	16:05		
15	05:13	20:43 (2)	06:03		06:58		18:38 (4)	07:52		17:28 (5)	07:51	08:37			
	21:50	28	21:11 (2)	20:57		19:44	38	19:16 (3)	18:31	14	17:42 (5)	16:29	16:05		
16	05:14	20:43 (2)	06:04		06:59		18:39 (4)	07:54		17:26 (5)	07:53	08:38			
	21:49	28	21:11 (2)	20:55		19:42	35	19:14 (3)	18:29	18	17:44 (5)	16:27	16:05		
17	05:16	20:43 (2)	06:06		07:01		18:38 (4)	07:55		17:25 (5)	07:55	08:38			
	21:47	28	21:11 (2)	20:53		19:39	33	19:11 (4)	18:26	20	17:45 (5)	16:26	16:05		
18	05:17	20:43 (2)	06:08		07:03		18:38 (4)	07:57		17:24 (5)	07:57	08:39			
	21:46	28	21:11 (2)	20:50		19:37	30	19:08 (4)	18:24	22	17:46 (5)	16:24	16:05		
19	05:18	20:43 (2)	06:10		07:05		18:39 (4)	07:59		17:23 (5)	07:59	08:40			
	21:45	28	21:11 (2)	20:48		19:34	27	19:06 (4)	18:22	23	17:46 (5)	16:23	16:05		
20	05:20	20:44 (2)	06:12		07:06		18:39 (4)	08:01		17:22 (5)	08:00	08:41			
	21:44	26	21:10 (2)	20:46		19:32	25	19:04 (4)	18:20	24	17:46 (5)	16:22	16:06		
21	05:21	20:44 (2)	06:13		07:08		18:39 (4)	08:03		17:22 (5)	08:02	08:41			
	21:42	25	21:09 (2)	20:44		19:29	22	19:01 (4)	18:17	24	17:46 (5)	16:20	16:06		
22	05:23	20:44 (2)	06:15		07:10		18:40 (4)	08:05		17:22 (5)	08:04	08:42			
	21:41	23	21:07 (2)	20:42		19:27	18	18:58 (4)	18:15	23	17:45 (5)	16:19	16:06		
23	05:24	20:45 (2)	06:17		07:12		18:42 (4)	08:07		17:22 (5)	08:06	08:42			
	21:39	22	21:07 (2)	20:39		19:24	14	18:56 (4)	18:13	21	17:43 (5)	16:18	16:07		
24	05:26	20:44 (2)	06:19		07:13		18:43 (4)	08:09		17:22 (5)	08:08	08:43			
	21:38	21	21:05 (2)	20:37		19:22	11	18:54 (4)	18:11	19	17:41 (5)	16:17	16:08		
25	05:27	20:45 (2)	06:20		07:15		18:45 (4)	07:11		16:22 (5)	08:09	08:43			
	21:36	19	21:04 (2)	20:35		19:19	6	18:51 (4)	17:09	16	16:38 (5)	16:16	16:08		
26	05:29	20:46 (2)	06:22		07:17			07:13		16:23 (5)	08:11	08:43			
	21:35	16	21:02 (2)	20:32		19:17		17:06		13	16:36 (5)	16:14	16:09		
27	05:30	20:46 (2)	06:24		07:19			07:14		16:24 (5)	08:13	08:44			
	21:33	14	21:00 (2)	20:30		19:14		17:04		10	16:34 (5)	16:13	16:10		
28	05:32	20:47 (2)	06:26		07:21			07:16			16:25 (5)	08:14	08:44		
	21:32	12	20:59 (2)	20:28		19:12		17:02		6	16:31 (5)	16:12	16:11		
29	05:34	20:47 (2)	06:27		07:22			07:18			16:26 (5)	08:16	08:44		
	21:30	10	20:57 (2)	20:25		19:09		17:00		3	16:29 (5)	16:12	16:11		
30	05:35	20:49 (2)	06:29		07:24			07:20			08:18	08:44			
	21:28	7	20:56 (2)	20:23		19:07		16:58			16:11	16:12			
31	05:37	20:51 (2)	06:31					07:22				08:44			
	21:26	4	20:55 (2)	20:21				16:56				16:13			
Potential sun hours	512		460		382		328		259		233				
Total, worst case	682		1		764		265								
Sun reduction	0.32		0.34		0.32		0.29								
Oper. time red.	1.00		1.00		1.00		1.00								
Wind dir. red.	0.63		0.63		0.67		0.67								
Total reduction	0.20		0.21		0.22		0.20								
Total, real	139		0		165		52								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: Q - H17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:06 (5)	07:16	16:45 (4)	07:01	05:52	19:44 (2)	05:03		
	16:15	17:06	20 16:26 (5)	18:02	29 17:14 (4)	20:00	20:55	28 20:12 (2)	21:45		
2	08:44	08:12	16:07 (5)	07:14	16:46 (4)	06:59	05:50	19:44 (2)	05:02		
	16:16	17:08	18 16:25 (5)	18:04	26 17:12 (4)	20:02	20:57	27 20:11 (2)	21:46		
3	08:44	08:10	16:08 (5)	07:12	16:48 (4)	06:56	05:48	19:45 (2)	05:01		
	16:17	17:10	16 16:24 (5)	18:06	23 17:11 (4)	20:04	20:59	25 20:10 (2)	21:48		
4	08:43	08:08	16:10 (5)	07:09	16:50 (4)	06:54	05:46	19:46 (2)	05:00		
	16:18	17:12	13 16:23 (5)	18:07	19 17:09 (4)	20:06	21:01	23 20:09 (2)	21:49		
5	08:43	08:07	16:13 (5)	07:07	16:53 (4)	06:51	05:44	19:47 (2)	04:59		
	16:19	17:14	7 16:20 (5)	18:09	12 17:05 (4)	20:07	21:03	20 20:07 (2)	21:50		
6	08:42	08:05	07:04	18:11	2 17:45 (3)	20:09	05:42	19:49 (2)	04:59		
	16:21	17:16	07:02	18:13	5 17:46 (3)	20:11	05:40	19:52 (2)	04:58		
7	08:42	08:03	07:02	18:15	8 17:48 (3)	20:13	05:40	20:04 (2)	21:52		
	16:22	17:18	07:00	18:15	8 17:48 (3)	20:13	05:38	19:56 (2)	04:57		
8	08:42	08:01	18:15	06:57	17:39 (3)	06:42	05:36	19:59 (2)	21:53		
	16:24	17:20	06:57	18:17	11 17:50 (3)	20:15	05:36		04:57		
9	08:41	07:59	16:51 (4)	06:55	17:38 (3)	06:39	05:34		21:54		
	16:25	17:22	16:54 (4)	18:19	14 17:52 (3)	20:17	05:33		04:56		
10	08:40	07:57	16:49 (4)	06:52	17:38 (3)	06:37	05:33		21:55		
	16:26	17:24	3 16:56 (4)	18:21	17 17:55 (3)	20:19	05:31		04:56		
11	08:40	07:55	16:47 (4)	06:50	17:38 (3)	06:35	05:31		21:55		
	16:28	17:26	7 16:58 (4)	18:23	18 17:56 (3)	20:20	05:31		04:55		
12	08:39	07:53	16:46 (4)	06:48	17:38 (3)	06:32	05:29		21:56		
	16:30	17:28	11 17:00 (4)	18:25	20 17:58 (3)	20:22	05:29		04:55		
13	08:38	07:51	16:45 (4)	06:45	17:38 (3)	06:30	05:27		21:57		
	16:31	17:30	14 17:02 (4)	18:27	22 18:00 (3)	20:24	05:27		04:55		
14	08:37	07:49	16:45 (4)	06:43	17:39 (3)	06:28	05:26		21:58		
	16:33	17:32	17 17:05 (4)	18:28	20 17:59 (3)	20:26	05:26		04:54		
15	08:36	07:47	16:44 (4)	06:40	17:39 (3)	06:25	05:25		21:58		
	16:34	17:34	20 16:44 (4)	18:30	18 17:57 (3)	20:28	05:24		04:54		
16	08:35	07:45	16:44 (4)	06:38	17:41 (3)	06:23	05:22		21:59		
	16:36	17:36	23 17:09 (4)	18:32	15 17:56 (3)	20:30	05:22		04:54		
17	08:34	07:43	16:42 (4)	06:35	17:43 (3)	06:21	05:21		22:00		
	16:38	17:38	9 17:52 (3)	20:31	16 20:03 (2)	21:25	05:19		04:54		
18	08:33	16:04 (5)	07:39	16:42 (4)	06:18	19:46 (2)	05:19		22:00		
	16:40	16:05 (5)	17:40	17:13 (4)	20:33	19 20:05 (2)	21:27		04:54		
19	08:32	16:04 (5)	07:39	16:42 (4)	06:16	19:46 (2)	05:18		22:00		
	16:41	16:07 (5)	17:42	17:16 (4)	20:35	21 20:07 (2)	21:28		04:54		
20	08:31	16:03 (5)	07:36	16:42 (4)	06:14	19:44 (2)	05:16		22:01		
	16:43	5 16:08 (5)	17:44	17:18 (4)	20:37	24 20:08 (2)	21:30		04:55		
21	08:30	16:03 (5)	07:34	16:41 (4)	06:12	19:43 (2)	05:15		22:01		
	16:45	8 16:11 (5)	17:46	17:19 (4)	20:39	27 20:10 (2)	21:31		04:55		
22	08:29	16:02 (5)	07:32	16:42 (4)	06:09	19:43 (2)	05:13		22:01		
	16:47	10 16:12 (5)	17:48	16:42 (4)	20:41	29 20:12 (2)	21:33		04:55		
23	08:27	16:03 (5)	07:30	16:42 (4)	06:07	19:43 (2)	05:12		22:01		
	16:49	12 16:15 (5)	17:50	17:19 (4)	20:42	31 20:14 (2)	21:34		04:55		
24	08:26	16:02 (5)	07:28	16:42 (4)	06:05	19:43 (2)	05:11		22:01		
	16:50	15 16:17 (5)	17:52	17:18 (4)	20:44	32 20:15 (2)	21:36		04:56		
25	08:24	16:03 (5)	07:25	16:43 (4)	06:03	19:43 (2)	05:09		22:01		
	16:52	16 16:19 (5)	17:54	17:17 (4)	20:46	32 20:15 (2)	21:37		04:56		
26	08:23	16:03 (5)	07:23	16:44 (4)	06:01	19:43 (2)	05:07		22:01		
	16:54	18 16:21 (5)	17:56	17:17 (4)	20:48	32 20:15 (2)	21:39		04:57		
27	08:22	16:03 (5)	07:21	16:44 (4)	05:58	19:43 (2)	05:07		22:01		
	16:56	20 16:23 (5)	17:58	16:44 (4)	20:50	31 20:14 (2)	21:40		04:57		
28	08:20	16:04 (5)	07:18	17:15 (4)	05:56	19:43 (2)	05:06		22:01		
	16:58	22 16:26 (5)	18:00	07:08	20:52	31 20:14 (2)	21:41		04:58		
29	08:18	16:04 (5)		07:06	20:53	30 20:13 (2)	21:43		22:00		
	17:00	23 16:27 (5)		19:56			05:04				
30	08:17	16:04 (5)		19:54			21:44				
	17:02	22 16:26 (5)		07:04							
31	08:15	16:05 (5)		19:58							
	17:04	21 16:26 (5)		367							
Potential sun hours	250		273		420		494		510		
Total, worst case		196	570	288	381		154				
Sun reduction		0.24	0.23	0.27	0.35		0.38				
Oper. time red.		1.00	1.00	1.00	1.00		1.00				
Wind dir. red.		0.66	0.67	0.67	0.65		0.65				
Total reduction		0.16	0.16	0.18	0.23		0.25				
Total, real		32	88	53	87		38				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: Q - H17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:17 (3) 16:54	16:21 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:16 (3) 16:52	16:23 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:16 (3) 16:50	16:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:16 (3) 16:48	16:24 16:08
5	05:02 21:58	05:45 21:17	20:03 (2) 20:11 (2)	06:40 20:09	07:32 18:17 (3)	16:25 16:07
6	05:03 21:58	05:47 21:15	20:00 (2) 20:14 (2)	06:42 20:06	07:34 18:17 (3)	15:42 (5) 16:07
7	05:04 21:57	05:49 21:13	19:59 (2) 20:16 (2)	06:43 20:04	07:36 18:17 (3)	15:40 (5) 16:06
8	05:05 21:56	05:50 21:12	19:56 (2) 20:17 (2)	06:45 20:01	07:38 18:17 (3)	15:38 (5) 16:06
9	05:06 21:55	05:52 21:10	19:55 (2) 20:19 (2)	06:47 19:59	07:40 18:15	15:37 (5) 16:05
10	05:07 21:55	05:54 21:07	19:53 (2) 20:19 (2)	06:49 19:56	07:42 18:14	15:37 (5) 16:05
11	05:08 21:54	05:56 21:05	19:53 (2) 20:20 (2)	06:50 19:54	07:44 18:40	15:36 (5) 16:05
12	05:09 21:53	05:57 21:03	19:52 (2) 20:21 (2)	06:52 19:51	07:46 18:38	15:36 (5) 16:05
13	05:10 21:52	05:59 21:01	19:51 (2) 20:21 (2)	06:54 19:49	07:48 18:36	15:36 (5) 16:05
14	05:12 21:51	06:01 20:59	19:50 (2) 20:21 (2)	06:56 19:47	07:50 18:33	15:36 (5) 16:04
15	05:13 21:50	06:03 20:57	19:50 (2) 20:22 (2)	06:58 19:44	07:52 18:31	15:36 (5) 16:05
16	05:14 21:49	06:04 20:55	19:49 (2) 20:21 (2)	06:59 19:42	07:54 18:29	15:36 (5) 16:05
17	05:16 21:47	06:06 20:53	19:49 (2) 20:21 (2)	07:01 19:39	07:55 18:26	15:36 (5) 16:05
18	05:17 21:46	06:08 20:51	19:49 (2) 20:22 (2)	07:03 19:37	07:57 18:24	15:36 (5) 16:05
19	05:18 21:45	06:10 20:48	19:48 (2) 20:19 (2)	07:05 19:34	07:59 18:22	15:37 (5) 16:05
20	05:20 21:44	06:12 20:46	19:49 (2) 20:17 (2)	07:06 19:32	08:01 18:20	15:37 (5) 16:06
21	05:21 21:42	06:13 20:44	19:49 (2) 20:15 (2)	07:08 19:29	08:03 18:17	15:38 (5) 16:06
22	05:23 21:41	06:15 20:42	19:49 (2) 20:12 (2)	07:10 19:27	08:05 18:15	15:39 (5) 16:06
23	05:24 21:39	06:17 20:39	19:49 (2) 20:10 (2)	07:12 19:24	08:07 18:13	15:40 (5) 16:07
24	05:26 21:38	06:19 20:37	19:50 (2) 20:09 (2)	07:13 19:22	08:09 18:11	15:41 (5) 16:08
25	05:27 21:36	06:20 20:35	19:50 (2) 20:06 (2)	07:15 19:19	08:09 18:11	15:42 (5) 16:08
26	05:29 21:35	06:22 20:32	19:52 (2) 20:04 (2)	07:17 19:17	08:11 18:05	16:16 16:09
27	05:30 21:33	06:24 20:30	19:53 (2) 20:02 (2)	07:19 19:14	08:13 18:03	16:14 (4) 16:10
28	05:32 21:32	06:26 20:28	19:54 (2) 19:59 (2)	07:21 19:12	08:14 18:02	16:15 (4) 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	18:19 (3) 18:40 (3)	07:18 17:00	16:16 (4) 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	18:17 (3) 18:38 (3)	07:20 16:58	16:17 (4) 16:11
31	05:37 21:26	06:31 20:21	07:25 16:56	18:38 (3) 16:25 (4)	07:21 16:25 (4)	16:18 (4) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		546	99	693	273	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.18	
Total, real		121	21	136	48	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: R - H18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44		08:14	16:23 (4)	07:16		17:31 (3)	07:01	05:52	19:35 (2)	05:03
	16:15		17:06	12 16:35 (4)	18:02	3	17:34 (3)	20:00	20:55	26 20:01 (2)	21:45
2	08:44		08:12	16:22 (4)	07:14		17:29 (3)	06:59	05:50	19:36 (2)	05:02
	16:16		17:08	15 16:37 (4)	18:04	7	17:36 (3)	20:02	20:57	23 19:59 (2)	21:46
3	08:44		08:10	16:21 (4)	07:12		17:28 (3)	06:56	05:48	19:37 (2)	05:01
	16:17		17:10	18 16:39 (4)	18:06	10	17:38 (3)	20:04	20:59	21 19:58 (2)	21:48
4	08:43		08:08	16:20 (4)	07:09		17:28 (3)	06:54	05:46	19:39 (2)	05:00
	16:18		17:12	21 16:41 (4)	18:07	13	17:41 (3)	20:06	21:01	17 19:56 (2)	21:49
5	08:43		08:07	16:20 (4)	07:07		17:26 (3)	06:51	05:44	19:41 (2)	04:59
	16:19		17:14	23 16:43 (4)	18:09	16	17:42 (3)	20:07	21:03	12 19:53 (2)	21:50
6	08:43		08:05	16:19 (4)	07:04		17:26 (3)	06:49	05:42		04:59
	16:21		17:16	26 16:45 (4)	18:11	19	17:45 (3)	20:09	21:04		21:51
7	08:42		08:03	16:19 (4)	07:02		17:26 (3)	06:47	05:40		04:58
	16:22	1	15:45 (5)	17:18	28 16:47 (4)	18:13	20 17:46 (3)	20:11	21:06		21:52
8	08:42		08:01	16:18 (4)	07:00		17:26 (3)	06:44	05:38		04:57
	16:24	2	15:46 (5)	17:20	32 16:50 (4)	18:15	22 17:48 (3)	20:13	21:08		21:53
9	08:41		07:59	16:18 (4)	06:57		17:26 (3)	06:42	05:36		04:57
	16:25	5	15:49 (5)	17:22	34 16:52 (4)	18:17	23 17:49 (3)	20:15	21:10		21:54
10	08:40		07:57	16:18 (4)	06:55		17:27 (3)	06:39	19:48 (2)		04:56
	16:26	6	15:50 (5)	17:24	36 16:54 (4)	18:19	22 17:49 (3)	20:17	1 19:49 (2)	21:11	21:55
11	08:40		07:55	16:18 (4)	06:52		17:28 (3)	06:37	19:44 (2)	05:33	04:56
	16:28	8	15:52 (5)	17:26	38 16:56 (4)	18:21	20 17:48 (3)	20:19	7 19:51 (2)	21:13	21:55
12	08:39		07:53	16:17 (4)	06:50		17:28 (3)	06:35	19:41 (2)	05:31	04:55
	16:30	10	15:54 (5)	17:28	40 16:57 (4)	18:23	18 17:46 (3)	20:20	12 19:53 (2)	21:15	21:56
13	08:38		07:51	16:17 (4)	06:48		17:30 (3)	06:32	19:39 (2)	05:29	04:55
	16:31	11	15:55 (5)	17:30	40 16:57 (4)	18:25	14 17:44 (3)	20:22	15 19:54 (2)	21:17	21:57
14	08:37		07:49	16:17 (4)	06:45		17:33 (3)	06:30	19:37 (2)	05:27	04:55
	16:33	13	15:57 (5)	17:32	40 16:57 (4)	18:27	8 17:41 (3)	20:24	19 19:56 (2)	21:18	21:58
15	08:36		07:47	16:18 (4)	06:43			06:28	19:36 (2)	05:26	04:54
	16:34	15	15:59 (5)	17:34	39 16:57 (4)	18:28		20:26	22 19:58 (2)	21:20	21:58
16	08:35		07:45	16:18 (4)	06:40			06:25	19:35 (2)	05:24	04:54
	16:36	16	16:00 (5)	17:36	39 16:57 (4)	18:30		20:28	25 20:00 (2)	21:22	21:59
17	08:34		07:43	16:19 (4)	06:38			06:23	19:33 (2)	05:22	04:54
	16:38	19	16:03 (5)	17:38	37 16:56 (4)	18:32		20:30	28 20:01 (2)	21:23	21:59
18	08:33		07:41	16:19 (4)	06:35			06:21	19:33 (2)	05:21	04:54
	16:40	20	16:05 (5)	17:40	36 16:55 (4)	18:34		20:31	30 20:03 (2)	21:25	22:00
19	08:32		07:39	16:20 (4)	06:33			06:18	19:32 (2)	05:19	04:54
	16:41	22	16:07 (5)	17:42	34 16:54 (4)	18:36		20:33	33 20:05 (2)	21:27	22:00
20	08:31		07:36	16:21 (4)	06:31			06:16	19:32 (2)	05:18	04:54
	16:43	23	16:08 (5)	17:44	33 16:54 (4)	18:38		20:35	35 20:07 (2)	21:28	22:00
21	08:30		07:34	16:22 (4)	06:28			06:14	19:31 (2)	05:16	04:54
	16:45	23	16:09 (5)	17:46	31 16:53 (4)	18:40		20:37	35 20:06 (2)	21:30	22:01
22	08:29		07:32	16:23 (4)	06:26			06:12	19:31 (2)	05:15	04:55
	16:47	23	16:09 (5)	17:48	28 16:51 (4)	18:42		20:39	35 20:06 (2)	21:31	22:01
23	08:27		07:30	16:24 (4)	06:23			06:09	19:31 (2)	05:13	04:55
	16:49	22	16:09 (5)	17:50	26 16:50 (4)	18:43		20:41	35 20:06 (2)	21:33	22:01
24	08:26		07:28	16:27 (4)	06:21			06:07	19:31 (2)	05:12	04:55
	16:50	22	16:09 (5)	17:52	21 16:48 (4)	18:45		20:43	35 20:06 (2)	21:34	22:01
25	08:24		07:25	16:29 (4)	06:18			06:05	19:31 (2)	05:11	04:55
	16:52	20	16:09 (5)	17:54	15 16:44 (4)	18:47		20:44	35 20:06 (2)	21:36	22:01
26	08:23		07:23	16:36 (4)	06:16			06:03	19:31 (2)	05:09	04:56
	16:54	19	16:08 (5)	17:56	2 16:38 (4)	18:49		20:46	34 20:05 (2)	21:37	22:01
27	08:22		07:21		06:13			06:01	19:32 (2)	05:08	04:56
	16:56	17	16:07 (5)	17:58		18:51		20:48	33 20:05 (2)	21:39	22:01
28	08:20		07:18		06:11			05:58	19:32 (2)	05:07	04:57
	16:58	15	16:07 (5)	18:00		18:53		20:50	32 20:04 (2)	21:40	22:01
29	08:18				07:08			05:56	19:33 (2)	05:06	04:57
	17:00	12	16:06 (5)		19:54			20:52	30 20:03 (2)	21:41	22:01
30	08:17				07:06			05:54	19:34 (2)	05:05	04:58
	17:02	12	16:30 (4)		19:56			20:54	28 20:02 (2)	21:43	22:00
31	08:15				07:04					05:04	
	17:04	7	16:31 (4)		19:58					21:44	
Potential sun hours	250		273		367		420		494		510
Total, worst case	363		744		215		559		99		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.66		0.68		0.65		0.65		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	58		113		39		129		25		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: R - H18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December	
1	04:59	05:39			06:33	19:43 (2)	07:26	18:08 (3)	07:24	15:47 (4)	08:19	15:26 (5)
	22:00	21:25			20:18	7 19:50 (2)	19:05	16 18:24 (3)	16:54	36 16:23 (4)	16:10	8 15:34 (5)
2	04:59	05:40			06:35	19:47 (2)	07:28	18:06 (3)	07:26	15:48 (4)	08:21	15:26 (5)
	22:00	21:23			20:16	1 19:48 (2)	19:02	20 18:26 (3)	16:52	33 16:21 (4)	16:09	7 15:33 (5)
3	05:00	05:42			06:36		07:30	18:05 (3)	07:28	15:48 (4)	08:22	15:27 (5)
	21:59	21:21			20:13		19:00	21 18:26 (3)	16:50	31 16:19 (4)	16:08	5 15:32 (5)
4	05:01	05:44			06:38		07:31	18:04 (3)	07:30	15:48 (4)	08:24	15:29 (5)
	21:59	21:19			20:11		18:57	23 18:27 (3)	16:48	29 16:17 (4)	16:08	3 15:32 (5)
5	05:02	05:45			06:40		07:33	18:03 (3)	07:32	15:49 (4)	08:25	15:29 (5)
	21:58	21:17			20:09		18:55	23 18:26 (3)	16:46	26 16:15 (4)	16:07	1 15:30 (5)
6	05:03	05:47			06:42		07:35	18:03 (3)	07:34	15:49 (4)	08:26	
	21:58	21:15			20:06		18:52	21 18:24 (3)	16:44	23 16:12 (4)	16:07	
7	05:04	05:49		19:54 (2)	06:43		07:37	18:02 (3)	07:36	15:50 (4)	08:28	
	21:57	21:13	6	20:00 (2)	20:04		18:50	19 18:21 (3)	16:43	20 16:10 (4)	16:06	
8	05:05	05:50		19:50 (2)	06:45		07:39	18:01 (3)	07:38	15:51 (4)	08:29	
	21:56	21:12	13	20:03 (2)	20:01		18:48	17 18:18 (3)	16:41	17 16:08 (4)	16:06	
9	05:06	05:52		19:47 (2)	06:47		07:41	18:02 (3)	07:40	15:52 (4)	08:30	
	21:55	21:10	19	20:06 (2)	19:59		18:45	14 18:16 (3)	16:39	14 16:06 (4)	16:05	
10	05:07	05:54		19:45 (2)	06:49		07:42	18:02 (3)	07:42	15:54 (4)	08:31	
	21:55	21:07	22	20:07 (2)	19:56		18:43	12 18:14 (3)	16:37	11 16:05 (4)	16:05	
11	05:08	05:56		19:44 (2)	06:50		07:44	18:03 (3)	07:44	15:56 (4)	08:33	
	21:54	21:05	24	20:08 (2)	19:54		18:40	8 18:11 (3)	16:35	7 16:03 (4)	16:05	
12	05:09	05:57		19:43 (2)	06:52		07:46	18:03 (3)	07:45	15:28 (5)	08:34	
	21:53	21:03	27	20:10 (2)	19:51		18:38	6 18:09 (3)	16:34	11 16:01 (4)	16:05	
13	05:10	05:59		19:41 (2)	06:54		07:48	18:05 (3)	07:47	15:26 (5)	08:35	
	21:52	21:01	29	20:10 (2)	19:49		18:36	2 18:07 (3)	16:32	12 15:38 (5)	16:05	
14	05:12	06:01		19:40 (2)	06:56		07:50		07:49	15:24 (5)	08:36	
	21:51	20:59	31	20:11 (2)	19:47		18:33		16:31	15 15:39 (5)	16:04	
15	05:13	06:03		19:40 (2)	06:58		07:52		07:51	15:23 (5)	08:37	
	21:50	20:57	32	20:12 (2)	19:44		18:31		16:29	17 15:40 (5)	16:05	
16	05:14	06:04		19:38 (2)	06:59		07:54	17:04 (4)	07:53	15:22 (5)	08:38	
	21:49	20:55	33	20:11 (2)	19:42		18:29	10 17:14 (4)	16:27	19 15:41 (5)	16:05	
17	05:16	06:06		19:38 (2)	07:01		07:55	17:00 (4)	07:55	15:22 (5)	08:38	
	21:47	20:53	34	20:12 (2)	19:39		18:26	17 17:17 (4)	16:26	20 15:42 (5)	16:05	
18	05:17	06:08		19:38 (2)	07:03		07:57	16:57 (4)	07:57	15:21 (5)	08:39	
	21:46	20:51	34	20:12 (2)	19:37		18:24	23 17:20 (4)	16:24	22 15:43 (5)	16:05	
19	05:18	06:10		19:37 (2)	07:05		07:59	16:55 (4)	07:59	15:21 (5)	08:40	
	21:45	20:48	35	20:12 (2)	19:34		18:22	26 17:21 (4)	16:23	22 15:43 (5)	16:05	
20	05:20	06:12		19:36 (2)	07:06		08:01	16:53 (4)	08:00	15:21 (5)	08:41	
	21:44	20:46	36	20:12 (2)	19:32		18:20	30 17:23 (4)	16:22	23 15:44 (5)	16:06	
21	05:21	06:13		19:37 (2)	07:08		08:03	16:52 (4)	08:02	15:21 (5)	08:41	
	21:42	20:44	35	20:12 (2)	19:29		18:17	32 17:24 (4)	16:20	23 15:44 (5)	16:06	
22	05:23	06:15		19:36 (2)	07:10		08:05	16:51 (4)	08:04	15:21 (5)	08:42	
	21:41	20:42	35	20:11 (2)	19:27		18:15	33 17:24 (4)	16:19	23 15:44 (5)	16:06	
23	05:24	06:17		19:36 (2)	07:12		08:07	16:50 (4)	08:06	15:21 (5)	08:42	
	21:39	20:39	34	20:10 (2)	19:24		18:13	35 17:25 (4)	16:18	22 15:43 (5)	16:07	
24	05:26	06:19		19:36 (2)	07:13		08:09	16:49 (4)	08:08	15:22 (5)	08:43	
	21:38	20:37	33	20:09 (2)	19:22		18:11	36 17:25 (4)	16:17	20 15:42 (5)	16:08	
25	05:27	06:20		19:36 (2)	07:15		07:11	15:48 (4)	08:09	15:22 (5)	08:43	
	21:36	20:35	30	20:06 (2)	19:19		17:09	38 16:26 (4)	16:16	19 15:41 (5)	16:08	
26	05:29	06:22		19:36 (2)	07:17		07:13	15:48 (4)	08:11	15:23 (5)	08:43	
	21:35	20:32	28	20:04 (2)	19:17		17:06	38 16:26 (4)	16:14	17 15:40 (5)	16:09	
27	05:30	06:24		19:37 (2)	07:19		07:15	15:47 (4)	08:13	15:23 (5)	08:44	
	21:33	20:30	25	20:02 (2)	19:14		17:04	39 16:26 (4)	16:13	15 15:38 (5)	16:10	
28	05:32	06:26		19:37 (2)	07:21		07:16	15:47 (4)	08:14	15:24 (5)	08:44	
	21:32	20:28	22	19:59 (2)	19:12		17:02	39 16:26 (4)	16:12	13 15:37 (5)	16:11	
29	05:34	06:27		19:38 (2)	07:22	18:16 (3)	07:18	15:47 (4)	08:16	15:24 (5)	08:44	
	21:30	20:25	19	19:57 (2)	19:09	3 18:19 (3)	17:00	39 16:26 (4)	16:12	12 15:36 (5)	16:11	
30	05:35	06:29		19:40 (2)	07:24	18:10 (3)	07:20	15:46 (4)	08:18	15:25 (5)	08:44	
	21:28	20:23	15	19:55 (2)	19:07	12 18:22 (3)	16:58	40 16:26 (4)	16:11	10 15:35 (5)	16:12	
31	05:37	06:31		19:40 (2)			07:22	15:46 (4)			08:44	
	21:27	20:21	12	19:52 (2)			16:56	39 16:25 (4)			16:13	
Potential sun hours	512	460			382		328		259		233	
Total, worst case		663		23			716		582		24	
Sun reduction		0.34		0.32			0.29		0.27		0.21	
Oper. time red.		1.00		1.00			1.00		1.00		1.00	
Wind dir. red.		0.65		0.67			0.66		0.66		0.66	
Total reduction		0.22		0.21			0.19		0.17		0.14	
Total, real		147		5			139		102		3	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: S - H19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	16:09 (3)	07:16	16:41 (2)	07:01
	16:15	17:06	16:26 (3)	18:02	21	17:02 (2)
2	08:44	08:12	16:10 (3)	07:14	16:42 (2)	06:59
	16:16	17:08	16:25 (3)	18:04	18	17:00 (2)
3	08:44	08:10	16:12 (3)	07:12	16:45 (2)	06:56
	16:17	17:10	16:23 (3)	18:06	12	16:57 (2)
4	08:43	08:08	16:14 (3)	07:09	06:54	05:46
	16:18	17:12	16:21 (3)	18:07	20:06	21:01
5	08:43	08:07	07:07	06:51	05:44	04:59
	16:19	17:14	18:09	20:07	21:03	21:50
6	08:43	08:05	07:04	06:49	05:42	04:58
	16:21	17:16	18:11	20:09	21:04	21:51
7	08:42	08:03	07:02	06:47	05:40	04:58
	16:22	17:18	18:13	20:11	21:06	21:52
8	08:42	08:01	07:00	06:44	05:38	04:57
	16:24	17:20	18:15	20:13	21:08	21:53
9	08:41	07:59	16:48 (2)	06:57	06:42	05:36
	16:25	17:22	16:52 (2)	18:17	20:15	21:10
10	08:40	07:57	16:45 (2)	06:55	06:39	05:34
	16:26	17:24	16:54 (2)	18:19	20:17	21:11
11	08:40	07:55	16:43 (2)	06:53	06:37	05:33
	16:28	17:26	16:56 (2)	18:21	20:19	21:13
12	08:39	07:53	16:41 (2)	06:50	06:35	05:31
	16:30	17:28	16:59 (2)	18:23	20:20	21:15
13	08:38	07:51	16:39 (2)	06:48	06:32	05:29
	16:31	17:30	17:00 (2)	18:25	20:22	21:17
14	08:37	07:49	16:38 (2)	06:45	06:30	05:27
	16:33	17:32	17:02 (2)	18:27	20:24	21:18
15	08:36	07:47	16:38 (2)	06:43	06:28	05:26
	16:34	17:34	17:05 (2)	18:28	20:26	21:20
16	08:35	07:45	16:37 (2)	06:40	06:25	05:24
	16:36	17:36	17:07 (2)	18:30	20:28	21:22
17	08:34	07:43	16:37 (2)	06:38	06:23	05:22
	16:38	17:38	17:09 (2)	18:32	20:30	21:23
18	08:33	07:41	16:36 (2)	06:35	06:21	05:21
	16:40	17:40	17:08 (2)	18:34	20:31	21:25
19	08:32	16:06 (3)	07:39	16:35 (2)	06:33	06:18
	16:41	16:07 (3)	17:42	17:09 (2)	18:36	20:33
20	08:31	16:05 (3)	07:36	16:36 (2)	06:31	06:16
	16:43	16:08 (3)	17:44	17:09 (2)	18:38	20:35
21	08:30	16:05 (3)	07:34	16:36 (2)	06:28	06:14
	16:45	16:11 (3)	17:46	17:09 (2)	18:40	20:37
22	08:29	16:04 (3)	07:32	16:35 (2)	06:26	06:12
	16:47	16:12 (3)	17:48	17:09 (2)	18:42	20:39
23	08:27	16:05 (3)	07:30	16:36 (2)	06:23	06:09
	16:49	16:15 (3)	17:50	17:08 (2)	18:43	20:41
24	08:26	16:04 (3)	07:28	16:36 (2)	06:21	06:07
	16:50	16:17 (3)	17:52	17:08 (2)	18:45	20:43
25	08:24	16:05 (3)	07:25	16:36 (2)	06:18	06:05
	16:52	16:19 (3)	17:54	17:07 (2)	18:47	20:44
26	08:23	16:05 (3)	07:23	16:37 (2)	06:16	06:03
	16:54	16:21 (3)	17:56	17:06 (2)	18:49	20:46
27	08:22	16:05 (3)	07:21	16:38 (2)	06:13	06:00
	16:56	16:23 (3)	17:58	17:06 (2)	18:51	20:48
28	08:20	16:06 (3)	07:18	16:39 (2)	06:11	05:58
	16:58	16:26 (3)	18:00	17:04 (2)	18:53	20:50
29	08:19	16:06 (3)	07:18	17:08	05:56	05:06
	17:00	16:27 (3)	19:54	20:52	21:41	22:01
30	08:17	16:06 (3)	07:16	17:06	05:54	05:05
	17:02	16:26 (3)	19:56	20:54	21:43	22:00
31	08:15	16:07 (3)	07:14	17:04	05:54	05:04
	17:04	16:26 (3)	19:58	20:56	21:44	22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case	169	571	51			
Sun reduction	0.24	0.23	0.27			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.66	0.66			
Total reduction	0.16	0.15	0.18			
Total, real	27	88	9			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: S - H19

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	16:15 (2) 16:23 (2)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	16:18 (2) 16:21 (2)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	15:44 (3) 15:51 (3)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	15:41 (3) 15:53 (3)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	15:41 (3) 15:56 (3)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 17:23 (2) 17:28 (2)	15:40 (3) 15:57 (3)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 17:18 (2) 17:32 (2)	15:39 (3) 15:58 (3)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:45 17:15 (2) 17:35 (2)	15:38 (3) 15:58 (3)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 17:13 (2) 17:36 (2)	15:38 (3) 15:59 (3)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 17:11 (2) 17:37 (2)	15:38 (3) 15:57 (3)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 17:10 (2) 17:38 (2)	15:38 (3) 15:56 (3)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 17:09 (2) 17:39 (2)	15:38 (3) 15:54 (3)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 17:08 (2) 17:39 (2)	15:38 (3) 15:52 (3)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 17:07 (2) 17:40 (2)	15:38 (3) 15:50 (3)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 17:07 (2) 17:40 (2)	15:39 (3) 15:49 (3)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 17:06 (2) 17:40 (2)	14:40 (4) 15:39 (3) 15:47 (3)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 17:06 (2) 17:40 (2)	15:40 (3) 15:46 (3)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 17:06 (2) 17:40 (2)	15:41 (3) 15:44 (3)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 17:06 (2) 17:39 (2)	15:42 (3) 15:43 (3)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 17:06 (2) 17:39 (2)	16:07 16:08
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:06 (2) 16:38 (2)	16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:07 (2) 16:36 (2)	16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:07 (2) 16:34 (2)	16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:08 (2) 16:31 (2)	16:10
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:09 (2) 16:29 (2)	16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:10 (2) 16:27 (2)	16:12
31	05:37 21:27	06:31 20:21		07:22 16:56	16:12 (2) 16:25 (2)	16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case				572	229	11
Sun reduction				0.29	0.27	0.21
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.66	0.66	0.65
Total reduction				0.19	0.18	0.13
Total, real				111	40	1

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: T - H20

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26			07:24		15:51 (2)	08:19						
	16:15		17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05			16:54	31	16:22 (2)	16:10						
2	08:44		08:12		16:35 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35			07:26		15:52 (2)	08:21						
	16:16		17:08	2	16:37 (2)	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02		16:52	29	16:21 (2)	16:09						
3	08:44		08:10		16:30 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		15:52 (2)	08:22						
	16:17		17:10	9	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00		16:50	27	16:19 (2)	16:08						
4	08:43		08:08		16:27 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31		07:30		15:53 (2)	08:24						
	16:18		17:12	14	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	24	16:17 (2)	16:08						
5	08:43		08:07		16:26 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33		07:32		15:54 (2)	08:25						
	16:19		17:14	17	16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55		16:46	20	16:14 (2)	16:07						
6	08:43		08:05		16:24 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35		07:34		15:56 (2)	08:26						
	16:21		17:16	21	16:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52		16:44	16	16:12 (2)	16:07						
7	08:42		08:03		16:23 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37		07:36		15:57 (2)	08:28						
	16:22		17:18	24	16:47 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	13	16:10 (2)	16:06						
8	08:42		08:01		16:23 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39		07:38		16:00 (2)	08:29						
	16:24		17:20	27	16:50 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	8	16:08 (2)	16:06						
9	08:41		07:59		16:22 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40			08:30						
	16:25		17:22	30	16:52 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45		16:39			16:05						
10	08:40		07:57		16:21 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42		07:42			08:31						
	16:26		17:24	31	16:52 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43		16:37			16:05						
11	08:40		07:55		16:21 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44		07:44		15:34 (3)	08:33						
	16:28		17:26	32	16:53 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40		16:35	8	15:42 (3)	16:05						
12	08:39		07:53		16:21 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46		07:45		15:32 (3)	08:34						
	16:30		17:28	33	16:54 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38		16:34	13	15:45 (3)	16:05						
13	08:38		15:54 (3)	07:51	16:20 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48		07:47		15:31 (3)	08:35						
	16:31	1	15:55 (3)	17:30	16:53 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32	15	15:46 (3)	16:04						
14	08:37		15:54 (3)	07:49	16:20 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49		15:30 (3)	08:36						
	16:33	3	15:57 (3)	17:32	16:53 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31	17	15:47 (3)	16:04						
15	08:36		15:54 (3)	07:47	16:20 (2)	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52		07:51		15:29 (3)	08:37						
	16:34	5	15:59 (3)	17:34	16:54 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	19	15:48 (3)	16:04						
16	08:35		15:53 (3)	07:45	16:20 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54		17:04 (2)	07:53		08:38						
	16:36	7	16:00 (3)	17:36	16:54 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	9	17:13 (2)	16:27	19	15:48 (3)	16:05					
17	08:34		15:53 (3)	07:43	16:21 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55		17:00 (2)	07:55		08:38						
	16:38	9	16:02 (3)	17:38	16:54 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	17	17:17 (2)	16:26	20	15:49 (3)	16:05					
18	08:33		15:53 (3)	07:41	16:20 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57		16:57 (2)	07:57		08:39						
	16:40	12	16:05 (3)	17:40	16:52 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	21	17:18 (2)	16:24	21	15:49 (3)	16:05					
19	08:32		15:54 (3)	07:39	16:21 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		16:56 (2)	07:59		08:40						
	16:41	13	16:07 (3)	17:42	16:52 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	24	17:20 (2)	16:23	21	15:49 (3)	16:05					
20	08:31		15:53 (3)	07:36	16:22 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01		16:54 (2)	08:00		08:41						
	16:43	15	16:08 (3)	17:44	16:52 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	27	17:21 (2)	16:22	18	15:47 (3)	16:06					
21	08:30		15:54 (3)	07:34	16:23 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		16:53 (2)	08:02		08:41						
	16:45	17	16:11 (3)	17:46	16:51 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	29	17:22 (2)	16:20	17	15:46 (3)	16:06					
22	08:29		15:54 (3)	07:32	16:23 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		16:52 (2)	08:04		08:42						
	16:47	18	16:12 (3)	17:48	16:49 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	30	17:22 (2)	16:19	15	15:44 (3)	16:06					
23	08:27		15:54 (3)	07:30	16:25 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		16:51 (2)	08:06		08:42						
	16:49	21	16:15 (3)	17:50	16:48 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	32	17:23 (2)	16:18	13	15:43 (3)	16:07					
24	08:26		15:54 (3)	07:28	16:27 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09		16:51 (2)	08:08		08:43						
	16:50	21	16:15 (3)	17:52	16:47 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	32	17:23 (2)	16:17	12	15:42 (3)	16:08					
25	08:25		15:56 (3)	07:25	16:29 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11		15:50 (2)	08:09		08:43						
	16:52	20	16:16 (3)	17:54	16:43 (2)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	33	16:23 (2)	16:16	10	15:41 (3)	16:08					
26	08:23		15:56 (3)	07:23	16:34 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		15:50 (2)	08:13		08:43						
	16:54	19	16:15 (3)	17:56	16:39 (2)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	33	16:23 (2)	16:14	7	15:39 (3)	16:09					
27	08:22		15:56 (3)	07:21	16:00	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15		15:49 (2)	08:13		08:44						
	16:56	19	16:15 (3)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	34	16:23 (2)	16:13	5	15:38 (3)	16:10						
28	08:20		15:58 (3)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	17:04		15:49 (2)	08:14		08:44						
	16:58	17	16:15 (3)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	34	16:23 (2)	16:12	3	15:37 (3)	16:10						
29	08:19		15:59 (3)		17:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	17:04		15:49 (2)	08:16		08:44						
	17:00	15	16:14 (3)		19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	34	16:23 (2)	16:11	2	15:36 (3)	16:11						
30	08:17		16:01 (3)		17:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	17:06		15:50 (2)	08:18		08:44						
	17:02	12	16:13 (3)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	32	16:22 (2)	16:11			16:12						
31	08:15		16:03 (3)		17:04	05:04	05:04		05:37	06:31		07:22	17:06		15:50 (2)			08:44						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

6918 Kellystown

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathlyn Feeney / kfeeney@jodireland.com

Calculated

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: U - H21

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		16:32 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26					07:24		15:49 (2)	08:19			
	16:15		17:06	2	16:34 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05					16:54	30	16:19 (2)	16:10			
2	08:44		08:12		16:27 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28					07:26		15:49 (2)	08:21			
	16:16		17:08	10	16:37 (2)	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02					07:52	30	16:19 (2)	16:09			
3	08:44		08:10		16:25 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30					07:28		15:50 (2)	08:22			
	16:17		17:10	14	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00					07:50	28	16:18 (2)	16:08			
4	08:43		08:08		16:23 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31					07:30		15:50 (2)	08:24			
	16:18		17:12	18	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57					07:30	27	16:17 (2)	16:08			
5	08:43		08:07		16:22 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33					07:32		15:51 (2)	08:25			
	16:19		17:14	21	16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55					07:32	23	16:14 (2)	16:07			
6	08:43		08:05		16:21 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35					07:34		15:52 (2)	08:26			
	16:21		17:16	24	16:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52					07:34	20	16:12 (2)	16:07			
7	08:42		08:03		16:20 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37					07:36		15:53 (2)	08:28			
	16:22		17:18	27	16:47 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50					07:36	17	16:10 (2)	16:06			
8	08:42		08:01		16:20 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39					07:38		15:55 (2)	08:29			
	16:24		17:20	28	16:48 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48					07:38	13	16:08 (2)	16:06			
9	08:41		07:59		16:19 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41					07:40		15:58 (2)	08:30			
	16:25		17:22	30	16:49 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45					07:42	9	16:07 (2)	16:05			
10	08:40		07:57		16:19 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42					07:42			08:31			
	16:26		17:24	31	16:50 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43					07:42			08:31			
11	08:40		07:55		16:19 (2)	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44					07:44		15:56 (3)	08:33			
	16:28		17:26	31	16:50 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40					07:44	3	15:39 (3)	16:05			
12	08:39		07:53		16:19 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46					07:45		15:33 (3)	08:34			
	16:30		17:28	31	16:50 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38					07:45	10	15:43 (3)	16:05			
13	08:38		15:53 (3)	07:51		16:18 (2)	06:48	06:32	05:29	04:55	05:10	05:59	07:48					07:47		15:31 (3)	08:35			
	16:31	2	15:55 (3)	17:30	32	16:50 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49					07:47	13	15:44 (3)	16:04			
14	08:37		15:53 (3)	07:49		16:18 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56					07:49		15:30 (3)	08:36			
	16:33	4	15:57 (3)	17:32	32	16:50 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47					07:49	15	15:45 (3)	16:04			
15	08:36		15:53 (3)	07:47		16:18 (2)	06:43	06:28	05:25	04:54	05:13	06:03	06:58					07:51		15:29 (3)	08:37			
	16:34	6	15:59 (3)	17:34	32	16:50 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44					07:51	17	15:46 (3)	16:04			
16	08:35		15:52 (3)	07:45		16:19 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59					07:53		15:29 (3)	08:38			
	16:36	8	16:00 (3)	17:36	31	16:50 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42					07:53	18	15:47 (3)	16:05			
17	08:34		15:53 (3)	07:43		16:20 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01					07:55		15:28 (3)	08:38			
	16:38	9	16:02 (3)	17:38	29	16:49 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39					07:55	20	15:48 (3)	16:05			
18	08:33		15:53 (3)	07:41		16:19 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03					07:57		15:28 (3)	08:39			
	16:40	12	16:05 (3)	17:40	29	16:48 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37				17:01 (2)	07:57	9	17:10 (2)	16:24	20	15:48 (3)	16:05
19	08:32		15:53 (3)	07:39		16:20 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05					07:59		16:57 (2)	07:59		15:28 (3)	08:40
	16:41	14	16:07 (3)	17:42	27	16:47 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34					07:59	16	17:13 (2)	16:23	21	15:49 (3)	16:05
20	08:31		15:53 (3)	07:36		16:22 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06					08:01		16:55 (2)	08:00		15:28 (3)	08:41
	16:43	15	16:08 (3)	17:44	25	16:47 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32					08:01	20	17:15 (2)	16:22	19	15:47 (3)	16:06
21	08:30		15:53 (3)	07:34		16:23 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08					08:03		16:53 (2)	08:02		15:29 (3)	08:41
	16:45	18	16:11 (3)	17:46	23	16:46 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29					08:03	23	17:16 (2)	16:20	17	15:46 (3)	16:06
22	08:29		15:53 (3)	07:32		16:24 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10					08:05		16:52 (2)	08:04		15:29 (3)	08:42
	16:47	19	16:12 (3)	17:48	19	16:43 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27					08:05	25	17:17 (2)	16:19	15	15:44 (3)	16:06
23	08:27		15:54 (3)	07:30		16:27 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12					08:07		16:51 (2)	08:06		15:29 (3)	08:42
	16:49	21	16:15 (3)	17:50	14	16:41 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24					08:07	27	17:18 (2)	16:18	14	15:43 (3)	16:07
24	08:26		15:54 (3)	07:28		16:32 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13					08:08		16:50 (2)	08:08		15:30 (3)	08:43
	16:50	20	16:14 (3)	17:52	5	16:37 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22					08:08	29	17:19 (2)	16:17	12	15:42 (3)	16:08
25	08:25		15:55 (3)	07:25		06:18		06:05	05:11	04:55	05:27	06:20	07:15					08:09		15:49 (2)	08:09		15:31 (3)	08:43
	16:52	20	16:15 (3)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:04					08:09	30	16:19 (2)	16:16	10	15:41 (3)	16:08
26	08:23		15:56 (3)	07:23		06:16		06:03	05:09	04:56	05:28	06:22	07:17					08:11		15:48 (2)	08:11		15:31 (3)	08:43
	16:54	18	16:14 (3)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06					08:11	31	16:19 (2)	16:14	8	15:39 (3)	16:09
27	08:22		15:56 (3)	07:21		06:13		06:00	05:08	04:56	05:30	06:24	07:19					08:12		15:48 (2)	08:13		15:32 (3)	08:44
	16:56	17	16:13 (3)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04					08:12	31	16:19 (2)	16:13	6	15:38 (3)	16:10
28	08:20		15:58 (3)	07:18		06:11		05:58	05:07	04:57	05:32	06:26	07:21					08:13		15:48 (2)	08:14		15:33 (3)	08:44
	16:58	16	16:14 (3)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02					08:13	31	16:19 (2)	16:12	4	15:37 (3)	16:10
29	08:19		15:59 (3)			07:08		05:56	05:06	04:57	05:34	06:27	07:22					08:14		15:47 (2)	08:16		15:34 (3)	08:44
	17:00	13	16:12 (3)			19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00					08:14	32	16:19 (2)	16:11	2	15:36 (3)	16:11
30	08:17		16:01 (3)			07:06		05:54	05:05	04:58	05:35	06:29	07:24					08:15		15:47 (2)	08:18			08:44
	17:02	10	16:11 (3)			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58					08:15	32	16:19 (2)	16:11			16:12
31	08:15		16:05 (3)			07:04		05:04		05:37	06:31		07:22					08:15		15:47 (2)				08:44
	17:04	1	16:06 (3)			19:58		21:44		21:27	20:													

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker (WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker (WTG causing flicker last time)
	Minutes with flicker	
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
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28		
29		
30		
31		

Project: **6918 Kellystown**
Description: **5 no. turbine Wind Farm, Co. Louth**

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: V - H22

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44		15:07 (3)	08:14		15:21 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24			06:33	07:26	07:24			08:19	14:54 (2)		
	16:15	29	15:36 (2)	17:06	26	15:47 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54			20:18	19:05	16:54			16:10	15:26 (2)		
2	08:44		15:08 (3)	08:12		15:22 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26			05:40	06:35	07:28			08:21	14:54 (2)		
	16:16	29	15:37 (2)	17:08	24	15:46 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52			20:16	19:02	16:52			16:09	15:26 (2)		
3	08:44		15:08 (3)	08:10		15:24 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			05:42	06:36	07:30			08:22	14:55 (2)		
	16:17	29	15:37 (2)	17:10	21	15:45 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50			20:13	19:00	16:50			16:08	15:26 (2)		
4	08:43		15:09 (3)	08:08		15:26 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30			05:44	06:38	07:31			08:24	14:56 (2)		
	16:18	30	15:39 (2)	17:12	17	15:43 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48			20:11	18:57	16:48			16:08	15:27 (2)		
5	08:43		15:09 (3)	08:07		15:30 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32			05:45	06:40	07:33			08:25	14:56 (2)		
	16:19	30	15:39 (2)	17:14	10	15:40 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46			05:45	06:40	18:55			16:07	15:26 (2)		
6	08:43		15:11 (2)	08:05			07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34				06:42	07:35	07:34			14:59 (2)	08:26	
	16:21	29	15:40 (2)	17:16			18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	11			06:42	07:35	07:34			15:10 (2)	16:07	
7	08:42		15:11 (2)	08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				06:43	07:37	07:36			14:56 (2)	08:28	
	16:22	30	15:41 (2)	17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	17			05:49	06:43	07:37			15:13 (2)	16:06	
8	08:42		15:11 (2)	08:01			07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38				06:45	07:39	07:38			14:54 (2)	08:29	
	16:24	30	15:41 (2)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	21			05:50	06:45	07:39			15:15 (2)	16:06	
9	08:41		15:12 (2)	07:59			06:57	06:42	05:36	04:54	05:07	05:06	05:52	06:47	07:41	07:40				06:47	07:41	07:40			14:53 (2)	08:30
	16:25	31	15:43 (2)	17:22			18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	24			05:06	05:52	06:47			15:17 (2)	16:05	
10	08:40		15:11 (2)	07:57			06:55	06:39	05:34	04:56	05:07	05:04	06:49	07:42	07:42				05:07	05:54	06:49			14:52 (2)	08:32	
	16:26	33	15:44 (2)	17:24			18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	26			05:04	05:54	06:49			15:18 (2)	16:05	
11	08:40		15:11 (2)	07:55			06:53	06:37	05:33	04:56	05:08	05:06	06:50	07:44	07:44				05:08	05:56	06:50			14:51 (2)	08:33	
	16:28	33	15:44 (2)	17:26			18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	28			05:06	05:56	06:50			15:19 (2)	16:05	
12	08:39		15:11 (2)	07:53			06:50	06:35	05:31	04:55	05:09	05:07	06:52	07:46	07:46				05:07	05:57	06:52			14:50 (2)	08:34	
	16:30	34	15:45 (2)	17:28			18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	30			05:09	05:57	06:52			15:20 (2)	16:05	
13	08:38		15:12 (2)	07:51			06:48	06:32	05:29	04:55	05:10	05:09	06:54	07:48	07:47				05:10	05:09	06:54			14:49 (2)	08:35	
	16:31	34	15:46 (2)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	32			05:11	05:09	06:54			15:21 (2)	16:04	
14	08:37		15:12 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				05:12	06:01	06:56			14:49 (2)	08:36	
	16:33	34	15:46 (2)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	32			05:13	06:02	06:57			15:21 (2)	16:04	
15	08:36		15:12 (2)	07:47			06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51				05:14	06:03	06:58			14:48 (2)	08:37	
	16:34	35	15:47 (2)	17:34			18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	34			05:14	06:04	06:58			15:22 (2)	16:04	
16	08:35		15:11 (2)	07:45			06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53				05:15	06:04	06:59			14:48 (2)	08:38	
	16:36	36	15:47 (2)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	35			05:16	06:06	06:59			15:23 (2)	16:05	
17	08:34		15:12 (2)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55				05:17	06:06	07:01			14:48 (2)	08:39	
	16:38	35	15:47 (2)	17:38			18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	35			05:18	06:06	07:01			15:23 (2)	16:05	
18	08:33		15:12 (2)	07:41			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				05:19	06:08	07:03			14:48 (2)	08:39	
	16:40	36	15:48 (2)	17:40			18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	35			05:20	06:09	07:03			15:24 (2)	16:05	
19	08:32		15:13 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				05:21	06:10	07:05			14:49 (2)	08:40	
	16:41	36	15:49 (2)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	36			05:22	06:11	07:06			15:24 (2)	16:05	
20	08:31		15:12 (2)	07:36			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00				05:23	06:12	07:06			14:48 (2)	08:41	
	16:43	37	15:49 (2)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	36			05:24	06:13	07:07			15:24 (2)	16:06	
21	08:30		15:13 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				05:25	06:14	07:08			14:48 (2)	08:41	
	16:45	36	15:49 (2)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	36			05:26	06:15	07:09			15:24 (2)	16:06	
22	08:29		15:13 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04				05:27	06:16	07:10			14:48 (2)	08:42	
	16:47	36	15:49 (2)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	37			05:28	06:17	07:11			15:25 (2)	16:06	
23	08:27		15:14 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				05:29	06:18	07:12			14:49 (2)	08:42	
	16:49	36	15:50 (2)	17:50			18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	36			05:30	06:19	07:13			15:25 (2)	16:07	
24	08:26		15:14 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08				05:31	06:20	07:14			14:49 (2)	08:43	
	16:50	35	15:49 (2)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17				05:32	06:21	07:15			15:25 (2)	16:08	
25	08:25		15:15 (2)	07:25			06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09				05:33	06:22	07:16			14:50 (2)	08:43	
	16:52	35	15:50 (2)	17:54			18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16				05:34	06:23	07:17			15:25 (2)	16:08	
26	08:23		15:15 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11				05:35	06:24	07:18			14:50 (2)	08:43	
	16:54	35	15:50 (2)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	36			05:36	06:25	07:19			15:26 (2)	16:09	
27	08:22		15:15 (2)	07:21			06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13				05:37	06:26	07:20			14:51 (2)		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: W - H23

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:03 (2)	08:14	15:16 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26				07:24		08:19				14:46 (2)	
	16:15	29	15:32 (2)	17:06	15:41 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05				16:54		16:10	36			15:22 (2)	
2	08:44		15:03 (2)	08:12	15:18 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28				07:26		08:21				14:46 (2)	
	16:16	30	15:33 (2)	17:08	15:39 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02				16:52		16:09	35			15:21 (2)	
3	08:44		15:03 (2)	08:10	15:20 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30				07:28		08:22				14:47 (2)	
	16:17	31	15:34 (2)	17:10	15:37 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00				16:50		16:08	35			15:22 (2)	
4	08:43		15:03 (2)	08:08	15:24 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31				07:30		08:24				14:48 (2)	
	16:18	32	15:35 (2)	17:12	15:34 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57				16:48		16:08	34			15:22 (2)	
5	08:43		15:03 (2)	08:07	15:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33				07:32		08:25				14:49 (2)	
	16:19	32	15:35 (2)	17:14	15:09	07:07	20:07	21:03	21:50	21:58	21:17	20:09	18:55				16:46		16:07	33			15:22 (2)	
6	08:43		15:04 (2)	08:05	15:04	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35				07:34		08:26				14:50 (2)	
	16:21	32	15:36 (2)	17:16	15:11	07:09	20:09	21:04	21:51	21:58	21:15	20:06	18:52				16:44		16:07				15:22 (2)	32
7	08:42		15:03 (2)	08:03	15:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37				07:36		14:53 (2)				14:50 (2)	
	16:22	34	15:37 (2)	17:18	15:13	07:10	20:11	21:06	21:52	21:57	21:14	20:04	18:50				16:43	11	15:04 (2)	32			15:22 (2)	
8	08:42		15:03 (2)	08:01	15:03	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39				07:38		14:50 (2)	32			14:50 (2)	
	16:24	34	15:37 (2)	17:20	15:15	07:10	20:13	21:08	21:53	21:56	21:12	20:01	18:48				16:41	17	15:07 (2)	32			15:22 (2)	
9	08:41		15:04 (2)	07:59	15:07	07:06	06:57	05:42	05:36	04:57	05:06	05:52	06:47				07:40		14:49 (2)	30			14:52 (2)	
	16:25	35	15:39 (2)	17:22	15:17	07:10	20:15	21:10	21:54	21:55	21:10	19:59	18:45				16:39	21	15:10 (2)	31			15:23 (2)	
10	08:40		15:04 (2)	07:57	15:04	07:05	06:55	05:39	05:34	04:56	05:07	05:54	06:49				07:42		14:47 (2)	30			14:52 (2)	
	16:26	35	15:39 (2)	17:24	15:19	07:10	20:17	21:12	21:55	21:55	21:08	19:56	18:43				16:37	24	15:11 (2)	31			15:23 (2)	
11	08:40		15:04 (2)	07:55	15:04	07:06	06:53	05:37	05:33	04:56	05:08	06:50	07:44				07:44		14:46 (2)	30			14:53 (2)	
	16:28	36	15:40 (2)	17:26	15:21	07:10	20:19	21:13	21:55	21:54	21:06	19:54	18:40				16:35	27	15:13 (2)	30			15:23 (2)	
12	08:39		15:04 (2)	07:53	15:04	07:05	06:50	05:31	04:55	05:09	05:57	06:52	07:46				07:46		14:45 (2)	30			14:53 (2)	
	16:30	36	15:40 (2)	17:28	15:21	07:10	20:20	21:15	21:56	21:53	21:03	19:51	18:38				16:34	29	15:14 (2)	30			15:23 (2)	
13	08:38		15:05 (2)	07:51	15:23	07:06	06:53	05:29	04:55	05:10	05:59	06:54	07:48				07:47		14:44 (2)	30			14:54 (2)	
	16:31	36	15:41 (2)	17:30	15:24	07:07	20:22	21:17	21:57	21:52	21:01	19:49	18:36				16:32	31	15:15 (2)	29			15:23 (2)	
14	08:37		15:05 (2)	07:49	15:25	07:08	06:50	05:27	04:55	05:12	06:01	06:56	07:50				07:49		14:43 (2)	29			14:55 (2)	
	16:33	36	15:41 (2)	17:32	15:26	07:09	20:24	21:18	21:58	21:51	20:59	19:47	18:33				16:31	32	15:15 (2)	30			15:24 (2)	
15	08:36		15:05 (2)	07:47	15:27	07:10	06:52	05:26	04:54	05:13	06:03	06:58	07:52				07:51		14:43 (2)	29			14:55 (2)	
	16:34	37	15:42 (2)	17:34	15:28	07:11	20:26	21:20	21:58	21:50	20:57	19:44	18:31				16:29	33	15:16 (2)	30			15:23 (2)	
16	08:35		15:05 (2)	07:45	15:29	07:12	06:52	05:24	04:54	05:14	06:04	06:59	07:54				07:53		14:42 (2)	28			14:55 (3)	
	16:36	37	15:42 (2)	17:36	15:31	07:13	20:28	21:22	21:59	21:49	20:55	19:42	18:29				16:27	35	15:17 (2)	28			15:23 (2)	
17	08:34		15:05 (2)	07:43	15:32	07:14	06:52	05:22	04:54	05:16	06:06	07:01	07:55				07:55		14:42 (2)	28			14:56 (3)	
	16:38	37	15:42 (2)	17:38	15:33	07:15	20:30	21:23	21:59	21:47	20:53	19:39	18:26				16:26	35	15:17 (2)	28			15:24 (2)	
18	08:33		15:06 (2)	07:41	15:34	07:16	06:51	05:21	04:54	05:17	06:08	07:03	07:57				07:57		14:42 (2)	28			14:56 (3)	
	16:40	37	15:43 (2)	17:40	15:35	07:17	20:31	21:25	22:00	21:46	20:51	19:37	18:24				16:24	36	15:18 (2)	29			15:25 (2)	
19	08:32		15:06 (2)	07:39	15:36	07:18	06:52	05:19	04:54	05:18	06:10	07:05	07:59				17:28 (1)		07:59				14:57 (3)	
	16:41	38	15:44 (2)	17:42	15:37	07:19	20:33	21:27	22:00	21:45	20:48	19:34	18:22				17:36 (1)		16:23	36			15:25 (2)	
20	08:31		15:06 (2)	07:36	15:38	07:20	06:53	05:18	04:54	05:20	06:12	07:06	08:01				17:25 (1)		08:00				14:57 (3)	
	16:43	37	15:43 (2)	17:44	15:39	07:21	20:35	21:28	22:00	21:44	20:46	19:32	18:20				17:38 (1)		16:22	37			15:25 (2)	
21	08:30		15:07 (2)	07:34	15:40	07:22	06:54	05:16	04:54	05:21	06:13	07:08	08:03				17:24 (1)		08:02				14:58 (3)	
	16:45	37	15:44 (2)	17:46	15:41	07:23	20:37	21:30	22:01	21:42	20:44	19:29	18:17				17:39 (1)		16:20	37			15:26 (2)	
22	08:29		15:07 (2)	07:32	15:42	07:24	06:55	05:15	04:55	05:23	06:15	07:10	08:05				17:23 (1)		08:04				14:58 (3)	
	16:47	36	15:43 (2)	17:48	15:43	07:25	20:39	21:31	22:01	21:41	20:42	19:27	18:15				17:40 (1)		16:19	37			15:26 (2)	
23	08:27		15:08 (2)	07:30	15:44	07:26	06:58	05:13	04:55	05:24	06:17	07:12	08:07				17:22 (1)		08:06				14:59 (3)	
	16:49	36	15:44 (2)	17:50	15:45	07:27	20:41	21:33	22:01	21:39	20:39	19:24	18:13				17:40 (1)		16:18	38			15:27 (2)	
24	08:26		15:08 (2)	07:28	15:46	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13				17:22 (1)		08:08				14:59 (3)	
	16:50	36	15:44 (2)	17:52	15:47	07:29	20:43	21:34	22:01	21:38	20:37	19:22	18:11				17:40 (1)		16:17	37			15:27 (2)	
25	08:25		15:09 (2)	07:25	15:48	07:30	06:18	06:05	05:11	04:55	05:27	06:20	07:15				16:21 (1)		08:09				14:59 (3)	
	16:52	35	15:44 (2)	17:54	15:49	07:31	20:44	21:36	22:01	21:36	20:35	19:19	17:09				16:38 (1)		16:16	37			15:27 (2)	
26	08:23		15:09 (2)	07:23	15:50	07:32	06:16	06:03	05:09	04:56	05:29	06:22	07:17				16:31 (1)		08:11				14:59 (3)	
	16:54	35	15:44 (2)	17:56	15:51	07:33	20:46	21:37	22:01	21:35	20:32	19:17	17:06				16:36 (1)		16:14	37			15:28 (2)	
27	08:22		15:10 (2)	07:21	15:52	07:34	06:13	06:01	05:09	05:14	06:04	06:59	07:54				16:22 (1)		08:12				14:54 (2)	
	16:56	33	15:43 (2)	17:58	15:53	07:35	20:48	21:39	22:01	21:33	20:30	19:14	17:04				16:34 (1)		16:13	37			15:21 (2)	
28	08:20		15:11 (2)	07:19	15:54	07:36	06:11	05:58	05:07	04:57	05:32	06:26	07:21				16:22 (1)		08:14				14:45 (2)	
	16:58	32	15:43 (2)	18:00	15:55	07:37	20:50	21:40	22:01	21:32	20:28	19:12	17:02				16:31 (1)		16:12	36			15:30 (2)	
29	08:19		15:12 (2)		15:56	07:38	07:09	05:56	05:06	04:57	05:34	06:27	07:22				16:23 (1)		08:16				14:45 (2)	
	17:00	31	15:43 (2)		15:57	07:39	19:55	20:52	21:41	22:01	21:30	20:25	19:09				16:29 (1)		16:12	36			15:31 (2)	
30	08:17		15:13 (2)		15:58	07:40	07:06	05:54	05:05	04:58	05:35	06:29	07:24				16:24 (1)		</					

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** X - H24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44		08:14	07:16	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:19 (1)
	16:15		17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	15:37 (1)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	08:21	15:20 (1)
	16:16	1	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	15:37 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22	15:20 (1)
	16:17	2	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08
4	08:43	15:37 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24	15:22 (1)
	16:18	4	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	15:37 (1)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	08:25	15:22 (1)
	16:19	5	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07
6	08:43	15:37 (1)	08:05	07:05	06:49	05:42	04:58	05:03	05:47	06:42	07:35	08:26	15:23 (1)
	16:21	7	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	16:07
7	08:42	15:37 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	08:28	15:24 (1)
	16:22	8	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06
8	08:42	15:37 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29	15:25 (1)
	16:24	9	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06
9	08:41	15:37 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30	15:26 (1)
	16:25	12	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05
10	08:40	15:37 (1)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	08:32	15:26 (1)
	16:26	13	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05
11	08:40	15:37 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33	15:28 (1)
	16:28	15	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:35	16:05
12	08:39	15:37 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	08:34	15:28 (1)
	16:30	16	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	16:05
13	08:38	15:38 (1)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	08:35	15:29 (1)
	16:31	17	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:05
14	08:37	15:38 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36	15:30 (1)
	16:33	19	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:04
15	08:36	15:38 (1)	07:47	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	08:37	15:31 (1)
	16:34	21	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04
16	08:35	15:39 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	08:38	15:32 (1)
	16:36	21	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05
17	08:34	15:38 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39	15:33 (1)
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18	08:33	15:39 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39	15:34 (1)
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19	08:32	15:40 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:40	15:35 (1)
	16:41	21	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05
20	08:31	15:40 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:41	15:36 (1)
	16:43	20	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:06
21	08:30	15:41 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:42	15:37 (1)
	16:45	20	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06
22	08:29	15:41 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:44	15:38 (1)
	16:47	19	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06
23	08:27	15:42 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:46	15:39 (1)
	16:49	18	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07
24	08:26	15:43 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:48	15:40 (1)
	16:50	16	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:08
25	08:25	15:45 (1)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:49	15:41 (1)
	16:52	14	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:16	16:08
26	08:23	15:46 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:51	15:42 (1)
	16:54	12	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14	16:09
27	08:22	15:48 (1)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:53	15:43 (1)
	16:56	8	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	16:10
28	08:20	15:56 (1)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:54	15:44 (1)
	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	16:11
29	08:19			07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:56	15:45 (1)
	17:00			19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:12	16:11
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:58	15:46 (1)
	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	16:12
31	08:15			07:04		05:04		05:37	06:31		07:22		16:13
	17:04			19:58		21:44		21:27	20:21		16:56		16:13
Potential sun hours	250		273		420		510		512		460		382
Total, worst case	361												286
Sun reduction	0.24												0.27
Oper. time red.	1.00												1.00
Wind dir. red.	0.66												0.66
Total reduction	0.16												0.18
Total, real	58												50

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: Y - H25

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: Z - H26

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AA - H27

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:57 (5) 20:26 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:09 (5) 20:33 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:56 (5) 20:26 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:09 (5) 20:34 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:56 (5) 20:26 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:07 (5) 20:34 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:56 (5) 20:26 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:07 (5) 20:35 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:56 (5) 20:26 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:06 (5) 20:35 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:56 (5) 20:25 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:06 (5) 20:35 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:57 (5) 20:26 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:06 (5) 20:36 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	19:57 (5) 20:25 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:05 (5) 20:35 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	19:57 (5) 20:24 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:05 (5) 20:35 (5)	06:47 20:01	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	19:57 (5) 20:23 (5)	04:56 21:55	05:07 21:54	05:54 21:07	20:05 (5) 20:35 (5)	06:49 20:02	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	19:58 (5) 20:23 (5)	04:56 21:55	05:08 21:54	05:56 21:05	20:05 (5) 20:35 (5)	06:50 20:03	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	19:59 (5) 20:22 (5)	04:55 21:56	05:09 21:53	05:58 21:03	20:05 (5) 20:34 (5)	06:52 20:05	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:00 (5) 20:21 (5)	04:55 21:57	05:11 21:52	05:59 21:01	20:05 (5) 20:31 (5)	06:54 20:05	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:01 (5) 20:20 (5)	04:55 21:57	05:12 21:51	06:01 20:59	20:06 (5) 20:29 (5)	06:56 20:07	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:02 (5) 20:18 (5)	04:55 21:58	05:13 21:50	06:03 20:57	20:06 (5) 20:28 (5)	06:58 20:08	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:05 (5) 20:17 (5)	04:54 21:59	05:14 21:48	06:05 20:55	20:06 (5) 20:25 (5)	06:59 20:09	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:07 (5) 20:14 (5)	04:54 21:59	05:16 21:47	06:06 20:53	20:08 (5) 20:23 (5)	07:01 20:10	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	20:08 (5) 21:25	04:54 21:59	05:17 21:46	06:08 20:50	20:09 (5) 20:22 (5)	07:03 20:11	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:09 (5) 20:16 (5)	04:54 21:59	05:18 21:45	06:10 20:48	20:10 (5) 20:19 (5)	07:05 20:04	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:17 (5) 20:28 (5)	04:54 21:59	05:20 21:44	06:12 20:46	20:12 (5) 20:17 (5)	07:06 20:13	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:19 (5) 20:30 (5)	04:54 21:59	05:21 21:42	06:13 20:44	20:18 (5) 20:29 (5)	07:08 20:14	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	20:21 (5) 20:32 (5)	04:55 21:59	05:23 21:41	06:15 20:42	20:20 (5) 20:27 (5)	07:10 20:15	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:22 (5) 20:33 (5)	04:55 21:59	05:24 21:39	06:17 20:39	20:22 (5) 20:30 (5)	07:12 20:16	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 20:42	20:24 (5) 20:35 (5)	04:55 21:59	05:26 21:38	06:19 20:37	20:22 (5) 20:37 (5)	07:13 20:17	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:25 (5) 20:36 (5)	04:56 21:59	05:27 21:36	06:20 20:35	20:23 (5) 20:35 (5)	07:15 20:19	08:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	20:26 (5) 20:37 (5)	04:56 21:59	05:29 21:35	06:22 20:32	20:24 (5) 20:33 (5)	07:17 20:17	08:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:28 (5) 20:39 (5)	04:56 21:59	05:31 21:33	06:24 20:30	20:25 (5) 20:36 (5)	07:18 20:18	08:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	20:40 (5) 20:51 (5)	04:57 21:59	05:32 21:32	06:25 20:28	20:37 (5) 20:38 (5)	07:21 20:19	08:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00	07:16 17:54	06:09 19:00	05:56 20:52	05:06 21:41	20:41 (5) 20:52 (5)	04:58 21:59	05:34 21:30	06:28 20:17	20:39 (5) 20:40 (5)	07:22 20:20	08:17 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02	07:14 19:00	06:06 19:56	05:54 20:53	05:05 21:43	20:42 (5) 20:53 (5)	04:58 22:00	05:35 21:28	06:31 20:20	20:41 (5) 20:31 (5)	06:29 20:23	08:18 17:20	08:17 16:58	08:44 16:12
31	08:15 17:04	07:11 19:04	06:04 19:58	05:51 20:54	05:04 21:44	20:43 (5) 20:54 (5)	04:58 21:59	05:37 21:26	06:34 20:32	20:42 (5) 20:32 (5)	06:31 20:21	08:19 16:56	08:18 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case				136	411	40	82	473						
Sun reduction				0.35	0.38	0.32	0.32	0.34						
Oper. time red.				1.00	1.00	1.00	1.00	1.00						
Wind dir. red.				0.65	0.65	0.61	0.65	0.65						
Total reduction				0.23	0.25	0.19	0.21	0.22						
Total, real				31	101	8	17	104						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AB - H28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:55 (5) 20:24 (5)	05:03 21:45	04:59 22:00	3 21:24 (3)	21:21 (3) 21:25	05:39 20:09 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:55 (5) 20:24 (5)	05:02 21:46	05:00 22:00	2 21:24 (3)	21:22 (3) 21:23	05:40 20:09 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:55 (5) 20:24 (5)	05:01 21:48	05:00 21:59	2 21:21 (3)	21:21 (3) 21:21	05:42 20:07 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:54 (5) 20:24 (5)	05:00 21:49	05:01 21:59	1 21:22 (3)	21:22 (3) 21:19	05:44 20:07 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:55 (5) 20:23 (5)	04:59 21:50	05:02 21:58		05:45 21:17	20:05 (5) 20:31 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:55 (5) 20:22 (5)	04:59 21:51	05:03 21:57		05:47 21:15	20:05 (5) 20:32 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:56 (5) 20:23 (5)	04:58 21:52	05:04 21:57		05:49 21:13	20:05 (5) 20:33 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	19:56 (5) 20:22 (5)	04:57 21:53	05:05 21:56		05:51 21:11	20:04 (5) 20:33 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	19:56 (5) 20:21 (5)	04:57 21:54	05:52 21:55	2 21:17 (3)	05:06 21:19 (3)	20:04 (5) 20:33 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:25	07:57 17:22	06:55 18:17	06:39 20:15	05:34 21:10	19:57 (5) 20:21 (5)	04:56 21:54	05:54 21:55	2 21:17 (3)	05:07 21:19 (3)	20:05 20:32 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	19:59 (5) 20:18 (5)	04:55 21:56	05:58 21:53	3 21:17 (3)	05:09 21:21 (3)	20:04 (5) 20:33 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:01 (5) 20:16 (5)	04:55 21:57	05:59 21:52	5 21:16 (3)	05:11 21:17 (3)	20:03 (5) 20:31 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:03 (5) 20:15 (5)	04:55 21:57	06:01 21:52	5 21:17 (3)	05:12 21:21 (3)	20:03 (5) 20:29 (5)	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:06 (5) 20:11 (5)	04:55 21:58	06:03 21:53	5 21:17 (3)	05:13 21:22 (3)	20:04 (5) 20:28 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:05 (5) 21:22	04:54 21:59	06:05 21:54	6 21:17 (3)	05:14 21:23 (3)	20:04 (5) 20:25 (5)	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:04 (5) 21:23	04:54 21:59	06:06 21:59	6 21:17 (3)	05:16 21:23 (3)	20:05 (5) 20:23 (5)	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	20:05 (5) 21:25	04:54 21:59	06:08 21:59	7 21:17 (3)	05:17 21:24 (3)	20:06 (5) 20:22 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:04 (5) 22:00	04:54 21:45	06:10 22:00	6 21:19 (3)	05:18 21:24 (3)	20:06 (5) 20:19 (5)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:03 (5) 22:00	04:54 21:43	06:12 22:00	6 21:18 (3)	05:19 21:24 (3)	20:08 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:04 (5) 22:00	04:54 21:42	06:13 22:00	6 21:18 (3)	05:21 21:24 (3)	06:13 20:15 (5)	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	20:04 (5) 20:10 (5)	04:55 21:41	06:15 22:01	5 21:19 (3)	05:23 21:25 (3)	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:02 (5) 20:12 (5)	04:55 21:33	06:17 22:01	6 21:19 (3)	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	20:00 (5) 20:13 (5)	04:55 21:34	06:19 22:01	6 21:18 (3)	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	19:59 (5) 20:15 (5)	04:56 21:36	06:20 22:01	7 21:19 (3)	05:27 21:36	20:37 20:35	19:22 19:19	18:11 17:09	16:17 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	19:58 (5) 20:17 (5)	04:59 21:37	06:22 22:01	6 21:19 (3)	05:29 21:35	20:35 20:32	19:19 19:17	17:03 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	05:08 20:48	04:56 21:39	19:57 (5) 20:19 (5)	04:56 21:39	06:24 22:01	6 21:19 (3)	21:35 21:24 (3)	06:24 20:30	07:14 19:14	08:13 17:04	16:14 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	19:56 (5) 20:21 (5)	04:57 21:40	06:26 22:01	5 21:20 (3)	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00	07:09 19:54	05:56 20:52	05:46 21:41	05:06 21:41	19:55 (5) 20:22 (5)	04:58 21:41	06:28 22:00	8 21:21 (3)	06:28 21:30	06:28 20:13 (5)	06:28 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02	07:06 19:56	05:54 20:53	05:44 21:43	05:05 21:43	19:55 (5) 20:24 (5)	04:58 21:43	06:29 22:00	13 20:26 (5)	06:29 20:23	06:29 20:11 (5)	06:29 19:07	07:24 16:58	07:20 16:11	08:44 16:12
31	08:15 17:04	07:04 19:58	05:54 20:58	05:44 21:44	05:04 21:44	19:54 (5) 20:24 (5)	04:57 21:44	06:30 21:26	17 20:28 (5)	06:31 20:21	06:31 16:56	06:31 16:56	07:22 16:56	07:18 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233			
Total, worst case															
Sun reduction				0.35	0.38	0.32	0.32	0.34							
Oper. time red.				1.00	1.00	1.00	1.00	1.00							
Wind dir. red.				0.65	0.65	0.61	0.61	0.64							
Total reduction				0.23	0.25	0.19	0.21	0.22							
Total, real				38	85	22	10	105							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AC - H29
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:54 (5) 20:22 (5)	05:03 21:45	04:59 22:00	21:18 (3) 21:24 (3)	05:39 21:25	20:11 (5) 20:18	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:54 (5) 20:22 (5)	05:02 21:46	05:00 22:00	21:19 (3) 21:24 (3)	05:40 21:23	20:09 (5) 20:16	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:54 (5) 20:22 (5)	05:01 21:48	05:00 21:59	21:18 (3) 21:23 (3)	05:42 21:21	20:07 (5) 20:13	06:36 20:30	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:54 (5) 20:21 (5)	05:00 21:49	05:01 21:59	21:19 (3) 21:23 (3)	05:44 21:19	20:07 (5) 20:11	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:54 (5) 20:21 (5)	04:59 21:50	21:14 (3) 21:15 (3)	05:02 21:58	21:19 (3) 21:23 (3)	20:05 (5) 20:09	06:40 18:55	07:33 16:46	07:32 16:07	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:54 (5) 20:20 (5)	04:59 21:51	21:14 (3) 21:16 (3)	05:03 21:57	21:20 (3) 21:22 (3)	20:05 (5) 20:06	06:42 18:52	07:35 16:44	07:34 16:07	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:55 (5) 20:20 (5)	04:58 21:52	21:13 (3) 21:16 (3)	05:04 21:57	21:21 (3) 21:22 (3)	20:04 (5) 20:04	06:43 18:50	07:37 16:43	07:36 16:06	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	19:56 (5) 20:19 (5)	04:57 21:53	21:14 (3) 21:17 (3)	05:05 21:56	05:51 21:11	20:03 (5) 20:01	06:45 18:48	07:39 16:41	07:38 16:06	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	19:57 (5) 20:18 (5)	04:57 21:54	21:14 (3) 21:19 (3)	05:06 21:55	05:52 21:09	20:03 (5) 20:31 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	19:57 (5) 20:16 (5)	04:56 21:55	21:14 (3) 21:19 (3)	05:07 21:54	05:54 21:07	20:02 (5) 20:30 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:27	07:55 17:24	06:52 18:19	06:37 20:18	05:33 21:13	20:00 (5) 20:15 (5)	04:56 21:55	21:14 (3) 21:20 (3)	05:08 21:54	05:56 21:05	20:02 (5) 20:31 (5)	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:01 (5) 20:13 (5)	04:55 21:56	21:14 (3) 21:21 (3)	05:09 21:53	05:58 21:03	20:02 (5) 20:31 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:04 (5) 20:10 (5)	04:55 21:57	21:14 (3) 21:14 (3)	05:11 21:51	05:59 21:01	20:01 (5) 20:02 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:05 (5) 21:18	04:55 21:57	21:14 (3) 21:22 (3)	05:12 21:51	06:01 20:59	20:02 (5) 20:29 (5)	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:06 (5) 21:22 (5)	04:55 21:58	21:14 (3) 21:22 (3)	05:13 21:50	06:03 20:57	20:02 (5) 20:28 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:07 (5) 21:23 (3)	04:54 21:59	21:14 (3) 21:23 (3)	05:14 21:48	06:05 20:55	20:02 (5) 20:25 (5)	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:08 (5) 21:23 (3)	04:54 21:59	21:15 (3) 21:23 (3)	05:16 21:47	06:06 20:53	20:03 (5) 20:23 (5)	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	20:09 (5) 20:15 (5)	04:54 21:59	21:15 (3) 21:24 (3)	05:17 21:46	06:08 20:50	20:04 (5) 20:22 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:10 (5) 22:00	04:54 22:00	21:15 (3) 21:24 (3)	05:18 21:45	06:10 20:48	20:04 (5) 20:19 (5)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:11 (5) 22:00	04:54 22:00	21:15 (3) 21:24 (3)	05:20 21:43	06:12 20:46	20:05 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 20:08 (5)	20:03 (5) 20:08 (5)	04:54 21:30	21:15 (3) 21:16 (3)	05:21 05:23	06:13 06:15	20:07 (5) 20:08 (5)	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 20:10 (5)	20:01 (5) 21:31	04:55 22:01	21:16 (3) 21:25 (3)	05:23 21:41	06:15 20:42	20:08 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	19:59 (5) 20:12 (5)	04:55 22:01	21:16 (3) 21:25 (3)	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07	
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 20:42	19:58 (5) 20:13 (5)	04:55 21:34	21:16 (3) 21:25 (3)	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08	
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	19:57 (5) 20:15 (5)	04:56 21:36	21:17 (3) 21:25 (3)	05:27 21:36	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:16	08:43 16:08	
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	19:56 (5) 20:17 (5)	04:56 22:01	21:16 (3) 21:25 (3)	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:06	08:11 16:15	08:43 16:09	
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	19:55 (5) 20:19 (5)	04:56 21:39	21:16 (3) 21:24 (3)	05:30 21:33	06:24 20:30	07:14 19:14	08:15 17:04	08:13 16:14	08:44 16:10	
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	19:55 (5) 20:21 (5)	04:57 21:40	21:17 (3) 21:25 (3)	05:32 21:32	06:26 20:28	07:21 19:12	08:16 17:02	08:14 16:13	08:44 16:11	
29	08:18 17:00	07:09 17:54	05:56 19:54	05:06 20:52	05:06 21:41	19:54 (5) 20:22 (5)	04:58 22:00	21:18 (3) 21:25 (3)	05:34 21:30	06:28 20:25	07:22 19:09	08:18 17:00	08:16 16:12	08:44 16:11	
30	08:17 17:02	07:06 17:56	05:54 19:56	05:05 20:53	05:05 21:43	19:54 (5) 20:23 (5)	04:58 22:00	21:17 (3) 21:24 (3)	05:35 21:28	06:29 20:23	07:24 19:07	08:19 16:58	08:17 16:11	08:44 16:12	
31	08:15 17:04	07:04 17:58	05:04 19:58	05:04 21:44	05:04 21:44	19:54 (5) 20:24 (5)	04:58 22:00	21:17 (3) 21:26	05:37 21:26	06:30 20:23 (5)	07:25 19:08	08:20 16:59	08:18 16:12	08:44 16:13	
Potential sun hours	250	273	367	420	494	510	512	512	460	382	328	259	233		
Total, worst case				188	285	182	36	469							
Sun reduction				0.35	0.38	0.32	0.32	0.34							
Oper. time red.				1.00	1.00	1.00	1.00	1.00							
Wind dir. red.				0.65	0.65	0.61	0.62	0.65							
Total reduction				0.23	0.25	0.19	0.20	0.22							
Total, real				43	70	35	7	104							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AD - H30

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:20 (5) 20:26 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:24 (5) 20:50 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	20:19 (5) 20:27 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:24 (5) 20:50 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	20:17 (5) 20:29 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:23 (5) 20:50 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	20:16 (5) 20:30 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:24 (5) 20:48 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	20:15 (5) 20:32 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:23 (5) 20:46 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:14 (5) 20:33 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:24 (5) 20:45 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:15 (5) 20:36 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:25 (5) 20:43 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:14 (5) 20:37 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:25 (5) 20:41 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:13 (5) 20:38 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:26 (5) 20:39 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:13 (5) 20:39 (5)	04:56 21:54	05:07 21:54	05:54 21:07	20:26 (5) 20:37 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:14 (5) 20:40 (5)	04:56 21:55	05:08 21:54	05:56 21:05	20:28 (5) 20:35 (5)	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:13 (5) 20:39 (5)	04:55 21:56	05:09 21:53	05:58 21:03	20:30 (5) 20:34 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:13 (5) 20:39 (5)	04:55 21:57	05:11 21:52	05:59 19:49	06:54 19:49	07:48 18:36	07:47 16:32	07:47 16:05	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:14 (5) 20:39 (5)	04:55 21:57	05:12 21:51	06:01 19:47	06:56 19:47	07:50 18:33	07:49 16:31	07:49 16:05	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:14 (5) 20:38 (5)	04:55 21:58	05:13 21:50	06:03 19:44	06:58 19:44	07:52 18:31	07:51 16:29	07:51 16:05	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:15 (5) 20:38 (5)	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:27	07:53 16:05	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:15 (5) 20:37 (5)	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	07:55 16:05	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	20:16 (5) 20:37 (5)	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	07:57 16:05	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:17 (5) 20:37 (5)	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	07:59 16:05	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:17 (5) 20:35 (5)	04:54 22:00	05:20 21:43	8	20:33 (5) 20:41 (5)	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:19 (5) 20:35 (5)	04:54 22:00	05:21 21:42	12	20:31 (5) 20:43 (5)	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	20:20 (5) 20:34 (5)	04:55 22:01	05:23 21:41	15	20:29 (5) 20:44 (5)	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:21 (5) 20:32 (5)	04:55 22:01	05:24 21:39	17	20:29 (5) 20:46 (5)	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	20:24 (5) 20:29 (5)	04:55 22:01	05:26 21:38	19	20:27 (5) 20:46 (5)	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36		04:56 22:01	05:27 21:36	21	20:27 (5) 20:48 (5)	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	05:09 22:01	04:56 21:35	05:29 20:48 (5)	22	06:22 20:48 (5)	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:15
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39		04:56 22:01	05:30 21:33	23	06:24 20:49 (5)	06:24 20:30	07:19 19:14	08:13 17:04	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40		04:57 22:01	05:32 21:32	24	06:26 20:49 (5)	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41		04:58 22:00	05:34 21:30	25	06:28 20:50 (5)	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 1	20:23 (5) 20:24 (5)	04:58 21:43	05:35 22:00	26	06:29 20:50 (5)	06:29 20:23	07:24 19:07	08:17 16:58	08:44 16:11
31	08:15 17:04		07:04 19:58		05:04 21:44		05:04 21:44	05:37 21:26	26	06:31 20:50 (5)	06:31 20:21	07:22 16:56	08:44 16:13	08:44 16:13
Potential sun hours	250	273	367	420	494			510	512		460	382	328	259
Total, worst case				1	448			238		216				233
Sun reduction				0.35	0.38			0.32		0.34				
Oper. time red.				1.00	1.00			1.00		1.00				
Wind dir. red.				0.64	0.64			0.64		0.64				
Total reduction				0.23	0.24			0.21		0.22				
Total, real				0	110			49		47				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AE - H31

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1 08:44	09:18 (2) 08:14	09:33 (2) 07:16	07:01 05:52	05:03 04:59	05:39 06:33	07:26 07:24	08:19 09:02 (2)						
2 16:15	14:41 (1) 17:06	09:54 (2) 18:02	20:00 20:55	21:45 22:00	21:25 20:18	19:05 16:54	16:10 14:24 (1)						
3 08:44	09:18 (2) 08:12	09:35 (2) 07:14	06:59 05:50	05:02 05:00	05:40 06:35	07:28 07:26	08:21 09:03 (2)						
4 16:16	14:42 (1) 17:08	09:52 (2) 18:04	20:02 20:57	21:47 22:00	21:23 20:16	19:02 16:52	16:09 14:26 (1)						
5 08:44	09:18 (2) 08:10	09:38 (2) 07:12	06:56 05:48	05:01 05:00	05:42 06:36	07:30 07:28	08:22 09:03 (2)						
6 16:17	14:41 (1) 17:10	09:49 (2) 18:06	20:04 20:59	21:48 21:59	21:21 20:14	19:00 16:50	16:08 14:26 (1)						
7 08:43	09:18 (2) 08:09	07:09 06:54	05:46 05:00	05:01 05:44	06:38 07:32	07:30 07:28	08:24 09:04 (2)						
8 16:18	14:42 (1) 17:12	18:08 20:06	21:01 21:49	21:59 21:19	20:11 18:57	16:48 16:48	16:08 14:27 (1)						
9 08:43	09:18 (2) 08:07	07:07 06:52	05:44 04:59	05:02 05:45	06:40 07:33	07:32 07:32	08:25 09:04 (2)						
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12 16:21	14:43 (1) 17:16	18:11 20:09	21:04 21:51	21:58 21:16	20:06 18:52	16:44 16:44	16:07 14:29 (1)						
13 08:42	09:19 (2) 08:03	07:02 06:47	05:40 04:58	05:04 05:49	06:43 07:37	07:36 07:36	08:28 09:05 (2)						
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49 08:25	09:25 (2) 07:25	06:18 06:05	05:11 04:56	05:27 06:20	07:15 07:11	08:09 08:09	08:43 09:18 (2)						
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Potential sun hours	250	273	367	420	494	510	512	460	382	259	233	2034	
Total, worst case	1568	49								882		0.21	
Sun reduction	0.24	0.23								0.27		0.21	
Oper. time red.	1.00	1.00								1.00		1.00	
Wind dir. red.	0.62	0.60								0.61		0.63	
Total reduction	0.15	0.14								0.16		0.13	
Total, real	235	7								142		264	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AF - H32

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	[January	[February	[March	[April	[May	[June	[July	[August	[September	[October	[November	[December																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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	16:33	13 09:22 (2)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	22 08:58 (2)	16:05																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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	16:34	15 09:23 (2)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	23 08:58 (2)	16:05																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
16	08:36	09:07 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:35 (2)	08:38																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	16:36	17 09:24 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	24 08:59 (2)	16:05																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
17	08:35	09:05 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:35 (2)	08:39																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	16:38	18 09:23 (2)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	24 08:59 (2)	16:05																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
18	08:33	09:04 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:35 (2)	08:39																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	16:40	20 09:24 (2)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	25 09:00 (2)	16:05																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
19	08:32	09:03 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:35 (2)	08:40																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	16:41	22 09:25 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	25 09:00 (2)	16:05																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
20	08:31	09:01 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:35 (2)	08:41																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	16:43	24 09:25 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	26 09:01 (2)	16:06																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
21	08:30	09:00 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:35 (2)	08:41																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	16:45	26 09:26 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	26 09:01 (2)	16:06																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
22	08:29	09:01 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:37 (2)	08:42																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	16:47	26 09:27 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	24 09:01 (2)	16:07																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
23	08:27	09:01 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:39 (2)	08:42																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	16:49	25 09:26 (2)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	22 09:01 (2)	16:07																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
24	08:26	09:01 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:41 (2)	08:43																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	16:51	25 09:26 (2)	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	20 09:01 (2)	16:08																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
25	08:25	09:02 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:09	08:43 (2)	08:43																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	16:52	24 09:26 (2)	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	19 09:02 (2)	16:08																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
26	08:23	09:02 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:45 (2)	08:44																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	16:54	24 09:26 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	17 09:02 (2)	16:09																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
27	08:22	09:03 (2)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13	08:47 (2)	08:44																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	16:56	23 09:26 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:14	15 09:02 (2)	16:10																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
28	08:20	09:04 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:15	08:49 (2)	08:44																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	16:58	22 09:26 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	13 09:02 (2)	16:11																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
29	08:19	09:05 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16	08:50 (2)	08:44																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	17:00	20 09:25 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	11 09:01 (2)	16:11																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
30	08:17	09:05 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:52 (2)	08:44																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	17:02	19 09:24 (2)		19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	9 09:01 (2)	16:12																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
31	08:15	09:08 (2)		07:04		05:04		05:37	06:31		07:22			08:44																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
	17:04	15 09:23 (2)		19:58		21:44		21:27	20:21		16:56			16:13																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
Potential sun hours	250		273		367		420		510		512		460		382		259																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AG - H33
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	11:17 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	
	16:15	26	11:43 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05
2	08:44	11:19 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	
	16:16	24	11:43 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
3	08:44	11:19 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	
	16:17	23	11:42 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
4	08:43	11:21 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	
	16:18	21	11:42 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
5	08:43	11:22 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	
	16:20	19	11:41 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55
6	08:43	11:24 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	
	16:21	17	11:41 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53
7	08:42	11:26 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	
	16:22	13	11:39 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
8	08:42	11:29 (1)	08:01		06:44	05:38	04:57	05:05	05:51	06:45	07:39	
	16:24	7	11:36 (1)	17:20	08:28 (2)	07:00	06:44	05:38	04:57	05:51	06:45	07:39
9	08:41		07:59		08:31 (2)	07:15	06:44	05:38	04:57	05:51	06:45	07:39
	16:25		17:22		08:26 (2)	06:57	06:42	05:36	04:57	05:52	06:47	07:41
10	08:41		07:57		08:32 (2)	07:17	06:44	05:36	04:57	05:52	06:47	07:41
	16:27		17:24		08:24 (2)	06:55	06:40	05:34	04:56	05:50	06:49	07:43
11	08:40		07:55		08:33 (2)	07:19	06:44	05:34	04:56	05:50	06:49	07:43
	16:28		17:26		08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51
12	08:39		07:53		08:34 (2)	07:21	06:46	05:36	04:58	05:52	06:50	07:46
	16:30		17:28		08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52
13	08:38		07:51		08:35 (2)	07:23	06:48	05:38	04:59	05:53	06:52	07:46
	16:31		17:30		08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54
14	08:37		07:49		08:35 (2)	07:25	06:40	05:30	04:51	05:01	05:49	06:48
	16:33		17:32		08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56
15	08:36		07:47		08:34 (2)	07:27	06:38	05:28	04:51	05:01	05:49	06:48
	16:35		17:34		08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58
16	08:36		07:45		08:34 (2)	07:29	06:39	05:29	04:51	05:01	05:49	06:48
	16:36		17:36		08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59
17	08:35		07:43		08:34 (2)	07:30	06:40	05:30	04:51	05:01	05:49	06:48
	16:38		17:38		08:10 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01
18	08:33		07:41		08:34 (2)	07:32	06:42	05:32	04:53	05:17	06:08	07:03
	16:40		17:40		08:11 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03
19	08:32		07:39		08:34 (2)	07:34	06:44	05:34	04:54	05:18	06:10	07:05
	16:41		17:42		08:12 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05
20	08:31		07:37		08:32 (2)	07:36	06:46	05:36	04:56	05:20	06:12	07:06
	16:43		17:44		08:12 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06
21	08:30		07:34		08:31 (2)	07:38	06:48	05:38	04:56	05:21	06:13	07:08
	16:45		17:46		08:14 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08
22	08:29		07:32		08:30 (2)	07:40	06:50	05:40	04:56	05:22	06:14	07:09
	16:47		17:48		08:15 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10
23	08:27		07:30		08:27 (2)	07:42	06:52	05:42	04:56	05:24	06:17	07:12
	16:49		17:50		08:15 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10
24	08:26		07:28		08:27 (2)	07:44	06:54	05:44	04:56	05:25	06:18	07:13
	16:51		17:52		08:14 (2)	06:27	06:13	05:16	04:55	05:24	06:17	07:12
25	08:25		07:25		08:23 (2)	07:46	06:56	05:46	04:57	05:26	06:19	07:14
	16:52		17:54		08:13 (2)	06:28	06:14	05:17	04:56	05:27	06:21	07:15
26	08:23		07:23		08:22 (2)	07:48	06:58	05:48	04:58	05:27	06:21	07:15
	16:54		17:56		08:12 (2)	06:28	06:14	05:17	04:56	05:27	06:21	07:15
27	08:22		07:21		08:21 (2)	07:49	06:59	05:49	04:59	05:28	06:22	07:16
	16:56		17:58		08:11 (2)	06:27	06:13	05:16	04:55	05:26	06:19	07:14
28	08:20		07:19		08:20 (2)	07:50	07:00	05:50	04:60	05:29	06:23	07:17
	16:58		18:00		08:10 (2)	06:18	06:04	05:07	04:57	05:32	06:26	07:21
29	08:19				08:19 (2)	07:51	07:01	05:51	04:61	05:30	06:24	07:18
	17:00				08:09 (2)	07:41	06:51	05:41	04:51	05:28	06:21	07:15
30	08:17				08:08 (2)	07:40	06:50	05:40	04:50	05:27	06:20	07:14
	17:02				08:07 (2)	07:39	06:49	05:39	04:49	05:26	06:19	07:13
31	08:15				08:06 (2)	07:38	06:48	05:38	04:48	05:25	06:18	07:12
	17:04				08:05 (2)	07:37	06:47	05:37	04:47	05:24	06:17	07:11
Potential sun hours	250				19:58		21:44		21:27		16:56	
Total, worst case	150		273		367		420		494		510	
Sun reduction	0.24		240		494		510		512		460	
Oper. time red.	1.00		0.23									
Wind dir. red.	0.60		0.63									
Total reduction	0.15		0.15									
Total, real	22		35									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AH - H34

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:13 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	20:50 (4) 04:59	21:01 (4) 05:39	06:33 07:26	07:24 08:19		
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	20:51 (4) 05:00	21:01 (4) 05:40	06:35 07:28	07:26 08:21		
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	20:51 (4) 05:00	21:00 (4) 05:42	06:36 07:30	07:28 08:22		
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	20:52 (4) 05:01	21:00 (4) 05:44	06:38 07:31	07:30 08:23		
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	20:52 (4) 05:02	21:11 (4) 05:45	06:40 07:33	07:32 08:25		
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	20:53 (4) 05:03	21:13 (4) 05:47	06:42 07:35	07:34 08:26		
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	20:53 (4) 05:04	21:14 (4) 05:49	06:43 07:37	07:36 08:28		
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	20:54 (4) 05:05	21:14 (4) 05:50	06:45 07:39	07:38 08:29		
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	20:54 (4) 05:06	21:15 (4) 05:52	06:47 07:41	07:40 08:30		
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	20:55 (4) 05:07	21:16 (4) 05:54	06:49 07:42	07:42 08:31		
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	20:56 (4) 05:08	21:16 (4) 05:56	06:50 07:44	07:43 08:32		
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	20:56 (4) 05:09	21:17 (4) 05:57	06:52 07:46	07:45 08:34		
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	20:57 (4) 05:11	21:18 (4) 06:01	06:54 07:48	07:47 08:35		
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	05:27 21:18	04:55 21:57	21:05 (4) 05:12	21:19 (4) 06:02	06:56 07:50	07:49 08:36		
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	20:58 (4) 05:13	21:20 (4) 06:03	06:57 07:52	07:51 08:37		
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:00 (4) 05:14	21:21 (4) 06:04	06:59 07:53	07:53 08:37		
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:01 (4) 05:16	21:22 (4) 06:06	07:01 07:55	07:55 08:38		
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:04 (4) 05:17	21:23 (4) 06:08	07:03 07:57	07:57 08:39		
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:04 (4) 05:18	21:24 (4) 06:10	07:05 07:59	07:58 08:40		
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:05 (4) 05:19	21:25 (4) 06:12	07:06 08:01	08:00 08:40		
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:06 (4) 05:20	21:26 (4) 06:13	07:07 08:02	08:02 08:41		
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:07 (4) 05:21	21:27 (4) 06:14	07:08 08:03	08:03 08:42		
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:08 (4) 05:22	21:28 (4) 06:15	07:09 08:04	08:04 08:42		
24	08:26 16:50	07:27 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:09 (4) 05:23	21:29 (4) 06:16	07:10 08:05	08:05 08:43		
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:10 (4) 05:24	21:30 (4) 06:17	07:11 08:06	08:06 08:44		
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:11 (4) 05:25	21:31 (4) 06:18	07:12 08:07	08:07 08:45		
27	08:21 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	21:12 (4) 05:26	21:32 (4) 06:19	07:13 08:08	08:08 08:46		
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:13 (4) 05:27	21:33 (4) 06:20	07:14 08:09	08:09 08:47		
29	08:18 17:00	07:08 19:04	05:56 20:52	05:06 21:41	05:06 21:41	04:57 22:01	21:14 (4) 05:28	21:34 (4) 06:21	07:15 08:10	08:10 08:48		
30	08:17 17:02	07:06 19:06	05:54 20:54	05:05 21:43	05:05 21:43	04:58 22:01	21:15 (4) 05:29	21:35 (4) 06:22	07:16 08:11	08:11 08:49		
31	08:15 17:04	07:04 19:08	05:54 20:54	05:05 21:43	05:05 21:43	04:58 22:01	21:16 (4) 05:30	21:36 (4) 06:23	07:17 08:12	08:12 08:50		
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					162	241						
Sun reduction					0.38	0.32						
Oper. time red.					1.00	1.00						
Wind dir. red.					0.62	0.62						
Total reduction					0.24	0.20						
Total, real					38	48						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AI - H35

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
2	16:15	17:06	18:02	20	08:01 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
3	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21			
4	16:16	17:08	18:04	23	08:02 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09		
5	08:44	08:10	07:12	07:38 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22			
6	16:17	17:10	18:06	23	08:01 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:09		
7	08:43	08:09	07:09	07:39 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:21 (1)	07:30	08:24		
8	16:18	17:12	18:08	22	08:01 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	10	08:31 (1)	16:48	16:08
9	08:43	08:07	07:07	07:38 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:18 (1)	07:32	08:25		
10	16:20	17:14	18:10	22	08:00 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	15	08:33 (1)	16:46	16:07
11	08:43	08:05	07:05	07:39 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:17 (1)	07:34	08:27		
12	16:21	17:16	18:12	21	08:00 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	17	08:34 (1)	16:45	16:07
13	08:42	08:03	07:02	07:40 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:15 (1)	07:36	08:28		
14	16:22	17:18	18:13	19	07:59 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	20	08:35 (1)	16:43	16:06
15	08:42	08:01	07:00	07:41 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:15 (1)	07:38	08:29		
16	16:24	17:20	18:15	16	07:57 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	21	08:36 (1)	16:41	16:06
17	08:41	07:59	06:58	07:43 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:13 (1)	07:40	08:30		
18	16:25	17:22	18:17	12	07:55 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	22	08:35 (1)	16:39	16:06
19	08:41	07:57	06:55	07:45 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:12 (1)	07:42	08:32		
20	16:27	17:24	18:19	6	07:51 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	23	08:35 (1)	16:37	16:05
21	08:40	07:55	06:53		06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:12 (1)	07:44	08:33		
22	16:28	17:26	18:21		20:19	21:13	21:56	21:54	21:06	19:54	18:41	23	08:35 (1)	16:36	16:05	
23	08:39	07:53	06:50		06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:13 (1)	07:46	08:34		
24	16:30	17:28	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	22	08:35 (1)	16:34	16:05	
25	08:38	07:51	06:48		06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:15 (1)	07:48	08:35		
26	16:31	17:30	18:25		20:22	21:17	21:57	21:52	21:02	19:49	18:36	19	08:34 (1)	16:32	16:05	
27	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:17 (1)	07:50	08:36		
28	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16	08:33 (1)	16:31	16:05	
29	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:19 (1)	07:51	08:37		
30	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	13	08:32 (1)	16:29	16:05	
31	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	06:59	07:54	08:21 (1)	07:53	08:38		
32	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	10	08:31 (1)	16:28	16:05	
33	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:23 (1)	07:55	08:39		
34	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	6	08:29 (1)	16:26	16:05	
35	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58			07:57	08:39	
36	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24			16:25	16:05	
37	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59			07:59	08:40	
38	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22			16:23	16:05	
39	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01			08:01	08:41	
40	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20			16:22	16:06	
41	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03			08:02	08:41	
42	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18			16:21	16:06	
43	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05			08:04	08:42	
44	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15			16:19	16:07	
45	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07			08:06	08:43	
46	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13			16:18	16:07	
47	08:26	07:28		07:53 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:08	08:43	
48	16:51	17:52	3	07:56 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11		16:17	16:08	
49	08:25	07:26		07:51 (1)	06:19	06:05	05:11	04:56	05:27	06:21	07:15	07:11		08:10	08:43	
50	16:53	17:54	7	07:58 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09		16:16	16:08	
51	08:23	07:23		07:48 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13		08:11	08:44	
52	16:54	17:56	11	07:59 (1)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07		16:15	16:09	
53	08:22	07:21		07:46 (1)	06:14	06:01	05:08	04:57	05:31	06:24	07:19	07:15		08:13	08:44	
54	16:56	17:58	14	08:00 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05		16:14	16:10	
55	08:20	07:19		07:43 (1)	06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17		08:15	08:44	
56	16:58	18:00	18	08:01 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02		16:13	16:11	
57	08:19				07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19		08:16	08:44	
58	17:00				19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00		16:12	16:12	
59	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21		08:18	08:44	
60	17:02				19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58		16:11	16:13	
61	08:16				07:04		05:04		05:37	06:31		07:22			08:44	
62	17:04				19:58		21:44		21:27	20:21		16:56			16:14	
Potential sun hours	250	273		367		420	494	510	512	460	382	328	237	259	233	
Total, worst case			53	184									237			
Sun reduction			0.23	0.27									0.29			
Oper. time red.			1.00	1.00									1.00			
Wind dir. red.			0.65	0.65									0.65			
Total reduction			0.15	0.18									0.19			
Total, real			8	32									45			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AJ - H36

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:56	06:31 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:41	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	06:31 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	06:57	05:48	06:14 (1)	05:01	05:01	05:42	06:37	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	06:30 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09		
4	08:43	08:09	07:09	06:54	05:46	06:13 (1)	05:00	05:01	05:44	06:38	07:32	07:30	08:24		
	16:18	17:12	18:08	20:06	21:01	06:29 (1)	21:49	21:59	21:19	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	06:52	05:44	06:14 (1)	05:00	05:02	05:46	06:29 (1)	06:40	07:33	08:25		
	16:20	17:14	18:10	20:08	21:03	06:28 (1)	21:50	21:58	21:18	5	06:34 (1)	20:09	18:55	16:47	16:07
6	08:43	08:05	07:05	06:49	05:42	06:16 (1)	04:59	05:03	05:47	06:26 (1)	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:10	21:05	06:28 (1)	21:51	21:58	21:16	10	06:36 (1)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	06:17 (1)	04:58	05:04	05:49	06:25 (1)	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	06:26 (1)	21:52	21:57	21:14	13	06:38 (1)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38		04:57	05:05	05:51	06:23 (1)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:12	15	06:38 (1)	20:02	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36		04:57	05:06	05:52	06:22 (1)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10		21:54	21:56	21:10	17	06:39 (1)	19:59	18:45	16:39	16:06
10	08:41	07:57	06:55	06:40	05:35		04:56	05:07	05:54	06:24 (1)	06:49	07:43	07:42	08:32	
	16:27	17:24	18:19	20:17	21:12		21:55	21:55	21:08	16	06:40 (1)	19:57	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33		04:56	05:08	05:56	06:25 (1)	06:51	07:45	07:44	08:33	
	16:28	17:26	18:21	20:19	21:13		21:56	21:54	21:06	15	06:40 (1)	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	06:27 (1)	06:52	07:46	07:46	08:34	
	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	13	06:40 (1)	19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	06:29 (1)	06:54	07:48	07:48	08:35	
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:02	11	06:40 (1)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:30 (1)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	9	06:39 (1)	19:47	18:34	16:31	16:05
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:32 (1)	06:58	07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	7	06:39 (1)	19:44	18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	06:34 (1)	07:00	07:54	07:53	08:38	
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	5	06:39 (1)	19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22		04:55	05:16	06:07	06:35 (1)	07:01	07:56	07:55	08:39	
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	2	06:37 (1)	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08	07:03	07:58	07:57	08:39		
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51	19:37	18:24	16:25	16:05		
19	08:32	07:39	06:33	06:19	05:19		04:54	05:19	06:10	07:05	07:59	07:59	08:40		
	16:42	17:42	18:36	20:34	21:27		22:00	21:45	20:49	19:34	18:22	16:23	16:06		
20	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12	07:07	08:01	08:01	08:41		
	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46	19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16		04:55	05:22	06:14	07:08	08:03	08:02	08:41		
	16:45	17:46	18:40	20:37	21:30		22:01	21:42	20:44	19:29	18:18	16:21	16:06		
22	08:29	07:32	06:26	06:12	05:15		04:55	05:23	06:15	07:10	08:05	08:04	08:42		
	16:47	17:48	18:42	20:39	21:32		22:01	21:41	20:42	19:27	18:15	16:19	16:07		
23	08:27	07:30	06:23	06:10	05:13		04:55	05:24	06:17	07:12	08:07	08:06	08:42		
	16:49	17:50	18:44	20:41	21:33		22:01	21:40	20:40	19:24	18:13	16:18	16:07		
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26	06:19	07:14	08:09	08:08	08:43		
	16:51	17:52	18:45	20:43	21:35		22:01	21:38	20:37	19:22	18:11	16:17	16:08		
25	08:25	07:26	06:19	06:05	05:11		04:56	05:28	06:21	07:15	07:11	08:09	08:43		
	16:53	17:54	18:47	20:45	21:36		22:01	21:37	20:35	19:20	17:09	16:16	16:08		
26	08:23	07:23	06:16	06:03	05:10	06:28 (1)	04:56	05:29	06:22	07:17	07:13	08:11	08:44		
	16:55	17:56	18:49	20:46	3	06:31 (1)	22:01	21:35	20:33	19:17	17:07	16:15	16:09		
27	08:22	07:21	06:14	06:01	05:08	06:26 (1)	04:57	05:31	06:24	07:19	07:15	08:13	08:44		
	16:56	17:58	18:51	20:48	5	06:31 (1)	22:01	21:33	20:30	19:15	17:05	16:14	16:10		
28	08:20	07:19	06:11	05:59	05:07	06:24 (1)	04:57	05:32	06:26	07:21	07:17	08:15	08:44		
	16:58	18:00	18:53	20:50	8	06:32 (1)	22:01	21:32	20:28	19:12	17:02	16:13	16:11		
29	08:19		07:09	05:56	05:06	06:22 (1)	04:58	05:34	06:28	07:23	07:19	08:16	08:44		
	17:00		19:55	20:52	10	06:32 (1)	22:01	21:30	20:26	19:10	17:00	16:12	16:12		
30	08:17		07:06	05:54	05:05	06:20 (1)	04:58	05:36	06:30	07:24	07:21	08:18	08:44		
	17:02		19:57	20:54	12	06:32 (1)	22:01	21:28	20:23	19:07	16:58	16:11	16:13		
31	08:15		07:04		05:04			05:37	06:31		07:22		08:44		
	17:04		19:58		21:44			21:27	20:21		16:56		16:14		
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233		
Total, worst case				38	95				138						
Sun reduction				0.35	0.38				0.34						
Oper. time red.				1.00	1.00				1.00						
Wind dir. red.				0.68	0.68				0.68						
Total reduction				0.24	0.26				0.23						
Total, real				9	24				32						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AK - H37

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	08:42 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
2	16:15	17:06	08:54 (1)	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:10
3	08:44	08:12	08:40 (1)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
4	16:16	17:08	08:55 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
5	08:44	08:10	08:38 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:22
6	16:17	17:10	08:55 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
7	08:44	08:09	08:36 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
8	16:18	17:12	08:55 (1)	18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:08
9	08:43	08:07	08:35 (1)	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25
10	16:20	17:14	08:56 (1)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
11	08:43	08:05	08:35 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
12	16:21	17:16	08:55 (1)	18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:07
13	08:42	08:03	08:36 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
14	16:22	17:18	08:55 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
15	08:42	08:01	08:36 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
16	16:24	17:20	08:55 (1)	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:06
17	08:41	07:59	08:37 (1)	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:31
18	16:25	17:22	08:54 (1)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:05
19	08:41	07:57	08:39 (1)	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
20	16:27	17:24	08:53 (1)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
21	08:40	07:55	08:40 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:33
22	16:28	17:26	08:52 (1)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
23	08:39	07:53	08:43 (1)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34
24	16:30	17:28	08:49 (1)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
25	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:38	16:05
26	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32	16:05
27	08:38	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36	16:05
28	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31	16:05
29	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37
30	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05
31	08:36	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38
32	16:36	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16:05
33	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39
34	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	16:05
35	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57	08:39
36	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:05
37	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59	08:40
38	16:41	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23	16:05
39	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01	08:41
40	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	16:06
41	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:02	08:41
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	16:06
43	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42
44	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	16:07
45	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:43
46	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	16:07
47	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43
48	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	16:08
49	08:25	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:10	08:43
50	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16	16:08
51	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:44
52	16:54	17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15	16:09
53	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	07:15	08:13	08:44
54	16:56	17:58	18:51	20:48	21:39	22:01	21:34	20:30	19:15	17:05	16:14	16:10
55	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17	08:15	08:44
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16:11
57	08:19	08:47 (1)	07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16	08:44
58	17:00	08:51 (1)	19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	16:12
59	08:17	08:45 (1)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21	08:18	08:44
60	17:02	08:52 (1)	19:57	20:54	21:43	22:01	21:29	20:23	19:07	16:58	16:11	16:13
61	08:16	08:44 (1)	07:04		05:04		05:37	06:31		07:23	08:09 (1)	08:44
62	17:04	08:54 (1)	19:58		21:44		21:27	20:21		16:56	16:11	16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	21	191								20	194	
Sun reduction	0.24	0.23								0.29	0.27	
Oper. time red.	1.00	1.00								1.00	1.00	
Wind dir. red.	0.61	0.61								0.61	0.61	
Total reduction	0.15	0.14								0.18	0.16	
Total, real	3	27								4	31	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AL - H38

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AM - H39

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AN - H40

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AO - H41

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AP - H42

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AQ - H43

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AR - H44

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AS - H45

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December					
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00		05:52 20:55		05:03 21:45	04:59 22:00	05:39 21:25	06:09 (4) 06:20 (4)	06:33 20:18	25 07:00 (5)	07:26 19:05	07:24 16:54	08:19 16:10	
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	3	07:23 (5) 07:26 (5)	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:11 (4) 06:21 (4)	06:35 20:16	24 07:02 (5)	07:28 19:02	07:26 16:52	08:21 16:09	
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43		05:12 21:34	05:26 21:38	04:55 22:01	05:26 21:38	06:19 20:37	06:22 (4) 06:22 (4)	06:49 19:21	4 07:35 (5)	08:14 18:11	08:14 16:17	08:43 16:08	
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44		05:11 21:36	05:27 21:36	04:56 22:01	05:27 21:36	06:21 20:35	06:22 (4) 06:22 (4)	06:49 19:19	4 07:36 (5)	08:16 18:09	08:16 16:16	08:43 16:08	
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46		05:09 21:37	05:29 21:35	04:56 22:01	05:29 21:35	06:22 20:32	06:22 (4) 06:22 (4)	06:49 19:17	4 07:37 (5)	08:18 18:07	08:18 16:15	08:43 16:09	
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48		05:08 21:39	05:31 21:33	04:57 22:01	05:31 21:33	06:24 20:30	06:22 (4) 06:22 (4)	06:49 19:15	4 07:38 (5)	08:19 18:05	08:19 16:14	08:44 16:10	
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50		05:07 21:40	05:32 21:32	04:57 22:01	05:32 21:32	06:26 20:28	06:22 (4) 06:22 (4)	06:49 19:12	4 07:39 (5)	08:21 18:02	08:21 16:13	08:44 16:11	
29	08:19 17:00	07:18 18:01	06:09 18:55	05:56 20:52		05:06 21:41	05:34 21:30	04:58 22:01	05:34 21:30	06:28 20:25	06:22 (4) 06:22 (4)	06:49 19:10	4 07:40 (5)	08:23 18:00	08:23 16:12	08:44 16:12	
30	08:17 17:02	07:16 18:02	06:06 18:56	05:54 20:54		05:05 21:43	05:35 21:43	04:58 22:00	05:35 21:28	06:29 20:23	06:22 (4) 06:22 (4)	06:49 19:07	4 07:41 (5)	08:25 18:00	08:25 16:11	08:44 16:13	
31	08:15 17:04	07:14 18:04	06:04 18:58	05:54 20:54		05:04 21:44	05:37 21:44	04:57 22:01	05:37 21:27	06:31 20:21	06:22 (4) 06:22 (4)	06:49 19:05	4 07:42 (5)	08:27 18:00	08:27 16:14	08:44 16:14	
Potential sun hours	250	273	367	420		494		510	512		460		382		328	259	233
Total, worst case					311		89		40		211		158				
Sun reduction					0.35		0.38		0.32		0.34		0.32				
Oper. time red.					1.00		1.00		1.00		1.00		1.00				
Wind dir. red.					0.67		0.67		0.67		0.67		0.67				
Total reduction					0.24		0.25		0.22		0.23		0.22				
Total, real					74		23		9		48		34				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: AT - H46

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	07:45 (5)	05:52	06:18 (4)	05:03	04:59	05:39		
	16:15	17:06	18:02	20:00	08:07 (5)	20:55	06:31 (4)	21:45	22:00	21:25		
2	08:44	08:12	07:14	06:59	07:48 (5)	05:50	06:16 (4)	05:02	05:00	05:40		
	16:16	17:08	18:04	20:02	08:05 (5)	20:57	06:30 (4)	21:47	22:00	21:23		
3	08:44	08:10	07:12	06:56	07:51 (5)	05:48	06:14 (4)	05:01	05:00	05:42		
	16:17	17:10	18:06	20:04	08:00 (5)	20:59	06:29 (4)	21:48	21:59	21:21		
4	08:43	08:09	07:09	06:54	05:46	05:46	06:12 (4)	05:00	05:01	05:44		
	16:18	17:12	18:08	20:06	21:01	21:01	06:29 (4)	21:49	21:59	21:19		
5	08:43	08:07	07:07	06:52	05:44	05:44	06:10 (4)	04:59	05:02	05:46		
	16:20	17:14	18:10	20:08	21:03	21:03	06:27 (4)	21:50	21:58	21:17		
6	08:43	08:05	07:05	06:49	05:42	05:42	06:10 (4)	04:59	05:03	05:47		
	16:21	17:16	18:11	20:09	21:04	21:04	06:27 (4)	21:51	21:58	21:16		
7	08:42	08:03	07:02	06:47	05:40	05:40	06:11 (4)	04:58	05:04	05:49		
	16:22	17:18	18:13	20:11	21:06	21:06	06:25 (4)	21:52	21:57	21:14		
8	08:42	08:01	07:00	06:44	05:38	05:38	06:13 (4)	04:57	05:05	05:51		
	16:24	17:20	18:15	20:13	21:08	21:08	06:23 (4)	21:53	21:56	21:12		
9	08:41	07:59	06:57	06:42	05:36	05:36	06:23 (4)	04:57	05:06	05:52		
	16:25	17:22	18:17	20:15	21:10	21:10	06:23 (4)	21:54	21:55	21:10		
10	08:40	07:57	06:55	06:40	05:35	05:35	06:23 (4)	04:56	05:07	05:54		
	16:27	17:24	18:19	20:17	21:12	21:12	06:23 (4)	21:55	21:55	21:08		
11	08:40	07:55	06:53	06:37	05:33	05:33	06:23 (4)	04:56	05:08	05:56		
	16:28	17:26	18:21	20:19	21:13	21:13	06:23 (4)	21:55	21:54	21:06		
12	08:39	07:53	06:50	06:35	05:31	05:31	06:23 (4)	04:56	05:09	05:58		
	16:30	17:28	18:23	20:20	21:15	21:15	06:23 (4)	21:56	21:53	21:03		
13	08:38	07:51	06:48	06:32	05:29	05:29	06:23 (4)	04:55	05:11	05:59		
	16:31	17:30	18:25	20:22	21:17	21:17	06:23 (4)	21:57	21:52	21:01		
14	08:37	07:49	06:45	06:30	05:27	05:27	06:23 (4)	04:55	05:12	06:01		
	16:33	17:32	18:27	20:24	21:18	21:18	06:23 (4)	21:58	21:51	20:59		
15	08:36	07:47	06:43	06:28	05:26	05:26	06:23 (4)	04:55	05:13	06:03		
	16:35	17:34	18:29	20:26	21:20	21:20	06:23 (4)	21:58	21:50	20:57		
16	08:35	07:45	06:40	06:25	05:24	05:24	06:23 (4)	04:55	05:14	06:05		
	16:36	17:36	18:30	20:28	21:22	21:22	06:23 (4)	21:59	21:49	20:55		
17	08:34	07:43	06:38	06:23	05:22	05:22	06:23 (4)	04:54	05:16	06:06		
	16:38	17:38	18:32	20:30	21:23	21:23	06:23 (4)	21:59	21:47	20:53		
18	08:33	07:41	06:36	06:21	05:21	05:21	06:23 (4)	04:54	05:17	06:08		
	16:40	17:40	18:34	20:32	21:25	21:25	06:23 (4)	22:00	21:46	20:51		
19	08:32	07:39	06:33	06:18	05:19	05:19	06:23 (4)	04:54	05:19	06:10		
	16:41	17:42	18:36	20:33	21:27	21:27	06:23 (4)	22:00	21:45	20:48		
20	08:31	07:37	06:31	06:16	05:18	05:18	06:23 (4)	04:54	05:20	06:12		
	16:43	17:44	18:38	20:35	21:28	21:28	06:23 (4)	22:00	21:44	20:46		
21	08:30	07:34	06:28	06:14	05:16	05:16	06:23 (4)	04:55	05:21	06:13		
	16:45	17:46	18:40	20:37	21:30	21:30	06:23 (4)	22:01	21:42	20:44		
22	08:29	07:32	06:26	06:12	05:15	05:15	06:23 (4)	04:55	05:23	06:15		
	16:47	17:48	18:42	20:39	21:31	21:31	06:23 (4)	22:01	21:41	20:42		
23	08:27	07:30	06:23	06:09	05:13	05:13	06:23 (4)	04:55	05:24	06:17		
	16:49	17:50	18:43	20:41	21:33	21:33	06:23 (4)	22:01	21:39	20:39		
24	08:26	07:28	06:21	06:07	05:12	05:12	06:23 (4)	04:55	05:26	06:19		
	16:51	17:52	18:45	20:43	21:34	21:34	06:23 (4)	22:01	21:38	20:37		
25	08:25	07:25	06:18	06:05	05:11	05:11	06:23 (4)	04:56	05:27	06:21		
	16:53	17:54	18:47	20:44	21:36	21:36	06:23 (4)	22:01	21:36	20:35		
26	08:23	07:23	06:16	06:03	05:09	05:09	06:23 (4)	04:56	05:29	06:22		
	16:54	17:56	18:49	20:46	21:37	21:37	06:23 (4)	22:01	21:35	20:32		
27	08:22	07:21	06:14	06:01	05:08	05:08	06:23 (4)	04:57	05:31	06:24		
	16:56	17:58	18:51	20:48	21:39	21:39	06:23 (4)	22:01	21:33	20:30		
28	08:20	07:19	06:11	05:59	05:07	05:07	06:23 (4)	04:57	05:32	06:26		
	16:58	18:00	18:53	20:50	21:40	21:40	06:23 (4)	22:01	21:32	20:28		
29	08:19		07:09	05:56	05:06	05:06	06:23 (4)	04:58	05:34	06:28		
	17:00		19:55	20:52	21:41	21:41	06:23 (4)	22:01	21:30	20:25		
30	08:17		07:06	05:54	05:05	05:05	06:23 (4)	04:58	05:35	06:29		
	17:02		19:56	20:54	21:43	21:43	06:23 (4)	22:00	21:28	20:23		
31	08:15		07:04	05:51	05:04	05:04	06:23 (4)		05:37	06:31		
	17:04		19:58	20:59	21:44	21:44	06:23 (4)		21:27	20:21		
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case			442	88	117			161	497			
Sun reduction			0.27	0.35	0.38			0.34	0.32			
Oper. time red.			1.00	1.00	1.00			1.00	1.00			
Wind dir. red.			0.67	0.67	0.68			0.68	0.67			
Total reduction			0.18	0.24	0.26			0.23	0.21			
Total, real			80	21	30			37	107			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AU - H47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16	07:01	07:25 (5)	05:52	05:03	05:34 (3)									
	16:15	17:06	18:02	20:00	7 07:32 (5)	20:55	21:45	17 05:51 (3)									
2	08:44	08:12	07:14	06:59	07:23 (5)	05:50	05:02	05:33 (3)									
	16:16	17:08	18:04	20:02	9 07:32 (5)	20:57	21:47	17 05:50 (3)									
3	08:44	08:10	07:12	06:56	07:20 (5)	05:48	05:01	05:33 (3)									
	16:17	17:10	18:06	20:04	11 07:31 (5)	20:59	21:48	17 05:50 (3)									
4	08:43	08:09	07:09	06:54	07:18 (5)	05:46	05:00	05:33 (3)									
	16:18	17:12	18:08	20:06	13 07:31 (5)	21:01	21:49	16 05:49 (3)									
5	08:43	08:07	07:07	06:52	07:15 (5)	05:44	04:59	05:34 (3)									
	16:20	17:14	18:10	20:08	15 07:30 (5)	21:03	21:50	15 05:49 (3)									
6	08:43	08:05	07:05	06:49	07:13 (5)	05:42	04:59	05:35 (3)									
	16:21	17:16	18:11	20:09	16 07:29 (5)	21:04	21:51	13 05:48 (3)									
7	08:42	08:03	07:02	06:47	07:11 (5)	05:40	04:58	05:36 (3)									
	16:22	17:18	18:13	20:11	17 07:28 (5)	21:06	21:52	12 05:48 (3)									
8	08:42	08:01	07:00	06:44	07:12 (5)	05:38	04:57	05:37 (3)									
	16:24	17:20	18:15	20:13	14 07:26 (5)	21:08	21:53	10 05:47 (3)									
9	08:41	07:59	06:57	06:42	07:14 (5)	05:36	04:57	05:38 (3)									
	16:25	17:22	18:17	20:15	10 07:24 (5)	21:10	21:54	9 05:47 (3)									
10	08:40	07:57	06:55	06:40		05:35	04:56	05:39 (3)									
	16:27	17:24	18:19	20:17		21:12	21:55	7 05:46 (3)									
11	08:40	07:55	06:53	06:37		05:33	04:56	05:40 (3)									
	16:28	17:26	18:21	20:19		21:13	21:56	5 05:45 (3)									
12	08:39	07:53	06:50	06:35		05:31	04:56										
	16:30	17:28	18:23	20:21		21:15	21:56										
13	08:38	07:51	06:48	06:32		05:29	04:55										
	16:31	17:30	18:25	20:22		21:17	21:57										
14	08:37	07:49	06:45	06:30		05:27	04:55										
	16:33	17:32	18:27	20:24		21:18	21:58										
15	08:36	07:47	06:43	06:28		05:26	04:55										
	16:35	17:34	18:29	20:26		21:20	21:58										
16	08:35	07:45	06:41	06:25		05:24	04:55										
	16:36	17:36	18:30	20:28		21:22	21:59										
17	08:34	07:43	06:38	06:23		05:22	04:54										
	16:38	17:38	18:32	20:30		21:23	21:59										
18	08:33	07:41	06:36	06:21		05:21	04:54										
	16:40	17:40	18:34	20:32		21:25	2 05:51 (3)	22:00									
19	08:32	07:39	06:33	06:19		05:19	05:48 (3)	04:54									
	16:42	17:42	18:36	20:33		21:27	3 05:51 (3)	22:00									
20	08:31	07:37	06:31	06:16		05:18	05:46 (3)	04:55									
	16:43	17:44	18:38	20:35		21:28	5 05:51 (3)	22:00									
21	08:30	07:34	06:28	06:14		05:16	05:45 (3)	04:55									
	16:45	17:46	18:40	20:37		21:30	6 05:51 (3)	22:01									
22	08:29	07:32	06:26	06:12		05:15	05:44 (3)	04:55									
	16:47	17:48	18:42	20:39		21:31	8 05:52 (3)	22:01									
23	08:27	07:30	06:23	06:09		05:13	05:43 (3)	04:55									
	16:49	17:50	18:44	20:41		21:33	9 05:52 (3)	22:01									
24	08:26	07:28	06:21	06:07		05:12	05:41 (3)	04:55									
	16:51	17:52	18:45	20:43		21:34	10 05:51 (3)	22:01									
25	08:25	07:25	06:18	06:05		05:11	05:40 (3)	04:56									
	16:53	17:54	18:47	20:44		21:36	11 05:51 (3)	22:01									
26	08:23	07:23	06:16	06:03		05:10	05:39 (3)	04:56									
	16:54	17:56	18:49	20:46		21:37	12 05:51 (3)	22:01									
27	08:22	07:21	06:14	06:01		05:08	05:38 (3)	04:57									
	16:56	17:58	18:51	20:48		21:39	13 05:51 (3)	22:01									
28	08:20	07:19	06:11	05:59		05:07	05:37 (3)	04:57									
	16:58	18:00	18:53	20:50		21:40	14 05:51 (3)	22:01									
29	08:19		07:09	05:56		05:06	05:36 (3)	04:58									
	17:00		19:55	20:52		21:41	15 05:51 (3)	22:01									
30	08:17		07:06	05:54		05:05	05:35 (3)	04:58									
	17:02		19:56	2 07:32 (5)	20:54	21:43	16 05:51 (3)	22:00									
31	08:15		07:04	05:54		05:04	05:34 (3)										
	17:04		19:58	4 07:31 (5)		21:44	16 05:50 (3)										
Potential sun hours	250	273	367	420		494	510										
Total, worst case				6	112		140	138									
Sun reduction			0.27		0.35		0.38	0.32									
Oper. time red.			1.00		1.00		1.00	1.00									
Wind dir. red.			0.68		0.68		0.65	0.65									
Total reduction			0.18		0.24		0.25	0.21									
Total, real			1		27		35	29									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AU - H47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 3	05:45 (3) 05:48 (3) 21:25	05:39 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	05:00 22:00 6	05:44 (3) 05:50 (3) 21:23	05:40 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	05:00 21:59 8	05:43 (3) 05:51 (3) 21:21	05:42 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	05:01 21:59 10	05:42 (3) 05:52 (3) 21:19	05:44 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	05:02 21:58 11	05:42 (3) 05:53 (3) 21:17	05:46 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	05:03 21:58 13	05:41 (3) 05:54 (3) 21:16	05:47 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	05:04 21:57 14	05:41 (3) 05:55 (3) 21:14	05:49 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	05:05 21:56 15	05:41 (3) 05:56 (3) 21:12	05:51 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	05:06 21:55 17	05:40 (3) 05:57 (3) 21:10	05:52 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	05:07 21:55 17	05:40 (3) 05:57 (3) 21:08	05:54 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	05:08 21:54 17	05:41 (3) 05:58 (3) 21:06	05:56 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	05:10 21:53 16	05:42 (3) 05:58 (3) 21:04	05:58 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	05:11 21:52 16	05:43 (3) 05:59 (3) 21:01	05:59 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51 15	05:44 (3) 05:59 (3) 20:59	06:01 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	05:13 21:50 15	05:45 (3) 06:00 (3) 20:57	06:03 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	05:15 21:49 14	05:47 (3) 06:01 (3) 20:55	06:05 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	05:16 21:47 13	05:48 (3) 06:01 (3) 20:53	06:06 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	05:17 21:46 12	05:49 (3) 06:01 (3) 20:51	06:08 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	05:19 21:45 11	05:51 (3) 06:02 (3) 20:48	06:10 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44 10	05:52 (3) 06:02 (3) 20:46	06:12 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42 8	05:53 (3) 06:01 (3) 20:44	06:14 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	05:23 21:41 7	05:55 (3) 06:02 (3) 20:42	06:15 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	05:24 21:39 6	05:56 (3) 06:02 (3) 20:39	06:17 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38 4	05:57 (3) 06:01 (3) 20:37	06:19 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:28 21:36 3	05:59 (3) 06:02 (3) 20:35	06:19 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35 1	06:00 (3) 06:01 (3) 20:33	06:22 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	282		121			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.65		0.68			
Total reduction	0.21		0.22			
Total, real	60		26			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AV - H48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01	07:25 (5)	05:52				05:03	05:40 (3)	
	16:15	17:06	18:02						20:00	7	07:32 (5)	20:55			21:45	11	05:51 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50			05:02		05:41 (3)
	16:16	17:08	18:04						20:02	10	07:33 (5)	20:57			21:47	8	05:49 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48			05:01		05:43 (3)
	16:17	17:10	18:06						20:04	12	07:32 (5)	20:59			21:48	4	05:47 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46			05:00		
	16:18	17:12	18:08						20:06	13	07:31 (5)	21:01			21:49		
5	08:43	08:07	07:07						06:52		07:15 (5)	05:44			04:59		
	16:20	17:14	18:10						20:08	15	07:30 (5)	21:03			21:50		
6	08:43	08:05	07:05						06:49		07:13 (5)	05:42			04:59		
	16:21	17:16	18:11						20:09	16	07:29 (5)	21:04			21:51		
7	08:42	08:03	07:02						06:47		07:13 (5)	05:40			04:58		
	16:22	17:18	18:13						20:11	14	07:27 (5)	21:06			21:52		
8	08:42	08:01	07:00						06:44		07:14 (5)	05:38			04:57		
	16:24	17:20	18:15						20:13	10	07:24 (5)	21:08			21:53		
9	08:41	07:59	06:57						06:42			05:36			04:57		
	16:25	17:22	18:17						20:15			21:10			21:54		
10	08:40	07:57	06:55						06:40			05:35			04:56		
	16:27	17:24	18:19						20:17			21:12			21:55		
11	08:40	07:55	06:53						06:37			05:33			04:56		
	16:28	17:26	18:21						20:19			21:13			21:56		
12	08:39	07:53	06:50						06:35			05:31			04:56		
	16:30	17:28	18:23						20:21			21:15			21:56		
13	08:38	07:51	06:48						06:32			05:29			04:55		
	16:31	17:30	18:25						20:22			21:17			21:57		
14	08:37	07:49	06:45						06:30			05:27			04:55		
	16:33	17:32	18:27						20:24			21:18			21:58		
15	08:36	07:47	06:43						06:28			05:26		05:54 (3)	04:55		
	16:35	17:34	18:29						20:26			21:20	1	05:55 (3)	21:58		
16	08:35	07:45	06:41						06:25			05:24		05:52 (3)	04:55		
	16:36	17:36	18:30						20:28			21:22	3	05:55 (3)	21:59		
17	08:34	07:43	06:38						06:23			05:22		05:51 (3)	04:54		
	16:38	17:38	18:32						20:30			21:23	4	05:55 (3)	21:59		
18	08:33	07:41	06:36						06:21			05:21		05:49 (3)	04:54		
	16:40	17:40	18:34						20:32			21:25	6	05:55 (3)	22:00		
19	08:32	07:39	06:33						06:19			05:19		05:48 (3)	04:54		
	16:42	17:42	18:36						20:33			21:27	7	05:55 (3)	22:00		
20	08:31	07:37	06:31						06:16			05:18		05:46 (3)	04:55		
	16:43	17:44	18:38						20:35			21:28	9	05:55 (3)	22:00		
21	08:30	07:34	06:28						06:14			05:16		05:45 (3)	04:55		
	16:45	17:46	18:40						20:37			21:30	10	05:55 (3)	22:01		
22	08:29	07:32	06:26						06:12			05:15		05:44 (3)	04:55		
	16:47	17:48	18:42						20:39			21:31	11	05:55 (3)	22:01		
23	08:27	07:30	06:23						06:09			05:13		05:43 (3)	04:55		
	16:49	17:50	18:44						20:41			21:33	12	05:55 (3)	22:01		
24	08:26	07:28	06:21						06:07			05:12		05:41 (3)	04:55		
	16:51	17:52	18:45						20:43			21:34	13	05:54 (3)	22:01		
25	08:25	07:25	06:18						06:05			05:11		05:40 (3)	04:56		
	16:53	17:54	18:47						20:44			21:36	14	05:54 (3)	22:01		
26	08:23	07:23	06:16						06:03			05:10		05:39 (3)	04:56		
	16:54	17:56	18:49						20:46			21:37	15	05:54 (3)	22:01		
27	08:22	07:21	06:14						06:01			05:08		05:38 (3)	04:57		
	16:56	17:58	18:51						20:48			21:39	15	05:53 (3)	22:01		
28	08:20	07:19	06:11						05:59			05:07		05:37 (3)	04:57		
	16:58	18:00	18:53						20:50			21:40	16	05:53 (3)	22:01		
29	08:19		07:09						05:56			05:06		05:36 (3)	04:58		
	17:00		19:55						20:52			21:41	16	05:52 (3)	22:01		
30	08:17		07:06						05:54			05:05		05:37 (3)	04:58		
	17:02		19:56	2					07:32 (5)	20:54		21:43	15	05:52 (3)	22:00		
31	08:15		07:04						07:27 (5)			05:04		05:38 (3)			
	17:04		19:58	5					07:32 (5)			21:44	13	05:51 (3)			
Potential sun hours	250	273	367						420			494		510			
Total, worst case				7					97			180		23			
Sun reduction				0.27					0.35			0.38		0.32			
Oper. time red.				1.00					1.00			1.00		1.00			
Wind dir. red.				0.68					0.68			0.66		0.66			
Total reduction				0.18					0.24			0.25		0.21			
Total, real				1					23			45		5			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AV - H48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	06:33			07:26	07:24	08:19			
	22:00	21:25	20:18			19:05	16:54	16:10			
2	05:00	05:40	06:35			07:28	07:26	08:21			
	22:00	21:23	20:16			19:02	16:52	16:09			
3	05:01	05:42	06:37			07:30	07:28	08:22			
	21:59	21:21	20:14			19:00	16:50	16:09			
4	05:01	05:44	06:38			07:32	07:30	08:24			
	21:59	21:19	20:11	9	07:12 (5)	07:32	16:48	16:08			
5	05:02	05:46	06:40			07:09 (5)	07:33	08:25			
	21:58	21:17	20:09	14	07:23 (5)	18:55	16:46	16:07			
6	05:03	05:47	06:42			07:09 (5)	07:35	08:26			
	21:58	21:16	20:06	16	07:25 (5)	18:53	16:45	16:07			
7	05:04	05:49	06:44			07:10 (5)	07:37	08:28			
	21:57	21:14	20:04	15	07:25 (5)	18:50	16:43	16:06			
8	05:05	05:51	06:45			07:12 (5)	07:39	08:29			
	21:56	21:12	20:01	13	07:25 (5)	18:48	16:41	16:06			
9	05:06	05:52	06:47			07:14 (5)	07:41	08:30			
	21:55	21:10	19:59	12	07:26 (5)	18:45	16:39	16:06			
10	05:07	05:49 (3)	05:54	06:49		07:16 (5)	07:43	08:32			
	21:55	21:08	19:57	10	07:26 (5)	18:43	16:37	16:05			
11	05:08	05:48 (3)	05:56	06:51		07:17 (5)	07:44	08:33			
	21:54	21:06	19:54	8	07:25 (5)	18:41	16:36	16:05			
12	05:10	05:47 (3)	05:58	06:52		07:19 (5)	07:46	08:34			
	21:53	21:04	19:52	5	07:24 (5)	18:38	16:34	16:05			
13	05:11	05:46 (3)	05:59	06:54		07:21 (5)	07:48	08:35			
	21:52	21:01	19:49	3	07:24 (5)	18:36	16:32	16:05			
14	05:12	05:45 (3)	06:01	06:56		07:50	07:49	08:36			
	21:51	20:59	19:47			18:34	16:31	16:05			
15	05:13	05:45 (3)	06:03	06:58		07:52	07:51	08:37			
	21:50	20:57	19:44			18:31	16:29	16:05			
16	05:15	05:47 (3)	06:05	06:59		07:54	07:53	08:38			
	21:49	20:55	19:42			18:29	16:28	16:05			
17	05:16	05:48 (3)	06:06	07:01		07:56	07:55	08:39			
	21:47	20:53	19:39			18:27	16:26	16:05			
18	05:17	05:49 (3)	06:08	07:03		07:57	07:57	08:39			
	21:46	20:51	19:37			18:24	16:25	16:05			
19	05:19	05:51 (3)	06:10	07:05		07:59	07:59	08:40			
	21:45	20:48	19:34			18:22	16:23	16:05			
20	05:20	05:52 (3)	06:12	07:07		08:01	08:01	08:41			
	21:44	20:46	19:32			18:20	16:22	16:06			
21	05:21	05:53 (3)	06:14	07:08		08:03	08:02	08:41			
	21:42	20:44	19:29			18:18	16:21	16:06			
22	05:23	05:55 (3)	06:15	07:10		08:05	08:04	08:42			
	21:41	20:42	19:27			18:15	16:19	16:07			
23	05:24	05:56 (3)	06:17	07:12		08:07	08:06	08:42			
	21:39	20:39	19:24			18:13	16:18	16:07			
24	05:26	05:57 (3)	06:19	07:14		08:09	08:08	08:43			
	21:38	20:37	19:22			18:11	16:17	16:08			
25	05:28	05:59 (3)	06:21	07:15		07:11	08:09	08:43			
	21:37	20:35	19:19			17:09	16:16	16:08			
26	05:29	06:00 (3)	06:22	07:17		07:13	08:11	08:43			
	21:35	20:33	19:17			17:07	16:15	16:09			
27	05:31	06:02 (3)	06:24	07:19		07:15	08:13	08:44			
	21:33	20:30	19:15			17:05	16:14	16:10			
28	05:32	06:03 (3)	06:26	07:21		07:17	08:14	08:44			
	21:32	20:28	19:12			17:02	16:13	16:11			
29	05:34	06:28	07:23			07:19	08:16	08:44			
	21:30	20:25	19:10			17:00	16:12	16:12			
30	05:36	06:29	07:24			07:20	08:18	08:44			
	21:28	20:23	19:07			16:58	16:11	16:13			
31	05:37	06:31				07:22		08:44			
	21:27	20:21				16:56		16:14			
Potential sun hours	512	460	382			328	259	233			
Total, worst case	204		105								
Sun reduction	0.32		0.32								
Oper. time red.	1.00		1.00								
Wind dir. red.	0.66		0.68								
Total reduction	0.21		0.22								
Total, real	43		23								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AW - H49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	18:44 (4) 20:55	05:03 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	19:30 (3) 20:57	16 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	19:12 (3) 20:59	14 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	19:14 (3) 21:01	11 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	19:25 (3) 21:03	9 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	20:32 (2) 21:04	5 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	20:28 (2) 21:06	5 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	20:33 (2) 21:08	5 21:53
9	08:41 16:25	07:59 17:22	16:50 (5) 18:17	06:57 20:15	20:25 (2) 21:10	5 21:54
10	08:40 16:26	07:57 17:24	16:48 (5) 18:19	06:55 20:17	20:39 (2) 21:11	14 21:55
11	08:40 16:28	07:55 17:26	16:47 (5) 18:21	06:52 20:19	20:40 (2) 21:13	16 21:56
12	08:39 16:30	07:53 17:28	16:46 (5) 18:23	06:50 20:20	20:24 (2) 21:15	18 21:57
13	08:38 16:31	07:51 17:30	16:45 (5) 18:25	06:48 20:22	20:43 (2) 21:17	20 21:58
14	08:37 16:33	07:49 17:32	16:45 (5) 18:27	06:45 20:24	20:22 (2) 21:18	22 21:59
15	08:36 16:34	07:47 17:34	16:45 (5) 18:28	06:43 20:26	20:47 (2) 21:20	25 22:00
16	08:35 16:36	07:45 17:36	16:45 (5) 18:30	06:40 20:28	20:22 (2) 21:22	26 22:01
17	08:34 16:38	07:43 17:38	16:45 (5) 18:32	06:38 20:30	20:50 (2) 21:24	28 22:02
18	08:33 16:40	07:41 17:40	16:44 (5) 18:34	06:35 20:31	20:49 (2) 21:25	28 22:03
19	08:32 16:41	07:39 17:42	16:45 (5) 18:36	06:33 20:33	20:23 (2) 21:27	28 22:04
20	08:31 16:43	07:36 17:44	16:46 (5) 18:38	06:31 20:35	20:22 (2) 21:28	28 22:05
21	08:30 16:45	07:34 17:46	16:47 (5) 18:40	06:28 20:37	20:49 (2) 21:30	27 22:06
22	08:28 16:47	07:32 17:48	16:47 (5) 18:41	06:26 20:39	20:23 (2) 21:31	27 22:07
23	08:27 16:49	07:30 17:50	16:49 (5) 18:43	06:23 20:41	20:50 (2) 21:33	27 22:08
24	08:26 16:50	07:28 17:52	16:53 (5) 18:45	06:21 20:42	20:23 (2) 21:34	26 22:09
25	08:24 16:52	07:25 17:54	17:00 (5) 18:47	06:18 20:44	20:49 (2) 21:36	26 22:10
26	08:23 16:54	07:23 17:56	16:47 (5) 18:49	06:16 20:46	20:23 (2) 21:37	24 22:11
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	20:48 (2) 21:39	23 22:12
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	20:26 (2) 21:40	23 22:13
29	08:18 17:00		07:08 19:54	05:56 20:52	20:27 (2) 21:41	20 22:14
30	08:17 17:02		07:06 19:56	05:54 20:53	20:47 (2) 21:43	20 22:15
31	08:15 17:04		07:04 19:58	05:52 20:55	20:28 (2) 21:44	18 22:16
Potential sun hours	250	273	367	420	494	510
Total, worst case		249	650	94	558	55
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.67	0.67	0.64	0.64
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		38	119	22	135	11

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: AW - H49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	20	20:33 (2) 20:53 (2)	06:33 20:18	07:26 19:05	18:28 (4) 8 18:36 (4)	07:24 16:54	5	16:18 (5) 16:23 (5)	08:19 16:10
2	04:59 22:00	05:40 21:23	18	20:34 (2) 20:52 (2)	06:35 20:16	07:28 19:02	18:31 (4) 2 18:33 (4)	07:26 16:52	1	16:20 (5) 16:21 (5)	08:21 16:09
3	05:00 21:59	05:42 21:21	16	20:34 (2) 20:50 (2)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08			
4	05:01 21:59	05:44 21:19	13	20:35 (2) 20:48 (2)	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08			
5	05:02 21:58	05:45 21:17	10	20:36 (2) 20:46 (2)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07			
6	05:03 21:58	05:47 21:15	8	20:37 (2) 20:45 (2)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07			
7	05:04 21:57	05:49 21:13	4	20:39 (2) 20:43 (2)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06			
8	05:05 21:56	05:50 20:49 (2)		06:45 21:11	19:09 (3) 19:19 (3)	07:39 18:48	07:38 16:41	08:29 16:06			
9	05:06 21:55	05:52 20:50 (2)	8	06:47 21:09	19:06 (3) 19:21 (3)	07:41 18:45	07:40 16:39	08:30 16:05			
10	05:07 21:55	05:54 20:52 (2)	10	06:49 21:07	19:59 19:21 (3)	07:42 18:43	07:42 16:37	08:31 16:05			
11	05:08 21:54	05:56 20:53 (2)	13	06:50 21:05	19:56 19:54	07:44 18:40	07:44 16:35	08:33 16:05			
12	05:09 21:53	05:57 20:54 (2)	15	06:52 21:03	19:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05			
13	05:10 21:52	05:59 20:54 (2)	17	06:54 21:01	18:32 (4) 19:49	07:48 18:36	07:47 16:32	08:35 16:05			
14	05:12 21:51	06:01 20:55 (2)	17	06:56 20:59	18:30 (4) 19:18 (3)	07:50 18:33	07:49 16:31	08:36 16:04			
15	05:13 21:50	06:03 20:56 (2)	19	06:58 20:57	19:18 (3) 19:44	07:52 18:31	07:51 16:29	08:37 16:05			
16	05:14 21:49	06:04 20:56 (2)	21	06:59 20:55	18:27 (4) 19:14 (3)	07:54 18:29	07:53 16:27	08:38 16:05			
17	05:16 21:47	06:06 20:57 (2)	22	07:01 20:53	18:25 (4) 19:11 (3)	07:55 18:26	07:55 16:26	08:38 16:05			
18	05:17 21:46	06:08 20:58 (2)	22	07:03 20:50	18:25 (4) 19:08 (3)	07:57 18:24	17:23 (5) 9 17:32 (5)	08:39 16:05			
19	05:18 21:45	06:10 20:58 (2)	24	07:05 20:48	18:24 (4) 19:06 (3)	07:59 18:22	17:20 (5) 15 17:35 (5)	08:40 16:05			
20	05:20 21:44	06:12 20:59 (2)	25	07:06 20:46	18:24 (4) 19:04 (3)	08:01 18:20	17:18 (5) 18 17:36 (5)	08:41 16:06			
21	05:21 21:42	06:13 20:59 (2)	25	07:08 20:44	18:23 (4) 19:29	08:03 18:17	17:17 (5) 20 17:37 (5)	08:41 16:06			
22	05:23 21:41	06:15 20:59 (2)	26	07:10 20:42	18:23 (4) 19:10	08:05 18:15	17:16 (5) 21 17:37 (5)	08:42 16:06			
23	05:24 21:39	06:17 21:00 (2)	27	07:12 20:39	18:23 (4) 19:24	08:07 18:13	17:15 (5) 23 17:38 (5)	08:42 16:07			
24	05:26 21:38	06:19 21:00 (2)	28	07:13 20:37	18:23 (4) 19:22	08:09 18:11	17:15 (5) 23 17:38 (5)	08:43 16:08			
25	05:27 21:36	06:20 21:01 (2)	28	07:15 20:35	18:22 (4) 19:19	07:11 18:51 (4)	16:14 (5) 24 16:38 (5)	08:43 16:08			
26	05:29 21:35	06:22 21:02 (2)	28	07:17 20:32	18:23 (4) 19:17	07:13 18:48 (4)	16:14 (5) 22 16:36 (5)	08:43 16:09			
27	05:30 21:33	06:24 21:00 (2)	28	07:19 20:30	18:23 (4) 19:14	07:14 18:46 (4)	16:14 (5) 20 16:34 (5)	08:44 16:10			
28	05:32 21:32	06:26 20:59 (2)	28	07:21 20:28	18:24 (4) 19:12	07:16 18:44 (4)	16:14 (5) 17 16:31 (5)	08:44 16:11			
29	05:34 21:30	06:27 20:57 (2)	27	07:22 20:25	18:25 (4) 19:09	07:18 18:41 (4)	16:15 (5) 14 16:29 (5)	08:44 16:11			
30	05:35 21:28	06:29 20:56 (2)	25	07:24 20:23	18:26 (4) 19:07	07:20 18:38 (4)	16:15 (5) 12 16:27 (5)	08:44 16:12			
31	05:37 21:26	06:31 20:55 (2)	23	07:26 20:21		07:22 16:56	16:16 (5) 9 16:25 (5)	08:44 16:13			
Potential sun hours	512	460		382		328	259	233			
Total, worst case	527	89		744		257	6				
Sun reduction	0.32	0.34		0.32		0.29	0.27				
Oper. time red.	1.00	1.00		1.00		1.00	1.00				
Wind dir. red.	0.64	0.64		0.67		0.66	0.66				
Total reduction	0.21	0.22		0.22		0.19	0.18				
Total, real	108	19		161		50	1				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Assumptions for shadow calculations

Shadow receptor: AX - H50

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		12:51 (2)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		15:58 (1)	08:19		12:41 (2)				
	16:15	54	13:45 (2)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	25	16:23 (1)	16:10	48	13:29 (2)				
2	08:44		12:52 (2)	08:12		07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28		07:26		15:58 (1)	08:21		12:40 (2)				
	16:16	54	13:46 (2)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	23	16:21 (1)	16:09	49	13:29 (2)				
3	08:44		12:52 (2)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		15:59 (1)	08:22		12:40 (2)				
	16:17	53	13:45 (2)	17:10	4	16:39 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	20	16:19 (1)	16:08	50	13:30 (2)				
4	08:43		12:53 (2)	08:08		07:13	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		15:59 (1)	08:24		12:41 (2)				
	16:18	53	13:46 (2)	17:12	8	16:41 (1)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	18	16:17 (1)	16:08	50	13:31 (2)				
5	08:43		12:54 (2)	08:07		07:13	06:51	05:44	04:59	05:02	05:45	06:40	07:33		07:32		16:00 (1)	08:25		12:40 (2)				
	16:19	52	13:46 (2)	17:14	11	16:43 (1)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	14	16:14 (1)	16:07	52	13:32 (2)				
6	08:43		12:55 (2)	08:05		07:14	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34		16:01 (1)	08:26		12:41 (2)				
	16:21	52	13:47 (2)	17:16	15	16:45 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	11	16:12 (1)	16:07	52	13:33 (2)				
7	08:42		12:55 (2)	08:03		07:14	06:47	05:40	04:58	05:04	05:49	06:43	07:37		07:36		16:03 (1)	08:28		12:41 (2)				
	16:22	51	13:46 (2)	17:18	17	16:47 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	7	16:10 (1)	16:06	52	13:33 (2)				
8	08:42		12:56 (2)	08:01		07:15	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38		16:05 (1)	08:29		12:41 (2)				
	16:24	50	13:46 (2)	17:20	21	16:50 (1)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	3	16:08 (1)	16:06	52	13:33 (2)				
9	08:41		12:57 (2)	07:59		07:16	06:29	05:57	06:42	05:36	04:57	05:06	05:52	06:47	16:41			08:30		12:42 (2)				
	16:25	50	13:47 (2)	17:22	23	16:52 (1)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39			16:05	52	13:34 (2)				
10	08:40		12:58 (2)	07:57		07:17	06:28	05:55	06:39	05:34	04:56	05:07	05:54	06:49	16:42			08:32		12:42 (2)				
	16:26	49	13:47 (2)	17:24	25	16:53 (1)	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37			16:05	53	13:35 (2)				
11	08:40		12:59 (2)	07:55		07:18	06:28	05:53	06:37	05:33	04:56	05:08	05:56	06:51	16:44			08:33		12:42 (2)				
	16:28	48	13:47 (2)	17:26	25	16:53 (1)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:35			16:05	53	13:35 (2)				
12	08:39		12:59 (2)	07:53		07:19	06:28	05:50	06:35	05:31	04:55	05:09	05:57	06:52	16:46			08:34		12:42 (2)				
	16:30	48	13:47 (2)	17:28	26	16:54 (1)	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34			16:05	53	13:35 (2)				
13	08:38		13:00 (2)	07:51		07:20	06:28	05:48	06:32	05:29	04:55	05:10	05:59	06:54	16:47			08:35		12:43 (2)				
	16:31	47	13:47 (2)	17:30	25	16:53 (1)	18:24	20:22	21:17	21:57	21:52	21:02	19:51	18:37	16:32			16:05	54	13:36 (2)				
14	08:37		13:01 (2)	07:49		07:21	06:28	05:47	06:30	05:27	04:55	05:12	06:01	06:56	16:50			08:36		12:43 (2)				
	16:33	46	13:47 (2)	17:32	25	16:53 (1)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31			16:04	54	13:37 (2)				
15	08:36		13:02 (2)	07:47		07:22	06:29	05:46	06:28	05:26	04:54	05:13	06:03	06:58	16:52			08:37		12:43 (2)				
	16:34	45	13:47 (2)	17:34	23	16:52 (1)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29			16:05	54	13:37 (2)				
16	08:35		13:04 (2)	07:45		07:23	06:29	05:44	06:25	05:24	04:54	05:14	06:05	06:59	16:54			08:38		12:43 (2)				
	16:36	42	13:46 (2)	17:36	23	16:52 (1)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27			16:05	55	13:38 (2)				
17	08:34		13:04 (2)	07:43		07:24	06:31	05:48	06:23	05:22	04:54	05:16	06:06	07:01	16:56			16:05		12:44 (2)				
	16:38	41	13:45 (2)	17:38	20	16:51 (1)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	12	13:07 (2)	16:05	54	13:38 (2)				
18	08:33		13:06 (2)	07:41		07:25	06:31	05:46	06:21	05:21	04:54	05:17	06:08	07:03	16:57			16:05		12:44 (2)				
	16:40	39	13:45 (2)	17:40	18	16:49 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	20	13:11 (2)	16:05	55	13:39 (2)				
19	08:32		13:07 (2)	07:39		07:26	06:33	05:48	06:18	05:19	04:54	05:18	06:10	07:05	16:59			16:05		12:45 (2)				
	16:41	38	13:45 (2)	17:42	15	16:48 (1)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	24	13:13 (2)	16:05	55	13:40 (2)				
20	08:31		13:08 (2)	07:37		07:27	06:35	05:48	06:16	05:17	04:54	05:20	06:12	07:07	16:58			16:05		12:46 (2)				
	16:43	35	13:43 (2)	17:44	11	16:46 (1)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	29	13:16 (2)	16:06	55	13:40 (2)				
21	08:30		13:10 (2)	07:34		07:28	06:28	05:44	06:14	05:16	04:54	05:21	06:13	07:08	16:58			16:06		12:46 (2)				
	16:45	32	13:42 (2)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	17:09	16:22	4	17:13 (1)	16:20	32	13:17 (2)	16:06	55	13:41 (2)	
22	08:29		13:12 (2)	07:32		07:29	06:26	05:42	06:12	05:15	04:55	05:23	06:15	07:10	16:57			16:06		12:46 (2)				
	16:47	29	13:41 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	17:07	16:23	12	17:17 (1)	16:19	35	13:19 (2)	16:06	55	13:41 (2)	
23	08:27		13:15 (2)	07:30		07:30	06:23	05:39	06:09	05:13	04:55	05:24	06:17	07:12	16:58			16:06		12:47 (2)				
	16:49	24	13:39 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	17:05	16:23	16	17:19 (1)	16:18	38	13:21 (2)	16:07	55	13:42 (2)	
24	08:26		13:17 (2)	07:28		07:31	06:21	05:37	06:07	05:12	04:55	05:26	06:19	07:14	16:59			16:07		12:47 (2)				
	16:50	20	13:37 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	17:01	16:23	19	17:20 (1)	16:17	39	13:22 (2)	16:08	55	13:42 (2)	
25	08:25		13:22 (2)	07:25		07:32	06:18	05:35	06:05	05:11	04:55	05:27	06:20	07:15	16:59			16:08		12:47 (2)				
	16:52	12	13:34 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	17:01	16:24	21	16:21 (1)	16:16	41	13:23 (2)	16:08	55	13:42 (2)	
26	08:23		13:23 (2)	07:23		07:34	06:16	05:33	06:03	05:09	04:56	05:29	06:22	07:17	16:59			16:08		12:48 (2)				
	16:54		13:35 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:07	17:01	16:24	22	16:22 (1)	16:14	42	13:24 (2)	16:09	54	13:43 (2)	
27	08:21		13:24 (2)	07:21		07:35	06:13	05:30	06:01	05:08	04:56	05:30	06:23	07:18	16:58			16:09		12:49 (2)				
	16:56		13:36 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	17:04	16:24	23	16:22 (1)	16:13	44	13:26 (2)	16:10	55	13:44 (2)	
28	08:20		13:25 (2)	07:19		07:38	06:11	05:28	06:00	05:07	04:57	05:32	06:26	07:21	16:59			16:10		12:49 (2)				
	16:58		13:37 (2)	17:59		18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	17:02	16:24	24	16:22 (1)	16:12	46	13:27 (2)	16:11	54	13:44 (2)	
29	08:19		13:26 (2)	07:17		07:40	06:10	05:27	06:00	05:06	04:57	05:34	06:28	07:22	16:59			16:11		12:50 (2)				
	17:00		13:38 (2)	17:59		18:55	20:52	21:41	22:01	21														

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** AY - H51

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	08:54 (2)										
	16:15		17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	11 09:05 (2)										
2	08:44		08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	08:56 (2)										
	16:16		17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	9 09:05 (2)										
3	08:44		08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	08:57 (2)										
	16:17		17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08	7 09:04 (2)										
4	08:43		08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	08:59 (2)										
	16:18		17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	6 09:05 (2)										
5	08:43	09:16 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	09:00 (2)										
	16:20	1 09:17 (2)	17:14	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07	4 09:04 (2)										
6	08:43	09:16 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	09:02 (2)										
	16:21	2 09:18 (2)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	16:07	3 09:05 (2)										
7	08:42	09:15 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28	09:03 (2)										
	16:22	4 09:19 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	1 09:04 (2)										
8	08:42	09:14 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29											
	16:24	6 09:20 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06											
9	08:41	09:14 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30											
	16:25	7 09:21 (2)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05											
10	08:41	09:13 (2)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32											
	16:27	9 09:22 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05											
11	08:40	09:12 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33											
	16:28	10 09:22 (2)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05											
12	08:39	09:11 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34											
	16:30	12 09:23 (2)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	5 08:51 (2)	16:05										
13	08:38	09:10 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:35											
	16:31	14 09:24 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	11 08:54 (2)	16:05										
14	08:37	09:09 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36											
	16:33	15 09:24 (2)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	15 08:56 (2)	16:05										
15	08:37	09:08 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:40	16:05										
	16:34	17 09:25 (2)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	18 08:58 (2)	16:05										
16	08:36	09:07 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:39	16:05										
	16:36	19 09:26 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	20 08:59 (2)	16:05										
17	08:35	09:05 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39	16:05										
	16:38	21 09:26 (2)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	21 09:00 (2)	16:05										
18	08:33	09:04 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:38	16:05										
	16:40	22 09:26 (2)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	22 09:00 (2)	16:05										
19	08:32	09:03 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:38	16:05										
	16:41	24 09:27 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	23 09:01 (2)	16:05										
20	08:31	09:02 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:38	16:05										
	16:43	24 09:26 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	23 09:01 (2)	16:06										
21	08:30	09:03 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:38	16:06										
	16:45	24 09:27 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	24 09:02 (2)	16:06										
22	08:29	09:04 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:38	16:07										
	16:47	23 09:27 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	24 09:02 (2)	16:07										
23	08:27	09:04 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:39	16:07										
	16:49	23 09:27 (2)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	24 09:03 (2)	16:07										
24	08:26	09:04 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:41	16:08										
	16:51	22 09:26 (2)	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	22 09:03 (2)	16:08										
25	08:25	09:06 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09	08:43	16:08										
	16:52	21 09:27 (2)	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	21 09:04 (2)	16:08										
26	08:23	09:06 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:45	16:09										
	16:54	20 09:26 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	19 09:04 (2)	16:09										
27	08:22	09:08 (2)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13	08:47	16:10										
	16:56	18 09:26 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	16:14	17 09:04 (2)	16:10										
28	08:20	09:09 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:15	08:49	16:11										
	16:58	15 09:24 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16 09:05 (2)	16:11										
29	08:19	09:11 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16	08:51	16:12										
	17:00	11 09:22 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	14 09:05 (2)	16:11										
30	08:17	09:14 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	08:52	16:12										
	17:02	5 09:19 (2)		19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	12 09:04 (2)	16:12										
31	08:15			07:04		05:04		05:37	06:31		07:22		08:44											
	17:04			19:58		21:44		21:27	20:21		16:56		16:13											
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	233											
Total, worst case	389																							
Sun reduction	0.24												0.27											0.21
Oper. time red.	1.00																							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** AZ - H52

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December				
1	08:44		09:18 (2)	08:14		07:16		07:01		05:52		05:03		04:59		05:39		06:33		07:26		07:24		08:19		09:00 (2)	
	16:15	19	09:37 (2)	17:06		18:02		20:00		20:55		21:45		22:00		21:25		20:18		19:05		16:54		16:10	24	09:24 (2)	
2	08:44		09:18 (2)	08:12		07:14		06:59		05:50		05:02		05:00		05:40		06:35		07:28		07:26		08:21		09:00 (2)	
	16:16	20	09:38 (2)	17:08		18:04		20:02		20:57		21:47		22:00		21:23		20:16		19:02		16:52		16:09	24	09:24 (2)	
3	08:44		09:17 (2)	08:10		07:12		06:56		05:48		05:01		05:00		05:42		06:36		07:30		07:28		08:22		09:00 (2)	
	16:17	21	09:38 (2)	17:10		18:06		20:04		20:59		21:48		21:59		21:21		20:14		19:00		16:50		16:08	24	09:24 (2)	
4	08:43		09:17 (2)	08:09		07:09		06:54		05:46		05:00		05:01		05:44		06:38		07:32		07:30		08:24		09:01 (2)	
	16:18	22	09:39 (2)	17:12		18:08		20:06		21:01		21:49		21:59		21:19		20:11		18:57		16:48		16:08	24	09:25 (2)	
5	08:43		09:16 (2)	08:07		07:07		06:52		05:44		04:59		05:02		05:45		06:40		07:33		07:32		08:25		09:00 (2)	
	16:20	23	09:39 (2)	17:14		18:09		20:08		21:03		21:50		21:58		21:18		20:09		18:55		16:46		16:07	25	09:25 (2)	
6	08:43		09:16 (2)	08:05		07:05		06:49		05:42		04:59		05:03		05:47		06:42		07:35		07:34		08:27		09:02 (2)	
	16:21	24	09:40 (2)	17:16		18:11		20:09		21:05		21:51		21:58		21:16		20:06		18:53		16:44		16:07	24	09:26 (2)	
7	08:42		09:15 (2)	08:03		07:02		06:47		05:40		04:58		05:04		05:49		06:44		07:37		07:36		08:28		09:03 (2)	
	16:22	25	09:40 (2)	17:18		18:13		20:11		21:06		21:52		21:57		21:14		20:04		18:50		16:43		16:06	23	09:26 (2)	
8	08:42		09:17 (2)	08:01		07:00		06:44		05:38		04:57		05:05		05:51		06:45		07:39		07:38		08:29		09:05 (2)	
	16:24	24	09:41 (2)	17:20		18:15		20:13		21:08		21:53		21:56		21:12		20:01		18:48		16:41		16:06	22	09:27 (2)	
9	08:41		09:17 (2)	07:59		06:57		06:42		05:36		04:57		05:06		05:52		06:47		07:41		07:40		08:30		09:06 (2)	
	16:25	24	09:41 (2)	17:22		18:17		20:15		21:10		21:54		21:56		21:10		19:59		18:45		16:39		16:05	21	09:27 (2)	
10	08:41		09:17 (2)	07:57		06:55		06:40		05:34		04:56		05:07		05:54		06:49		07:43		07:42		08:32		09:07 (2)	
	16:27	24	09:41 (2)	17:24		18:19		20:17		21:12		21:55		21:55		21:08		19:57		18:43		16:37		16:05	20	09:27 (2)	
11	08:40		09:18 (2)	07:55		06:53		06:37		05:33		04:56		05:08		05:56		06:51		07:44		07:44		08:33		09:08 (2)	
	16:28	24	09:42 (2)	17:26		18:21		20:19		21:13		21:56		21:54		21:06		19:54		18:41		16:36		16:05	19	09:27 (2)	
12	08:39		09:18 (2)	07:53		06:50		06:35		05:31		04:55		05:09		05:58		06:52		07:46		07:46		08:34		09:10 (2)	
	16:30	24	09:42 (2)	17:28		18:23		20:21		21:15		21:56		21:53		21:04		19:52		18:38		16:34		16:05	18	09:28 (2)	
13	08:38		09:19 (2)	07:51		06:48		06:32		05:29		04:55		05:11		05:59		06:54		07:48		07:48		08:35		09:11 (2)	
	16:31	23	09:42 (2)	17:30		18:25		20:22		21:17		21:57		21:52		21:01		19:49		18:36		16:32		16:05	18	09:29 (2)	
14	08:37		09:19 (2)	07:49		06:45		06:30		05:27		04:55		05:12		06:01		06:56		07:50		07:49		08:36		09:12 (2)	
	16:33	23	09:42 (2)	17:32		18:27		20:24		21:19		21:58		21:51		20:59		19:47		18:33		16:31		16:05	17	09:29 (2)	
15	08:37		09:20 (2)	07:47		06:43		06:28		05:26		04:55		05:13		06:03		06:58		07:52		07:51		08:37		09:13 (2)	
	16:34	22	09:42 (2)	17:34		18:29		20:26		21:20		21:58		21:50		20:57		19:44		18:31		16:29		16:05	16	09:29 (2)	
16	08:36		09:21 (2)	07:45		06:40		06:25		05:24		04:54		05:14		06:05		06:59		07:54		07:53		08:38		09:13 (2)	
	16:36	21	09:42 (2)	17:36		18:30		20:28		21:22		21:59		21:49		20:55		19:42		18:29		16:28		16:05	16	09:29 (2)	
17	08:35		09:21 (2)	07:43		06:38		06:23		05:22		04:54		05:16		06:06		07:01		07:56		07:55		08:39		09:14 (2)	
	16:38	20	09:41 (2)	17:38		18:32		20:30		21:24		21:59		21:48		20:53		19:39		18:27		16:26		16:05	16	09:30 (2)	
18	08:33		09:23 (2)	07:41		06:36		06:21		05:21		04:54		05:17		06:08		07:03		07:57		07:57		08:39		09:15 (2)	
	16:40	18	09:41 (2)	17:40		18:34		20:32		21:25		22:00		21:46		20:51		19:37		18:24		16:25		16:05	15	09:30 (2)	
19	08:32		09:24 (2)	07:39		06:33		06:18		05:19		04:54		05:18		06:10		07:05		07:59		07:59		08:40		09:16 (2)	
	16:41	17	09:41 (2)	17:42		18:36		20:33		21:27		22:00		21:45		20:48		19:34		18:22		16:23		16:05	15	09:31 (2)	
20	08:31		09:25 (2)	07:37		06:31		06:16		05:18		04:54		05:20		06:12		07:06		08:01		08:01		09:04 (2)		09:16 (2)	
	16:43	14	09:39 (2)	17:44		18:38		20:35		21:28		22:00		21:44		20:46		19:32		18:20		16:22		7	09:11 (2)	15	09:31 (2)
21	08:30		09:27 (2)	07:34		06:28		06:14		05:16		04:54		05:21		06:13		07:08		08:03		08:02		09:02 (2)		09:17 (2)	
	16:45	12	09:39 (2)	17:46		18:40		20:37		21:30		22:01		21:42		20:44		19:29		18:17		16:20		12	09:14 (2)	15	09:32 (2)
22	08:29		09:30 (2)	07:32		06:26		06:12		05:15		04:55		05:23		06:15		07:10		08:05		08:04		09:01 (2)		09:17 (2)	
	16:47	7	09:37 (2)	17:48		18:42		20:39		21:31		22:01		21:41		20:42		19:27		18:15		16:19		14	09:15 (2)	15	09:32 (2)
23	08:27			07:30		06:23		06:09		05:13		04:55		05:24		06:17		07:12		08:07		08:06				09:18 (2)	
	16:49			17:50		18:43		20:41		21:33		22:01		21:40		20:39		19:24		18:13		16:18		17	09:17 (2)	15	09:33 (2)
24	08:26			07:28		06:21		06:07		05:12		04:55		05:26		06:19		07:14		08:09		08:08				09:18 (2)	
	16:51			17:52		18:45		20:43		21:35		22:01		21:38		20:37		19:22		18:11		16:17		18	09:18 (2)	15	09:33 (2)
25	08:25			07:25		06:18		06:05		05:11		04:56		05:27		06:20		07:15		08:11		08:09				09:18 (2)	
	16:52			17:54		18:47		20:45		21:36		22:01		21:37		20:35		19:19		17:09		16:16		19	09:19 (2)	15	09:33 (2)
26	08:23			07:23		06:16		06:03		05:09		04:56		05:29		06:22		07:17		08:13		08:11				09:19 (2)	
	16:54			17:56		18:49		20:46		21:37		22:01		21:35		20:33		19:17		17:07		16:15		21	09:20 (2)	15	09:34 (2)
27	08:22			07:21		06:14		06:01		05:08		04:56		05:30		06:24		07:19		08:15		08:13				09:19 (2)	
	16:56			17:58		18:51		20:48		21:39		22:01		21:33		20:30		19:14		17:04		16:14		22	09:21 (2)	16	09:35 (2)
28	08:20			07:19		06:11		05:58		05:07		04:57		05:32		06:26		07:21		08:17		08:15				09:19 (2)	
	16:58			18:00		18:53		20:50		21:40		22:01		21:32		20:28		19:12		17:02		16:13		22	09:22 (2)	16	09:35 (2)
29	08:19					07:09		05:56		05:06		04:57		05:34		06:28		07:23		08:19		08:16				09:19 (2)	
	17:00					19:55		20:52		21:42		22:01		21:30		20:25		19:10		17:00		16:12		23	09:23 (2)	17	09:36 (2)
30	08:17																										

6918 Kellystown

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathlyn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Assumptions for shadow calculations

Shadow receptor: BA - H53

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

			January	February	March	April	May	June	July	August	September	October	November	December		
	1	08:44	09:35 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19		
		16:15	16	09:51 (1)	17:06	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54	16:10	
	2	08:44	09:36 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21		
		16:16	15	09:51 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	
	3	08:44	09:38 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22		
		16:17	14	09:52 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08	
	4	08:44	09:38 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24		09:29 (1)
		16:18	13	09:51 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	3 09:32 (1)
	5	08:43	09:40 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25		09:27 (1)
		16:20	11	09:51 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07	7 09:34 (1)
	6	08:43	09:40 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27		09:27 (1)
		16:21	11	09:51 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	16:07	10 09:37 (1)
	7	08:42	09:42 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28		09:26 (1)
		16:22	7	09:49 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	11 09:37 (1)
	8	08:42	09:45 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29		09:26 (1)
		16:24	3	09:48 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	13 09:39 (1)
	9	08:41		07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:31		09:26 (1)
		16:25		17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	14 09:40 (1)	
	10	08:41		07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32		09:25 (1)
		16:27		17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05	15 09:40 (1)	
	11	08:40		07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33		09:25 (1)
		16:28		17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05	16 09:41 (1)	
	12	08:39		07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34		09:26 (1)
		16:30		17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05	17 09:43 (1)	
	13	08:38		07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:35		09:26 (1)
		16:31		17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32	16:05	17 09:43 (1)	
	14	08:37		07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50	08:36		09:27 (1)
		16:33		17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31	16:05	17 09:44 (1)	
	15	08:37		07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37		09:27 (1)
		16:35		17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05	18 09:45 (1)	
	16	08:36		07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38		09:27 (1)
		16:36		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16:05	18 09:45 (1)	
	17	08:35		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39		09:27 (1)
		16:38		17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	16:05	18 09:45 (1)	
	18	08:34		07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57	08:39		09:28 (1)
		16:40		17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:05	18 09:46 (1)	
	19	08:32		07:39	06:33	06:18	05:19	04:54	05:19	06:10	07:05	07:59	07:59	08:40		09:28 (1)
		16:41		17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23	16:05	19 09:47 (1)	
	20	08:31		07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01	08:41		09:28 (1)
		16:43		17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	16:06	18 09:46 (1)	
	21	08:30		07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41		09:29 (1)
		16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	16:06	18 09:47 (1)	
	22	08:29		07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42		09:29 (1)
		16:47		17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	16:07	18 09:47 (1)	
	23	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:43		09:30 (1)
		16:49		17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	16:07	18 09:48 (1)	
	24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43		09:30 (1)
		16:51		17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	16:08	19 09:49 (1)	
	25	08:25		07:26	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:10	08:43		09:31 (1)
		16:53		17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16	16:08	19 09:50 (1)	
	26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:44		09:32 (1)
		16:54		17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15	16:09	18 09:50 (1)	
	27	08:22		07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13	08:44		09:32 (1)
		16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	16:14	16:10	18 09:50 (1)	
	28	08:20		07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17	08:15	08:44		09:33 (1)
		16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16:11	17 09:50 (1)	
	29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16	08:44		09:33 (1)
		17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	16:12	18 09:51 (1)	
	30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21	08:18	08:44		09:34 (1)
		17:02			19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	16:12	17 09:51 (1)	
	31	08:16			07:04		05:04		05:37	06:31		07:22		08:44		09:35 (1)
		17:04			19:58		21:44		21:27	20:21		16:56		16:13	16 09:51 (1)	
Potential sun hours	250			273	367	420	494	510	512	460	382	328	259	233		
Total, worst case		90														445
Sun reduction		0.24														0.21
Oper. time red.		1.00														1.00
Wind dir. red.		0.59														0.59
Total reduction		0.14														0.12
Total, real		13														55

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BB - H54

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	08:11 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	08:17 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12		06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:09
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07		06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32	08:25
	16:20	17:14	18:10		20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07
6	08:43	08:05	07:05		06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27
	16:21	17:16	18:12		20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02		06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28
	16:22	17:18	18:13		20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00		06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06
9	08:41	07:59	06:58		06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
	16:25	17:22	18:17		20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05
10	08:41	07:57	06:55		06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42	08:32
	16:27	17:24	18:19		20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05
11	08:40	07:55	06:53		06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33
	16:28	17:26	18:21		20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50		06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34
	16:30	17:28	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05
13	08:38	07:51	06:48	08:18 (1)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
	16:31	17:30	18:25	08:23 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	08:15 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33	17:32	18:27	08:24 (1)	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31	16:05
15	08:37	07:47	06:43	08:13 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
	16:35	17:34	18:29	08:25 (1)	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05
16	08:36	07:45	06:41	08:11 (1)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38
	16:36	17:36	18:31	08:27 (1)	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	08:09 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
	16:38	17:38	18:32	08:28 (1)	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	16:05
18	08:34	07:41	06:36	08:07 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39
	16:40	17:40	18:34	08:28 (1)	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	08:04 (1)	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40
	16:41	17:42	18:36	08:28 (1)	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	08:03 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41
	16:43	17:44	18:38	08:28 (1)	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	08:03 (1)	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41
	16:45	17:46	18:40	08:29 (1)	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	08:02 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
	16:47	17:48	18:42	08:28 (1)	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	08:03 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
	16:49	17:50	18:44	08:28 (1)	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	08:04 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
	16:51	17:52	18:45	08:27 (1)	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	08:04 (1)	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:43
	16:53	17:54	18:47	08:26 (1)	20:45	21:36	22:01	21:37	20:35	19:20	18:09	16:16	16:08
26	08:23	07:23	06:16	08:05 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:44
	16:54	17:56	18:49	08:25 (1)	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:15	16:09
27	08:22	07:21	06:14	08:06 (1)	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:44
	16:56	17:58	18:51	08:24 (1)	20:48	21:39	22:01	21:33	20:30	19:15	18:05	16:14	16:10
28	08:20	07:19	06:11	08:08 (1)	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:44
	16:58	18:00	18:53	08:21 (1)	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:13	16:11
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:12	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:18	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	18:00	16:11	16:13
31	08:15		07:04			05:04		05:37	06:31		07:22		08:44
	17:04		19:58			21:44		21:27	20:21		16:56		16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328	259	233
Total, worst case		304		6								312	
Sun reduction		0.23		0.27								0.29	
Oper. time red.		1.00		1.00								1.00	
Wind dir. red.		0.64		0.64								0.64	
Total reduction		0.15		0.17								0.19	
Total, real		45		1								58	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: BC - H55

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December						
1	08:44	09:21 (3)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19	09:11 (3)					
	16:15	69	11:16 (1)	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10	55	10:59 (1)			
2	08:44	09:22 (3)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21	09:11 (3)					
	16:16	69	11:17 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	58	11:01 (1)			
3	08:44	09:22 (3)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22	09:10 (3)					
	16:17	68	11:17 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	61	11:01 (1)			
4	08:43	09:23 (3)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24	09:11 (3)					
	16:18	67	11:17 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	62	11:02 (1)			
5	08:43	09:23 (3)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25	09:10 (3)					
	16:20	67	11:17 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	63	11:02 (1)			
6	08:43	09:25 (3)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27	09:11 (3)					
	16:21	65	11:18 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	65	11:04 (1)			
7	08:42	09:25 (3)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28	09:10 (3)					
	16:22	63	11:17 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	67	11:04 (1)			
8	08:42	09:26 (3)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29	09:11 (3)					
	16:24	62	11:17 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	67	11:05 (1)			
9	08:41	09:27 (3)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30	09:11 (3)					
	16:25	60	11:18 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	69	11:06 (1)			
10	08:41	09:28 (3)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32	09:11 (3)					
	16:27	58	11:18 (1)	17:24	18:19	20:17	21:12	21:55	21:58	21:08	19:57	18:43	16:37	69	11:06 (1)			
11	08:40	09:29 (3)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33	09:11 (3)					
	16:28	56	11:17 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	69	11:06 (1)			
12	08:39	09:31 (3)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34	09:12 (3)					
	16:30	52	11:17 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	71	11:08 (1)			
13	08:38	09:32 (3)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35	09:12 (3)					
	16:31	49	11:17 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	7	11:08 (1)	71	11:08 (1)		
14	08:37	09:35 (3)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:31	07:49	71	11:09 (1)			
	16:33	41	11:16 (1)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	13	08:44 (2)	16:31	71	11:09 (1)	
15	08:37	10:42 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:29	07:51	71	11:13 (3)			
	16:35	34	11:16 (1)	17:34	18:14 (2)	20:26	21:20	21:58	21:50	20:57	19:44	18:31	17	08:46 (2)	16:29	72	11:10 (1)	
16	08:36	10:43 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:27	07:53	72	11:13 (3)			
	16:36	32	11:15 (1)	17:36	18:16 (2)	20:30	21:22	21:59	21:49	20:55	19:42	18:29	20	08:47 (2)	16:28	72	11:09 (1)	
17	08:35	10:44 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:26	07:55	72	11:14 (1)			
	16:38	30	11:14 (1)	17:38	18:17 (2)	20:30	21:24	21:59	21:48	20:53	19:39	18:27	22	08:48 (2)	16:26	72	11:10 (1)	
18	08:33	10:46 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:25	07:57	72	11:15 (3)			
	16:40	27	11:13 (1)	17:40	18:18 (2)	20:34	21:25	22:00	21:46	20:51	19:37	18:24	23	08:48 (2)	16:25	71	11:11 (1)	
19	08:32	10:48 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:27	07:59	71	11:16 (3)			
	16:41	24	11:12 (1)	17:42	18:17 (2)	20:36	21:27	22:00	21:45	20:48	19:34	18:22	21	08:49 (2)	16:23	71	11:12 (1)	
20	08:31	10:50 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:29	08:01	71	11:16 (3)			
	16:43	20	11:10 (1)	17:44	18:18 (2)	20:35	21:28	22:00	21:44	20:46	19:32	18:20	19	08:48 (2)	16:22	71	11:11 (1)	
21	08:30	10:54 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:31	08:02	71	11:17 (3)			
	16:45	13	11:07 (1)	17:46	18:18 (2)	20:37	21:30	22:01	21:42	20:44	19:29	18:18	17	08:48 (2)	16:20	13	10:29 (1)	
22	08:29	10:55 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:33	08:04	71	11:12 (1)			
	16:47		17:48	20	08:17 (2)	20:39	21:31	22:01	21:41	20:42	19:27	18:15	15	08:48 (2)	16:19	20	10:46 (1)	
23	08:27	10:56 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:35	08:06	71	11:13 (1)			
	16:49		17:50	22	08:17 (2)	20:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	13	08:48 (2)	16:18	24	10:48 (1)
24	08:26	10:57 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:37	08:08	71	11:13 (3)			
	16:51		17:52	23	08:17 (2)	20:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	10	08:47 (2)	16:17	27	10:50 (1)
25	08:25	10:58 (1)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:39	08:09	71	11:13 (1)			
	16:52		17:54	21	08:15 (2)	20:47	20:45	21:36	22:01	21:37	20:35	19:19	7	07:46 (2)	16:16	30	10:52 (1)	
26	08:23	10:59 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:41	08:11	72	11:14 (1)			
	16:54		17:56	18	08:14 (2)	20:49	20:46	21:37	22:01	21:35	20:33	19:17	4	07:45 (2)	16:15	32	10:54 (1)	
27	08:22	10:59 (1)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:43	08:13	71	11:15 (1)			
	16:56		17:58	16	08:13 (2)	20:51	20:48	21:39	22:01	21:33	20:30	19:15		16:14	34	10:55 (1)		
28	08:20	10:59 (1)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:45	08:15	71	11:16 (3)			
	16:58		18:00	11	08:10 (2)	20:50	21:40	22:01	21:32	20:28	19:12	18:02		16:13	41	10:56 (1)		
29	08:19	10:59 (1)	07:17	06:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:46	08:16	71	11:17 (3)			
	17:00				19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00		16:12	48	10:57 (1)		
30	08:17	10:59 (1)	07:15	06:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:43	08:18	71	11:18 (1)			
	17:02				19:56	20:54	21:43	22:01	21:28	20:23	19:07	18:00		16:11	52	10:58 (1)		
31	08:15	10:59 (1)	07:13	06:04	05:54	05:04	04:58	05:37	06:31	07:26	08:22	08:44	08:16	71	11:19 (1)			
	17:04				19:58	21:44	22:37	22:27	20:21	19:16	18:10	17:04		16:13	71	11:16 (1)		
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	2133					
Total, worst case	1026	203											208			2133		
Sun reduction	0.24	0.23											0.29			0.21		
Oper. time red.	1.00	1.00											1.00			1.00		
Wind dir. red.	0.60	0.64											0.64			0.60		
Total reduction	0.15	0.15											0.19			0.12		
Total, real	149	30											39			264		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** BD - H56

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		09:27 (3)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		06:33	07:26		07:24		06:33	07:26	08:19	09:20 (3)
	16:15	66	11:27 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54		18:02	20:00		16:54		18:02	20:00	16:10	11:09 (1)
2	08:44		09:28 (3)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		06:35	07:28		07:26		06:35	07:28	08:21	09:19 (3)
	16:16	66	11:28 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52		18:04	20:02		16:52		18:04	20:02	16:09	11:11 (1)
3	08:44		09:28 (3)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		06:36	07:30		07:28		06:36	07:30	08:22	09:17 (3)
	16:17	64	11:27 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50		18:06	20:04		16:50		18:06	20:04	16:08	11:11 (1)
4	08:43		09:29 (3)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		06:38	07:32		07:30		06:38	07:32	08:24	09:17 (3)
	16:18	63	11:28 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48		18:08	20:06		16:48		18:08	20:06	16:08	11:12 (1)
5	08:43		09:29 (3)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32		06:40	07:33		07:32		06:40	07:33	08:25	09:17 (3)
	16:20	63	11:28 (1)	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46		18:10	20:08		16:46		18:10	20:08	16:07	11:13 (1)
6	08:43		09:31 (3)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34		06:42	07:35		07:34		06:42	07:35	08:27	09:17 (3)
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7	08:42		09:31 (3)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36		06:44	07:37		07:36		06:44	07:37	08:28	09:17 (3)
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10	08:41		09:36 (3)	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42		06:40	07:43		07:42		06:40	07:43	08:32	09:17 (3)
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	16:49		11:22 (1)	17:50	23	08:20 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16	08:51 (2)	16:18	08:37 (2)	07:52		16:18		16:07	11:24 (1)	
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	16:52		11:54 (1)	17:54	20	08:18 (2)	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	11	07:50 (2)	16:16	08:41 (2)	07:52		16:16		16:08	11:25 (1)	
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	16:54		11:56 (1)	17:56	16	08:16 (2)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	8	07:49 (2)	16:15	08:42 (2)	07:53		16:15		16:09	11:26 (1)	
27	08:22		11:07 (1)	07:21																					

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BE - H57

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:25 (1)	07:24	08:19		
	16:15	17:06	18:02	19	08:00 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	3	08:28 (1)	16:54	16:10
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:19 (1)	07:26	08:21		
	16:16	17:08	18:04	22	08:01 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	12	08:31 (1)	16:52	16:09
3	08:44	08:10	07:12	07:37 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:17 (1)	07:28	08:22		
	16:17	17:10	18:06	24	08:01 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16	08:33 (1)	16:50	16:09
4	08:43	08:09	07:09	07:37 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:15 (1)	07:30	08:24		
	16:18	17:12	18:08	24	08:01 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	19	08:34 (1)	16:48	16:08
5	08:43	08:07	07:07	07:36 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:14 (1)	07:32	08:25		
	16:20	17:14	18:10	24	08:00 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	21	08:35 (1)	16:46	16:07
6	08:43	08:05	07:05	07:36 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:13 (1)	07:34	08:27		
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7	08:42	08:03	07:02	07:37 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:12 (1)	07:36	08:28		
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8	08:42	08:01	07:00	07:37 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:12 (1)	07:38	08:29		
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	17:04		19:58			21:44		21:27	20:21		16:56			16:14		
Potential sun hours	250	273	367		420	494	510	512	460	382	328		259	233		
Total, worst case			242									285				
Sun reduction		0.23	0.27									0.29				
Oper. time red.		1.00	1.00									1.00				
Wind dir. red.		0.65	0.65									0.65				
Total reduction		0.15	0.18									0.19				
Total, real		6	43								54					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: BF - H58

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	14	07:55 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	17	07:56 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	07:36 (1)	06:57	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22			
	16:17	17:10	18:06	19	07:55 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:09		
4	08:43	08:09	07:09	07:34 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:15 (1)	07:30	08:24		
	16:18	17:12	18:08	21	07:55 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	11	08:26 (1)	16:48	16:08
5	08:43	08:07	07:07	07:34 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:13 (1)	07:32	08:25		
	16:20	17:14	18:10	20	07:54 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	15	08:28 (1)	16:46	16:07
6	08:43	08:05	07:05	07:34 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:12 (1)	07:34	08:27		
	16:21	17:16	18:12	20	07:54 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	17	08:29 (1)	16:45	16:07
7	08:42	08:03	07:02	07:35 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:11 (1)	07:36	08:28		
	16:22	17:18	18:13	19	07:54 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	19	08:30 (1)	16:43	16:06
8	08:42	08:01	07:00	07:35 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:10 (1)	07:38	08:29		
	16:24	17:20	18:15	17	07:52 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	20	08:30 (1)	16:41	16:06
9	08:41	07:59	06:58	07:37 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:08 (1)	07:40	08:31		
	16:25	17:22	18:17	13	07:50 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	21	08:29 (1)	16:39	16:06
10	08:41	07:57	06:55	07:39 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:09 (1)	07:42	08:32		
	16:27	17:24	18:19	7	07:46 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	20	08:29 (1)	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:11 (1)	07:44	08:33			
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	17:28	18	08:29 (1)	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:13 (1)	07:46	08:34			
	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	17:24	16	08:29 (1)	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:15 (1)	07:48	08:35			
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	17:22	13	08:28 (1)	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:17 (1)	07:50	08:36			
	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	17:20	10	08:27 (1)	16:31	16:05	
15	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:19 (1)	07:51	08:37			
	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	17:17	6	08:25 (1)	16:29	16:05	
16	08:36	07:45	06:41	06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:21 (1)	07:53	08:38			
	16:36	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	17:15	2	08:23 (1)	16:28	16:05	
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:23 (1)	07:55	08:39			
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	17:13		16:26	16:05		
18	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58		07:57	08:39			
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25	16:05			
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59		07:59	08:40			
	16:42	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22		16:23	16:05			
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01		08:01	08:41			
	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20		16:22	16:06			
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03		08:03	08:41			
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18		16:21	16:06			
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:05	08:42			
	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15		16:19	16:07			
23	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:07	08:43			
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13		16:18	16:07			
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:08	08:43			
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11		16:17	16:08			
25	08:25	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11		08:10	08:43			
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09		16:16	16:08			
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13		08:11	08:44			
	16:54	17:56	4	07:52 (1)	18:49	20:46	21:37	22:01	21:35	20:33		19:17	17:07			
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15		08:13	08:44			
	16:56	17:58	8	07:54 (1)	18:51	20:48	21:39	22:01	21:33	20:30		19:15	17:05			
28	08:20	07:19	06:11	06:07	05:07	04:57	05:32	06:26	07:21	08:17		08:15	08:44			
	16:58	18:00	11	07:54 (1)	18:53	20:50	21:40	22:01	21:32	20:28		19:12	17:02			
29	08:19		07:09	07:05	05:56	05:06	04:58	05:34	06:28	07:23		08:16	08:44			
	17:00		17:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00		16:12	16:12			
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:19		08:18	08:44			
	17:02		19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58		16:11	16:13			
31	08:16		07:04	07:04	05:04	05:04	05:37	06:31	07:26	08:21		08:17	08:44			
	17:04		19:58	21:44	21:44	21:27	20:21	16:56					16:14			
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233				
Total, worst case		23	167							188						
Sun reduction		0.23	0.27							0.29						
Oper. time red.		1.00	1.00							1.00						
Wind dir. red.		0.65	0.65							0.65						
Total reduction		0.15	0.18							0.19						
Total, real		3	29							36						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: BG - H59

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	07:35 (1) 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:35 (1) 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:37 (1) 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:38 (1) 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:41 (1) 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:45 (1) 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:45 (1) 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:58	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:45 (1) 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:45 (1) 18:23	06:35 20:21	05:31 21:15	04:56 21:53	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:45 (1) 18:25	06:33 20:22	05:29 21:17	04:55 21:52	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	07:45 (1) 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	07:45 (1) 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	07:45 (1) 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	07:45 (1) 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	07:45 (1) 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	07:45 (1) 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	07:45 (1) 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	07:45 (1) 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	07:45 (1) 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	07:45 (1) 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:07 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	07:45 (1) 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:09 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	07:45 (1) 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	08:11 18:13	08:11 16:09
26	08:23 16:54	07:23 17:56	06:16 18:49	07:45 (1) 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:13 18:15	08:13 16:10
27	08:22 16:56	07:21 17:58	06:14 18:51	07:45 (1) 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	08:15 18:17	08:15 16:11
28	08:20 16:58	07:19 18:00	06:11 18:53	07:45 (1) 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 18:19	08:17 16:12
29	08:19 17:00		06:09 19:05	07:45 (1) 19:05	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:19 18:17	08:19 16:13
30	08:17 17:02		06:06 19:07	07:45 (1) 19:07	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	08:21 18:15	08:21 16:14
31	08:16 17:04		06:04 19:08	07:45 (1) 19:08	05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	06:31 19:07	07:23 18:05	08:23 17:05	08:23 16:15
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		24	111							135		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		4	20							26		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** BH - H60

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26	07:59 (1)	07:24	08:19
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	18	08:17 (1)	16:54
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:57 (1)	07:26
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	20	08:17 (1)	16:52
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	21	08:17 (1)	16:50
4	08:43	08:09	07:09		07:34 (1)	06:54	05:46	05:00	05:01	05:44		07:32		07:58 (1)	07:30
	16:18	17:12	18:08	3	07:37 (1)	20:06	21:01	21:49	21:59	20:11		18:57	19	08:17 (1)	16:48
5	08:43	08:07	07:07		07:31 (1)	06:52	05:44	04:59	05:02	05:46		07:33		08:00 (1)	07:32
	16:20	17:14	18:10	7	07:38 (1)	20:08	21:03	21:50	21:58	20:09		18:55	17	08:17 (1)	16:46
6	08:43	08:05	07:05		07:29 (1)	06:49	05:42	04:59	05:03	05:47		07:35		08:02 (1)	07:34
	16:21	17:16	18:12	10	07:39 (1)	20:10	21:05	21:51	21:58	20:06		18:53	14	08:16 (1)	16:45
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	05:49		07:37		08:04 (1)	07:36
	16:22	17:18	18:13	13	07:40 (1)	20:11	21:06	21:52	21:57	20:04		18:50	11	08:15 (1)	16:43
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	05:51		07:39		08:06 (1)	07:38
	16:24	17:20	18:15	15	07:39 (1)	20:13	21:08	21:53	21:56	20:02		18:48	8	08:14 (1)	16:41
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52		07:41		08:07 (1)	07:40
	16:25	17:22	18:17	18	07:40 (1)	20:15	21:10	21:54	21:56	21:10		18:45	5	08:12 (1)	16:39
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54		07:43		08:09 (1)	07:42
	16:27	17:24	18:19	20	07:39 (1)	20:17	21:12	21:55	21:55	21:08		18:43	1	08:10 (1)	16:37
11	08:40	07:55	06:53		07:19 (1)	06:37	05:33	04:56	05:08	05:56		07:45		07:44	08:33
	16:28	17:26	18:21	20	07:39 (1)	20:19	21:13	21:56	21:54	21:06		18:41		16:36	16:05
12	08:39	07:53	06:50		07:18 (1)	06:35	05:31	04:56	05:09	05:58		07:46		07:46	08:34
	16:30	17:28	18:23	19	07:37 (1)	20:21	21:15	21:56	21:53	21:04		18:38		16:34	16:05
13	08:38	07:51	06:48		07:20 (1)	06:33	05:29	04:55	05:11	05:59		07:48		07:48	08:35
	16:31	17:30	18:25	17	07:37 (1)	20:22	21:17	21:57	21:52	21:02		18:36		16:32	16:05
14	08:37	07:49	06:45		07:20 (1)	06:30	05:27	04:55	05:12	06:01		07:50		07:50	08:36
	16:33	17:32	18:27	14	07:34 (1)	20:24	21:19	21:58	21:51	20:59		18:34		16:31	16:05
15	08:37	07:47	06:43		07:22 (1)	06:28	05:26	04:55	05:13	06:03		07:52		07:51	08:37
	16:35	17:34	18:29	10	07:32 (1)	20:26	21:20	21:58	21:50	20:57		19:44		16:29	16:05
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	07:00		07:54		07:53	08:38
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42		18:29		16:28	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01		07:56		07:55	08:39
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39		18:27		16:26	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03		07:58		07:57	08:39
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37		18:24		16:25	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05		07:59		07:59	08:40
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34		18:22		16:23	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01		08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20		16:22	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03		08:02	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18		16:21	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05		08:04	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15		16:19	16:07
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07		08:06	08:43
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13		16:18	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09		08:08	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22		18:11		16:17	16:08
25	08:25	07:26	06:19		06:05	05:11	04:56	05:27	06:21	07:15		07:11		08:10	08:43
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20		17:09		16:16	16:08
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17		07:13		08:11	08:44
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17		17:07		16:15	16:09
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:15		08:13	08:44
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15		17:05		16:14	16:10
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:17		08:15	08:44
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12		8	08:12 (1)	17:02	16:13
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		08:02 (1)	17:19	16:16	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10		13	08:15 (1)	17:00	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		08:00 (1)	17:21	16:18	08:44
	17:02		19:57		20:54	21:43	22:01	21:32	20:23	19:07		16	08:16 (1)	16:58	16:13
31	08:16		07:04			05:04		05:27	06:31			07:23			08:44
	17:04		19:58			21:44		21:27	20:21			16:56			16:14
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233
Total, worst case			166									134			
Sun reduction			0.27									0.29			
Oper. time red.			1.00									1.00			
Wind dir. red.			0.65									0.65			
Total reduction			0.18									0.21			
Total, real			29									8		25	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** BI - H61

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March		April	May	June	July	August	September		October		November	December
1	08:44	08:14	07:16			07:01	05:52	05:03	04:59	05:39	06:33		07:26	07:53 (1)	07:24	08:19
	16:15	17:06	18:02			20:00	20:56	21:45	22:00	21:25	20:18		19:05	14 08:07 (1)	16:54	16:10
2	08:44	08:12	07:14			06:59	05:50	05:02	05:00	05:40	06:35		07:28	07:54 (1)	07:26	08:21
	16:16	17:08	18:04			20:02	20:57	21:47	22:00	21:23	20:16		19:02	11 08:05 (1)	16:52	16:09
3	08:44	08:10	07:12			06:57	05:48	05:01	05:00	05:42	06:37		07:30	07:56 (1)	07:28	08:22
	16:17	17:10	18:06			20:04	20:59	21:48	21:59	21:21	20:14		19:00	8 08:04 (1)	16:50	16:09
4	08:43	08:09	07:09			06:54	05:46	05:00	05:01	05:44	06:38		07:32	07:58 (1)	07:30	08:24
	16:18	17:12	18:08			20:06	21:01	21:49	21:59	21:19	20:11		18:57	5 08:03 (1)	16:48	16:08
5	08:43	08:07	07:07			06:52	05:44	04:59	05:02	05:46	06:40		07:33	08:00 (1)	07:32	08:25
	16:20	17:14	18:10			20:08	21:03	21:50	21:58	21:18	20:09		18:55	2 08:02 (1)	16:46	16:07
6	08:43	08:05	07:05			06:49	05:42	04:59	05:03	05:47	06:42		07:35		07:34	08:27
	16:21	17:16	18:12			20:10	21:05	21:51	21:58	21:16	20:06		18:53		16:45	16:07
7	08:42	08:03	07:02			06:47	05:40	04:58	05:04	05:49	06:44		07:37		07:36	08:28
	16:22	17:18	18:13			20:11	21:06	21:52	21:57	21:14	20:04		18:50		16:43	16:06
8	08:42	08:01	07:00			06:44	05:38	04:57	05:05	05:51	06:45		07:39		07:38	08:29
	16:24	17:20	18:15			20:13	21:08	21:53	21:56	21:12	20:02		18:48		16:41	16:06
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52	06:47		07:41		07:40	08:31
	16:25	17:22	18:17	4	07:26 (1)	20:15	21:10	21:54	21:56	21:10	19:59		18:45		16:39	16:06
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49		07:43		07:42	08:32
	16:27	17:24	18:19	7	07:26 (1)	20:17	21:12	21:55	21:55	21:08	19:57		18:43		16:37	16:05
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56	06:51		07:45		07:44	08:33
	16:28	17:26	18:21	10	07:27 (1)	20:19	21:13	21:56	21:54	21:06	19:54		18:41		16:36	16:05
12	08:39	07:53	06:50		07:14 (1)	06:35	05:31	04:56	05:09	05:58	06:52		07:46		07:46	08:34
	16:30	17:28	18:23	13	07:27 (1)	20:21	21:15	21:56	21:53	21:04	19:52		18:38		16:34	16:05
13	08:38	07:51	06:48		07:12 (1)	06:33	05:29	04:55	05:11	05:59	06:54		07:48		07:48	08:35
	16:31	17:30	18:25	15	07:27 (1)	20:22	21:17	21:57	21:52	21:02	19:49		18:36		16:32	16:05
14	08:37	07:49	06:45		07:09 (1)	06:30	05:27	04:55	05:12	06:01	06:56		07:50		07:50	08:36
	16:33	17:32	18:27	17	07:26 (1)	20:24	21:19	21:58	21:51	20:59	19:47		18:34		16:31	16:05
15	08:37	07:47	06:43		07:07 (1)	06:28	05:26	04:55	05:13	06:03	06:58		07:52		07:51	08:37
	16:35	17:34	18:29	19	07:26 (1)	20:26	21:20	21:58	21:50	20:57	19:44		18:31		16:29	16:05
16	08:36	07:45	06:41		07:06 (1)	06:25	05:24	04:55	05:15	06:05	07:00		07:54		07:53	08:38
	16:36	17:36	18:31	19	07:25 (1)	20:28	21:22	21:59	21:49	20:55	19:42		18:29		16:28	16:05
17	08:35	07:43	06:38		07:07 (1)	06:23	05:22	04:54	05:16	06:06	07:01		07:56		07:55	08:39
	16:38	17:38	18:32	17	07:24 (1)	20:30	21:24	21:59	21:48	20:53	19:39		18:27		16:26	16:05
18	08:34	07:41	06:36		07:07 (1)	06:21	05:21	04:54	05:17	06:08	07:03		07:58		07:57	08:39
	16:40	17:40	18:34	15	07:22 (1)	20:32	21:25	22:00	21:46	20:51	19:37		18:24		16:25	16:05
19	08:32	07:39	06:33		07:09 (1)	06:19	05:19	04:54	05:19	06:10	07:05		07:59		07:59	08:40
	16:42	17:42	18:36	11	07:20 (1)	20:34	21:27	22:00	21:45	20:49	19:34		18:22		16:23	16:05
20	08:31	07:37	06:31			06:16	05:18	04:54	05:20	06:12	07:07		08:01		08:01	08:41
	16:43	17:44	18:38			20:35	21:28	22:01	21:44	20:46	19:32		18:20		16:22	16:06
21	08:30	07:34	06:28			06:14	05:16	04:55	05:21	06:14	07:08		08:03		08:02	08:41
	16:45	17:46	18:40			20:37	21:30	22:01	21:42	20:44	19:29		18:18		16:21	16:06
22	08:29	07:32	06:26			06:12	05:15	04:55	05:23	06:15	07:10		08:05		08:04	08:42
	16:47	17:48	18:42			20:39	21:32	22:01	21:41	20:42	19:27		18:15		16:19	16:07
23	08:27	07:30	06:23			06:10	05:13	04:55	05:24	06:17	07:12		08:07		08:06	08:43
	16:49	17:50	18:44			20:41	21:33	22:01	21:40	20:40	19:24		18:13		16:18	16:07
24	08:26	07:28	06:21			06:07	05:12	04:55	05:26	06:19	07:14		07:54 (1)	08:09	08:08	08:43
	16:51	17:52	18:45			20:43	21:35	22:01	21:38	20:37	19:22	9	08:03 (1)	18:11	16:17	16:08
25	08:25	07:26	06:19			06:05	05:11	04:56	05:28	06:21	07:15		07:52 (1)	07:11	08:10	08:43
	16:53	17:54	18:47			20:45	21:36	22:01	21:37	20:35	19:20	13	08:05 (1)	17:09	16:16	16:08
26	08:23	07:23	06:16			06:03	05:10	04:56	05:29	06:22	07:17		07:49 (1)	07:13	08:11	08:44
	16:54	17:56	18:49			20:46	21:37	22:01	21:35	20:33	19:17	16	08:05 (1)	17:07	16:15	16:09
27	08:22	07:21	06:14			06:01	05:08	04:57	05:31	06:24	07:19		07:48 (1)	07:15	08:13	08:44
	16:56	17:58	18:51			20:48	21:39	22:01	21:33	20:30	19:15	18	08:06 (1)	17:05	16:14	16:10
28	08:20	07:19	06:11			05:59	05:07	04:57	05:32	06:26	07:21		07:47 (1)	07:17	08:15	08:44
	16:58	18:00	18:53			20:50	21:40	22:01	21:32	20:28	19:12	20	08:07 (1)	17:02	16:13	16:11
29	08:19		07:09			05:56	05:06	04:58	05:34	06:28	07:23		07:49 (1)	07:19	08:16	08:44
	17:00		19:55			20:52	21:42	22:01	21:30	20:26	19:10	18	08:07 (1)	17:00	16:12	16:12
30	08:17		07:06			05:54	05:05	04:58	05:35	06:29	07:24		07:51 (1)	07:21	08:18	08:44
	17:02		19:57			20:54	21:43	22:01	21:28	20:23	19:07	16	08:07 (1)	16:58	16:11	16:13
31	08:16		07:04				05:04		05:37	06:31				07:23		08:44
	17:04		19:58				21:44		21:27	20:21				16:56		16:14
Potential sun hours	250	273	367			420	494	510	512	460	382		328		259	233
Total, worst case												110		40		
Sun reduction												0.32		0.29		
Oper. time red.												1.00		1.00		
Wind dir. red.												0.66		0.66		
Total reduction												0.21		0.19		
Total, real												23		8		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BJ - H62

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14		07:16		07:41 (3)	07:01	07:25 (2)	05:52	07:03 (1)	05:03
	16:15	17:06		18:02	8	07:49 (3)	20:00	07:26 (2)	20:56	07:39 (1)	21:45
2	08:44	08:12		07:14		07:39 (3)	06:59	07:23 (2)	05:50	07:04 (1)	05:02
	16:16	17:08		18:04	11	07:50 (3)	20:02	07:27 (2)	20:57	07:37 (1)	21:47
3	08:44	08:10		07:12		07:36 (3)	06:56	07:20 (2)	05:48	07:05 (1)	05:01
	16:17	17:10		18:06	14	07:50 (3)	20:04	07:36 (1)	20:59	07:36 (1)	21:48
4	08:43	08:09		07:09		07:34 (3)	06:54	07:18 (2)	05:46	07:06 (1)	05:00
	16:18	17:12		18:08	16	07:50 (3)	20:06	07:40 (1)	21:01	07:34 (1)	21:49
5	08:43	08:07		07:07		07:31 (3)	06:52	07:15 (2)	05:44	07:08 (1)	04:59
	16:20	17:14		18:10	18	07:49 (3)	20:08	07:41 (1)	21:03	07:32 (1)	21:50
6	08:43	08:05		07:05		07:29 (3)	06:49	07:13 (2)	05:42	07:11 (1)	04:59
	16:21	17:16		18:11	20	07:49 (3)	20:09	07:43 (1)	21:05	07:30 (1)	21:51
7	08:42	08:03		07:02		07:26 (3)	06:47	07:11 (2)	05:40	07:14 (1)	04:58
	16:22	17:18		18:13	22	07:48 (3)	20:11	07:45 (1)	21:06	07:26 (1)	21:52
8	08:42	08:01		07:00		07:26 (3)	06:44	07:08 (2)	05:38		04:57
	16:24	17:20		18:15	21	07:47 (3)	20:13	07:45 (1)	21:08		21:53
9	08:41	07:59		06:57		07:27 (3)	06:42	07:06 (1)	05:36		04:57
	16:25	17:22		18:17	20	07:47 (3)	20:15	07:47 (1)	21:10		21:54
10	08:41	07:57		06:55		07:28 (3)	06:40	07:04 (1)	05:35		04:56
	16:27	17:24		18:19	16	07:44 (3)	20:17	07:47 (1)	21:12		21:55
11	08:40	07:55		06:53		07:30 (3)	06:37	07:03 (1)	05:33		04:56
	16:28	17:26		18:21	12	07:42 (3)	20:19	07:48 (1)	21:13		21:56
12	08:39	07:53		06:50		07:34 (3)	06:35	07:03 (1)	05:31		04:55
	16:30	17:28		18:23	3	07:37 (3)	20:21	07:48 (1)	21:15		21:56
13	08:38	07:51		06:48			06:32	07:02 (1)	05:29		04:55
	16:31	17:30		18:25			20:22	07:49 (1)	21:17		21:57
14	08:37	07:49		06:45			06:30	07:01 (1)	05:27		04:55
	16:33	17:32		18:27			20:24	07:48 (1)	21:19		21:58
15	08:36	07:47		06:43			06:28	07:00 (1)	05:26		04:55
	16:35	17:34		18:29			20:26	07:49 (1)	21:20		21:58
16	08:36	07:45		06:41			06:25	07:00 (1)	05:24		04:55
	16:36	17:36		18:30			20:28	07:49 (1)	21:22		21:59
17	08:35	07:43		06:38			06:23	06:59 (1)	05:22		04:54
	16:38	17:38		18:32			20:30	07:48 (1)	21:24		21:59
18	08:33	07:41		06:36			06:21	06:59 (1)	05:21		04:54
	16:40	17:40		18:34			20:32	07:48 (1)	21:25		22:00
19	08:32	07:39		06:33			06:18	06:59 (1)	05:19		04:54
	16:41	17:42		18:36			20:33	07:48 (1)	21:27		22:00
20	08:31	07:37		06:31			06:16	06:59 (1)	05:18		04:54
	16:43	17:44		18:38			20:35	07:48 (1)	21:28		22:00
21	08:30	07:34		06:28			06:14	06:59 (1)	05:16		04:55
	16:45	17:46		18:40			20:37	07:48 (1)	21:30		22:01
22	08:29	07:32		06:26			06:12	06:58 (1)	05:15		04:55
	16:47	17:48		18:42			20:39	07:46 (1)	21:31		22:01
23	08:27	07:30		06:23			06:09	06:58 (1)	05:13		04:55
	16:49	17:50		18:44			20:41	07:46 (1)	21:33		22:01
24	08:26	07:28		06:21			06:07	06:59 (1)	05:12		04:55
	16:51	17:52		18:45			20:43	07:46 (1)	21:34		22:01
25	08:25	07:25		06:18			06:05	06:59 (1)	05:11		04:56
	16:53	17:54		18:47			20:45	07:45 (1)	21:36		22:01
26	08:23	07:23		06:16			06:03	06:59 (1)	05:09		04:56
	16:54	17:56		18:49			20:46	07:44 (1)	21:37		22:01
27	08:22	07:21	07:46 (3)	06:14			06:01	07:00 (1)	05:08		04:57
	16:56	17:58	2	07:48 (3)	18:51		20:48	07:43 (1)	21:39		22:01
28	08:20	07:19	07:43 (3)	06:11			05:59	07:00 (1)	05:07		04:57
	16:58	18:00	5	07:48 (3)	18:53		20:50	07:42 (1)	21:40		22:01
29	08:19			07:09			05:56	07:01 (1)	05:06		04:58
	17:00			19:55			20:52	07:41 (1)	21:42		22:01
30	08:17			07:06			05:54	07:02 (1)	05:05		04:58
	17:02			19:57			20:54	07:40 (1)	21:43		22:00
31	08:15			07:04					05:04		
	17:04			19:58					21:44		
Potential sun hours	250	273		367			420		494		510
Total, worst case			7		181		1178		183		
Sun reduction			0.23		0.27		0.35		0.38		
Oper. time red.			1.00		1.00		1.00		1.00		
Wind dir. red.			0.65		0.65		0.67		0.67		
Total reduction			0.15		0.18		0.24		0.26		
Total, real			1		32		280		47		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BJ - H62

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:02 (1) 07:46 (1)	07:26 19:05	07:24 16:54
2	05:00 22:00	05:40 21:23	06:35 20:16	07:03 (1) 07:46 (1)	07:28 19:02	07:26 16:52
3	05:00 21:59	05:42 21:21	06:37 20:14	07:04 (1) 07:45 (1)	07:30 19:00	07:28 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	07:05 (2) 07:42 (1)	07:32 18:57	07:30 16:48
5	05:02 21:58	05:46 21:18	07:28 (1) 07:32 (1)	07:07 (2) 07:41 (1)	07:33 18:55	07:32 16:46
6	05:03 21:58	05:47 21:16	07:22 (1) 07:37 (1)	07:09 (2) 07:40 (1)	07:35 18:53	07:34 16:45
7	05:04 21:57	05:49 21:14	07:19 (1) 07:40 (1)	07:10 (2) 07:37 (1)	07:37 18:50	07:36 16:43
8	05:05 21:56	05:51 21:12	07:17 (1) 07:42 (1)	07:12 (2) 07:34 (1)	07:39 18:48	07:38 16:41
9	05:06 21:56	05:52 21:10	07:15 (1) 07:44 (1)	07:14 (2) 07:31 (1)	07:41 18:45	07:40 16:39
10	05:07 21:55	05:54 21:08	07:14 (1) 07:46 (1)	07:16 (2) 07:25 (1)	07:43 18:43	07:42 16:37
11	05:08 21:54	05:56 21:06	07:12 (1) 07:46 (1)	07:17 (2) 07:18 (2)	07:44 18:41	07:44 16:36
12	05:09 21:53	05:58 21:04	07:11 (1) 07:48 (1)	07:18 (2) 07:48	07:46 18:38	07:46 16:34
13	05:11 21:52	05:59 21:01	07:10 (1) 07:49 (1)	07:48 18:36	07:48 18:27	07:48 16:26
14	05:12 21:51	06:01 20:59	07:08 (1) 07:49 (1)	07:50 18:34	07:49 18:21	07:49 16:31
15	05:13 21:50	06:03 20:57	07:08 (1) 07:50 (1)	07:52 18:31	07:51 18:22	07:51 16:29
16	05:14 21:49	06:05 20:55	07:06 (1) 07:50 (1)	07:54 18:29	07:53 18:29	07:53 16:28
17	05:16 21:48	06:06 20:53	07:06 (1) 07:51 (1)	07:56 18:27	07:55 18:27	07:55 16:26
18	05:17 21:46	06:08 20:51	07:05 (1) 07:52 (1)	07:58 18:24	07:57 18:24	07:57 16:25
19	05:19 21:45	06:10 20:48	07:04 (1) 07:51 (1)	07:59 18:22	07:59 18:22	07:59 16:23
20	05:20 21:44	06:12 20:46	07:04 (1) 07:52 (1)	08:01 18:20	08:01 18:20	08:01 16:22
21	05:21 21:42	06:13 20:44	07:04 (1) 07:52 (1)	08:03 18:18	08:03 18:18	08:03 16:21
22	05:23 21:41	06:15 20:42	07:03 (1) 07:52 (1)	08:05 18:15	08:05 18:15	08:05 16:19
23	05:24 21:40	06:17 20:39	07:02 (1) 07:52 (1)	08:07 18:13	08:07 18:13	08:07 16:18
24	05:26 21:38	06:19 20:37	07:02 (1) 07:52 (1)	08:09 18:11	08:09 18:11	08:09 16:17
25	05:27 21:37	06:21 20:35	07:02 (1) 07:51 (1)	07:11 17:09	08:09 17:09	08:09 16:16
26	05:29 21:35	06:22 20:33	07:02 (1) 07:51 (1)	07:13 17:07	08:11 16:15	08:11 16:15
27	05:31 21:33	06:24 20:30	07:02 (1) 07:51 (1)	07:15 17:05	08:13 16:14	08:13 16:14
28	05:32 21:32	06:26 20:28	07:02 (1) 07:51 (1)	07:17 17:02	08:14 16:13	08:14 16:13
29	05:34 21:30	06:28 20:26	07:02 (1) 07:49 (1)	07:19 17:00	08:16 16:12	08:16 16:12
30	05:35 21:28	06:29 20:23	07:02 (1) 07:49 (1)	07:20 16:58	08:18 16:11	08:18 16:13
31	05:37 21:27	06:31 20:21	07:03 (1) 07:48 (1)	07:22 16:56	08:19 16:14	08:19 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case		1082		306	191	
Sun reduction		0.34		0.32	0.29	
Oper. time red.		1.00		1.00	1.00	
Wind dir. red.		0.67		0.67	0.65	
Total reduction		0.23		0.22	0.19	
Total, real		249		66	36	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: BK - H63

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	05:50 (1) 05:57 (1)	04:59 22:00	05:39 21:25	06:09 (1) 06:10 (1)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47		05:00 22:00	05:41 21:23		06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48		05:01 21:59	05:42 21:21		06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49		05:01 21:59	05:44 21:19		06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50		05:02 21:58	05:46 21:18		06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51		05:03 21:58	05:47 21:16		06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52		05:04 21:57	05:49 21:14		06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53		05:05 21:56	05:51 21:12		06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54		05:06 21:56	05:52 21:10		06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55		05:07 21:55	05:54 21:08		06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56		05:08 21:54	05:59 (1) 06:03 (1)		06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56		05:10 21:53	05:57 (1) 06:05 (1)		06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57		05:11 21:52	05:56 (1) 06:06 (1)		06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58		05:12 21:51	05:55 (1) 06:07 (1)		06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58		05:13 21:50	05:55 (1) 06:09 (1)		06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59		05:15 21:49	05:54 (1) 06:10 (1)		07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59		05:16 21:48	05:53 (1) 06:10 (1)		07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00		05:17 21:46	05:53 (1) 06:11 (1)		07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00		05:19 21:45	05:53 (1) 06:12 (1)		07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00		05:20 21:44	05:52 (1) 06:12 (1)		07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01		05:22 21:42	05:53 (1) 06:12 (1)		07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01		05:23 21:41	05:55 (1) 06:13 (1)		07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01		05:24 21:40	05:56 (1) 06:13 (1)		07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01		05:26 21:38	05:57 (1) 06:13 (1)		07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01		05:28 21:37	05:59 (1) 06:13 (1)		07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01		05:29 21:35	06:00 (1) 06:12 (1)		07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01		05:31 21:33	06:02 (1) 06:13 (1)		07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01		05:32 21:32	06:03 (1) 06:13 (1)		07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01		05:34 21:30	06:05 (1) 06:13 (1)		07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00		05:36 21:28	06:06 (1) 06:12 (1)		07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44	05:48 (1) 05:57 (1)		05:37 21:27	06:08 (1) 06:12 (1)		07:22 20:21	07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510		512	460		382	328	259	233
Total, worst case					266		7		274	1				
Sun reduction					0.38		0.32		0.32	0.34				
Oper. time red.					1.00		1.00		1.00					
Wind dir. red.					0.66		0.66		0.66					
Total reduction					0.25		0.21		0.21	0.23				
Total, real					67		1		59	0				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BL - H64

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44		09:20 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24				06:33	07:26	07:24				08:19	09:09 (1)		
	16:15	20	09:40 (1)	17:06	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54				06:35	07:28	07:26				16:10	15	09:24 (1)	
2	08:44		09:21 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26				06:37	07:30	07:28				08:21	16	09:09 (1)	
	16:16	20	09:41 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				06:37	07:30	07:28				16:09	16	09:25 (1)	
3	08:44		09:22 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28				06:38	07:32	07:30				08:22	17	09:08 (1)	
	16:17	19	09:41 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50				06:38	07:32	07:30				16:08	17	09:25 (1)	
4	08:44		09:22 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30				06:40	07:33	07:32				08:24	17	09:09 (1)	
	16:18	19	09:41 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:48				06:40	07:33	07:32				16:08	17	09:26 (1)	
5	08:43		09:23 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32				06:42	07:35	07:34				08:25	19	09:08 (1)	
	16:20	19	09:42 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46				06:42	07:35	07:34				16:07	19	09:27 (1)	
6	08:43		09:23 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34				06:44	07:37	07:36				08:27	19	09:09 (1)	
	16:21	19	09:42 (1)	17:16	18:11	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45				06:44	07:37	07:36				16:07	19	09:28 (1)	
7	08:42		09:23 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36				06:45	07:39	07:38				08:28	19	09:09 (1)	
	16:22	18	09:41 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				06:45	07:39	07:38				16:06	19	09:28 (1)	
8	08:42		09:25 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38				06:45	07:39	07:38				08:29	19	09:10 (1)	
	16:24	17	09:42 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:41				06:47	07:41	07:40				16:06	19	09:29 (1)	
9	08:41		09:25 (1)	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				06:49	07:43	07:42				08:31	19	09:10 (1)	
	16:25	17	09:42 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39				06:49	07:43	07:42				16:05	19	09:29 (1)	
10	08:41		09:26 (1)	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42				06:51	07:44	07:44				08:32	20	09:10 (1)	
	16:27	16	09:42 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37				06:51	07:44	07:44				16:05	20	09:30 (1)	
11	08:40		09:27 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44				06:51	07:44	07:44				08:33	20	09:10 (1)	
	16:28	15	09:42 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36				06:52	07:46	07:46				16:05	20	09:30 (1)	
12	08:39		09:28 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46				06:52	07:46	07:46				08:34	20	09:11 (1)	
	16:30	13	09:41 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34				06:52	07:46	07:46				16:05	20	09:31 (1)	
13	08:38		09:29 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48				06:54	07:48	07:48				08:35	20	09:11 (1)	
	16:31	11	09:40 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32				06:54	07:48	07:48				16:05	21	09:32 (1)	
14	08:38		09:31 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50				06:56	07:50	07:50				08:36	20	09:12 (1)	
	16:33	9	09:40 (1)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31				06:56	07:50	07:50				16:05	20	09:32 (1)	
15	08:37		09:34 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51				06:56	07:50	07:50				08:37	20	09:13 (1)	
	16:35	4	09:38 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				06:58	07:52	07:51				16:05	20	09:33 (1)	
16	08:36		07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	07:53				06:59	07:54	07:53				08:38	19	09:14 (1)	
	16:36		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28					06:59	07:54	07:53				16:05	19	09:33 (1)	
17	08:35		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	07:55				07:01	07:56	07:55				08:39	19	09:14 (1)	
	16:38		17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26					07:01	07:56	07:55				16:05	19	09:33 (1)	
18	08:34		07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57	07:57				07:03	07:58	07:57				08:40	19	09:15 (1)	
	16:40		17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25					07:03	07:58	07:57				16:05	19	09:34 (1)	
19	08:32		07:39	06:33	06:18	05:19	04:54	05:19	06:10	07:05	07:59	07:59	07:59				07:05	07:59	07:59				08:40	19	09:16 (1)	
	16:41		17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23					07:05	07:59	07:59				16:05	18	09:34 (1)	
20	08:31		07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01	08:01				07:07	08:01	08:01				08:41	19	09:16 (1)	
	16:43		17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22					07:07	08:01	08:01				16:06	18	09:34 (1)	
21	08:30		07:34	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:02	08:02				07:08	08:03	08:02				08:42	19	09:17 (1)	
	16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21					07:08	08:03	08:02				16:06	18	09:35 (1)	
22	08:29		07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:04				07:10	08:05	08:04				08:42	19	09:18 (1)	
	16:47		17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19					07:10	08:05	08:04				16:07	18	09:36 (1)	
23	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:06				07:12	08:07	08:06				08:43	19	09:18 (1)	
	16:49		17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18					07:12	08:07	08:06				16:07	18	09:36 (1)	
24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:08				07:14	08:09	08:08				08:43	19	09:18 (1)	
	16:51		17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17					07:14	08:09	08:08				16:08	18	09:36 (1)	
25	08:25		07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:09	08:09				07:15	08:10	08:09				08:43	19	09:19 (1)	
	16:53		17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09	16:16					07:15	08:10	08:09				16:08	18	09:37 (1)	
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:12	08:11	08:11				07:17	08:12	08:11				08:44	19	09:19 (1)	
	16:54		17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	18:06	16:13					07:17	08:12	08:11				16:09	19	09:38 (1)	
27	08:22		07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:14	08:13	08:13				07:19	08:14	08:13			09:13 (1)	08:44	19	09:19 (1)	
	16:56		17:58	18:51	20:48	21:39	22:01	21:34	20:30	19:15	18:04	16:14					07:19	08:14	08:13			3	09:16 (1)	16:10	19	09:38 (1)
28	08:20		07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:16	08:15	08:15				07:21	08:16	08:15				09:11 (1)	08:44	19	09:19 (1)
	16:58</																									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BM - H65

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:25 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19		09:17 (1)							
	16:15	20	09:45 (1)	17:06	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54		16:10	9	09:26 (1)							
2	08:44		09:26 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26		08:21		09:16 (1)							
	16:16	19	09:45 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09	12	09:28 (1)							
3	08:44		09:27 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28		08:22		09:15 (1)							
	16:17	19	09:46 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50		16:08	14	09:29 (1)							
4	08:44		09:28 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24		09:15 (1)							
	16:18	18	09:46 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:48		16:08	15	09:30 (1)							
5	08:43		09:29 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25		09:15 (1)							
	16:20	17	09:46 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46		16:07	16	09:31 (1)							
6	08:43		09:29 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:27		09:15 (1)							
	16:21	17	09:46 (1)	17:16	18:11	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45		16:07	17	09:32 (1)							
7	08:42		09:30 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36		08:28		09:15 (1)							
	16:22	16	09:46 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43		16:06	17	09:32 (1)							
8	08:42		09:31 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38		08:29		09:16 (1)							
	16:24	15	09:46 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41		16:06	18	09:34 (1)							
9	08:41		09:32 (1)	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:31		09:16 (1)							
	16:25	14	09:46 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39		16:05	18	09:34 (1)							
10	08:41		09:33 (1)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42		08:32		09:15 (1)							
	16:27	12	09:45 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37		16:05	19	09:34 (1)							
11	08:40		09:34 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44		08:33		09:16 (1)							
	16:28	10	09:44 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36		16:05	19	09:35 (1)							
12	08:39		09:36 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46		08:34		09:17 (1)							
	16:30	7	09:43 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34		16:05	19	09:36 (1)							
13	08:38		07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48		08:35		09:17 (1)								
	16:31		17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32		16:05	20	09:37 (1)								
14	08:38		07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50		08:36		09:17 (1)								
	16:33		17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31		16:05	20	09:37 (1)								
15	08:37		07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51		08:37		09:18 (1)								
	16:35		17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29		16:05	20	09:38 (1)								
16	08:36		07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53		08:38		09:18 (1)								
	16:36		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28		16:05	20	09:38 (1)								
17	08:35		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55		08:39		09:18 (1)								
	16:38		17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26		16:05	20	09:38 (1)								
18	08:34		07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57		08:39		09:18 (1)								
	16:40		17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25		16:05	21	09:39 (1)								
19	08:32		07:39	06:33	06:18	05:19	04:54	05:19	06:10	07:05	07:59	07:59		08:40		09:19 (1)								
	16:41		17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23		16:05	21	09:40 (1)								
20	08:31		07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01		08:41		09:19 (1)								
	16:43		17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22		16:06	20	09:39 (1)								
21	08:30		07:34	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:02		08:41		09:20 (1)								
	16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21		16:06	20	09:40 (1)								
22	08:29		07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04		08:42		09:21 (1)								
	16:47		17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19		16:07	20	09:41 (1)								
23	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06		08:43		09:21 (1)								
	16:49		17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18		16:07	20	09:41 (1)								
24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08		08:43		09:21 (1)								
	16:51		17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17		16:08	21	09:42 (1)								
25	08:25		07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:10		08:43		09:22 (1)								
	16:53		17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09	16:16		16:08	21	09:43 (1)								
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11		08:44		09:23 (1)								
	16:54		17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	18:07	16:15		16:09	20	09:43 (1)								
27	08:22		07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13		08:44		09:23 (1)								
	16:56		17:58	18:51	20:48	21:39	22:01	21:34	20:30	19:15	18:05	16:14		16:10	20	09:43 (1)								
28	08:20		07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:15		08:44		09:23 (1)								
	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:13		16:11	21	09:44 (1)								
29	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16		08:44		09:24 (1)								
	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:12		16:12	20	09:44 (1)								
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:18		08:44		09:25 (1)								
	17:02			19:57	20:54	21:43	22:01	21:29	20:23	19:07	18:58	16:11		16:12	20	09:45 (1)								
31	08:16			07:04		05:04		05:37	06:31		07:22			08:44		09:25 (1)								
	17:04			19:58		21:44		21:27	20:21		16:56			16:13	20	09:45 (1)								
Potential sun hours	250		273	367		420	494	510		46														

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Assumptions for shadow calculations

Shadow receptor: BN - H66

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	07:25 (1)	05:52	05:03	04:59	05:39	06:33	07:07 (1)	07:26
	16:15	17:06	18:02	20:00	07:35 (1)	20:56	21:45	22:00	21:25	20:18	07:43 (1)	19:05
2	08:44	08:12	07:14	06:59	07:23 (1)	05:50	05:02	05:00	05:40	06:35	07:07 (1)	07:28
	16:16	17:08	18:04	20:02	07:38 (1)	20:57	21:47	22:00	21:23	20:16	07:43 (1)	19:02
3	08:44	08:10	07:12	06:56	07:20 (1)	05:48	05:01	05:00	05:42	06:37	07:07 (1)	07:30
	16:17	17:10	18:06	20:04	07:40 (1)	20:59	21:48	21:59	21:21	20:14	07:42 (1)	19:00
4	08:43	08:09	07:09	06:54	07:18 (1)	05:46	05:00	05:01	05:44	06:38	07:07 (1)	07:32
	16:18	17:12	18:08	20:06	07:41 (1)	21:01	21:49	21:59	21:19	20:11	07:41 (1)	18:57
5	08:43	08:07	07:07	06:52	07:15 (1)	05:44	04:59	05:02	05:46	06:40	07:07 (1)	07:33
	16:20	17:14	18:10	20:08	07:42 (1)	21:03	21:50	21:58	21:18	20:09	07:40 (1)	18:55
6	08:43	08:05	07:05	06:49	07:13 (1)	05:42	04:59	05:03	05:47	06:42	07:09 (1)	07:35
	16:21	17:16	18:11	20:09	07:43 (1)	21:05	21:51	21:58	21:16	20:06	07:39 (1)	18:53
7	08:42	08:03	07:02	06:47	07:11 (1)	05:40	04:58	05:04	05:49	06:44	07:10 (1)	07:37
	16:22	17:18	18:13	20:11	07:44 (1)	21:06	21:52	21:57	21:14	20:04	07:37 (1)	18:50
8	08:42	08:01	07:00	06:44	07:10 (1)	05:38	04:57	05:05	05:51	06:45	07:12 (1)	07:39
	16:24	17:20	18:15	20:13	07:44 (1)	21:08	21:53	21:56	21:12	20:01	07:36 (1)	18:48
9	08:41	07:59	06:57	06:42	07:09 (1)	05:36	04:57	05:06	05:52	06:47	07:14 (1)	07:41
	16:25	17:22	18:17	20:15	07:44 (1)	21:10	21:54	21:56	21:10	19:59	07:34 (1)	18:45
10	08:41	07:57	06:55	06:40	07:09 (1)	05:35	04:56	05:07	05:54	06:49	07:16 (1)	07:43
	16:27	17:24	18:19	20:17	07:45 (1)	21:12	21:55	21:55	21:08	19:57	07:32 (1)	18:43
11	08:40	07:55	06:53	06:37	07:08 (1)	05:33	04:56	05:08	05:56	06:51	07:17 (1)	07:44
	16:28	17:26	18:21	20:19	07:44 (1)	21:13	21:56	21:54	21:06	19:54	07:28 (1)	18:41
12	08:39	07:53	06:50	06:35	07:08 (1)	05:31	04:56	05:09	05:58	06:52		07:46
	16:30	17:28	18:23	20:21	07:44 (1)	21:15	21:56	21:53	21:04	19:52		18:38
13	08:38	07:51	06:48	06:32	07:08 (1)	05:29	04:55	05:11	05:59	06:54		07:48
	16:31	17:30	18:25	20:22	07:44 (1)	21:17	21:57	21:52	21:01	19:49		18:36
14	08:37	07:49	06:45	06:30	07:07 (1)	05:27	04:55	05:12	06:01	06:56		07:50
	16:33	17:32	18:27	20:24	07:43 (1)	21:19	21:58	21:51	20:59	19:47		18:34
15	08:37	07:47	06:43	06:28	07:07 (1)	05:26	04:55	05:13	06:03	06:58		07:52
	16:35	17:34	18:29	20:26	07:43 (1)	21:20	21:58	21:50	20:57	19:44		18:31
16	08:36	07:45	06:41	06:25	07:08 (1)	05:24	04:55	05:14	06:05	06:59		07:54
	16:36	17:36	18:30	20:28	07:42 (1)	21:22	21:59	21:49	20:55	19:42		18:29
17	08:35	07:43	06:38	06:23	07:07 (1)	05:22	04:54	05:16	06:06	07:01		07:56
	16:38	17:38	18:32	20:30	07:41 (1)	21:24	21:59	21:48	20:53	19:39		18:27
18	08:33	07:41	06:36	06:21	07:08 (1)	05:21	04:54	05:17	06:08	07:25 (1)		07:03
	16:40	17:40	18:34	20:32	07:40 (1)	21:25	22:00	21:46	20:51	07:33 (1)		19:37
19	08:32	07:39	06:33	06:19	07:08 (1)	05:19	04:54	05:19	06:10	07:20 (1)		07:05
	16:42	17:42	18:36	20:33	07:39 (1)	21:27	22:00	21:45	20:48	07:36 (1)		19:34
20	08:31	07:37	06:31	06:16	07:09 (1)	05:18	04:54	05:20	06:12	07:18 (1)		07:07
	16:43	17:44	18:38	20:35	07:38 (1)	21:28	22:00	21:44	20:46	07:38 (1)		19:32
21	08:30	07:34	06:28	06:14	07:11 (1)	05:16	04:55	05:21	06:14	07:16 (1)		07:08
	16:45	17:46	18:40	20:37	07:37 (1)	21:30	22:01	21:42	20:44	07:40 (1)		19:29
22	08:29	07:32	06:26	06:12	07:11 (1)	05:15	04:55	05:23	06:15	07:14 (1)		07:10
	16:47	17:48	18:42	20:39	07:34 (1)	21:31	22:01	21:41	20:42	07:41 (1)		19:27
23	08:27	07:30	06:23	06:09	07:13 (1)	05:13	04:55	05:24	06:17	07:13 (1)		07:12
	16:49	17:50	18:44	20:41	07:32 (1)	21:33	22:01	21:40	20:39	07:42 (1)		19:24
24	08:26	07:28	06:21	06:07	07:15 (1)	05:12	04:55	05:26	06:19	07:12 (1)		07:14
	16:51	17:52	18:45	20:43	07:29 (1)	21:35	22:01	21:38	20:37	07:43 (1)		19:22
25	08:25	07:26	06:18	06:05	07:19 (1)	05:11	04:56	05:27	06:21	07:11 (1)		07:15
	16:53	17:54	18:47	20:45	07:25 (1)	21:36	22:01	21:37	20:35	07:44 (1)		19:19
26	08:23	07:23	06:16	06:03	07:20 (1)	21:37	22:01	21:38	20:34	07:45 (1)		19:17
	16:54	17:56	18:49	20:46	07:21 (1)	21:38	22:01	21:39	20:35	07:46 (1)		19:17
27	08:22	07:21	06:14	06:01	07:22 (1)	21:39	22:01	21:40	20:34	07:47 (1)		19:17
	16:56	17:58	18:51	20:48	07:23 (1)	21:40	22:01	21:41	20:35	07:48 (1)		19:17
28	08:20	07:19	06:11	05:59	07:24 (1)	21:41	22:01	21:42	20:36	07:49 (1)		19:17
	16:58	18:00	18:53	20:50	07:25 (1)	21:42	22:01	21:43	20:37	07:50 (1)		19:17
29	08:19		07:09	05:56	07:26 (1)	21:43	22:01	21:44	20:38	07:51 (1)		19:17
	17:00		19:55	20:52	07:27 (1)	21:44	22:01	21:45	20:39	07:52 (1)		19:17
30	08:17		07:06	05:54	07:28 (1)	21:45	22:01	21:46	20:39	07:53 (1)		19:17
	17:02		19:57	20:54	07:29 (1)	21:46	22:01	21:47	20:40	07:54 (1)		19:17
31	08:15		07:04		07:30 (1)	21:47	22:01	21:48	20:41	07:55 (1)		19:17
	17:04		19:58		07:31 (1)	21:48	22:01	21:49	20:42	07:56 (1)		19:17
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction				131	691				399	312	122	
Oper. time red.				0.27	0.35				0.34	0.32	0.29	
Wind dir. red.				1.00	1.00				1.00	1.00	1.00	
Total reduction				0.65	0.68				0.68	0.67	0.65	
Total, real				0.18	0.24				0.23	0.22	0.19	
				23	165				92	67	23	

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** BO - H67

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26		07:53 (1)	07:24	08:19
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	13	08:06 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	10	08:04 (1)	16:52	16:09
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	8	08:04 (1)	16:50	16:09
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	5	08:03 (1)	16:48	16:08
5	08:43	08:07	07:07		06:52	05:44	04:59	05:02	05:46	06:40		07:34		08:00 (1)	07:32	08:25
	16:20	17:14	18:10		20:08	21:03	21:50	21:58	21:18	20:09		18:55	1	08:01 (1)	16:46	16:07
6	08:43	08:05	07:05		06:49	05:42	04:59	05:03	05:47	06:42		07:35		07:34	08:27	
	16:21	17:16	18:12		20:10	21:05	21:51	21:58	21:16	20:06		18:53		16:45	16:07	
7	08:42	08:03	07:02		06:47	05:40	04:58	05:04	05:49	06:44		07:37		07:36	08:28	
	16:22	17:18	18:13		20:11	21:06	21:52	21:57	21:14	20:04		18:50		16:43	16:06	
8	08:42	08:01	07:00		06:44	05:38	04:57	05:05	05:51	06:45		07:39		07:38	08:29	
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:12	20:02		18:48		16:41	16:06	
9	08:41	07:59	06:58		06:42	05:36	04:57	05:06	05:52	06:47		07:41		07:40	08:31	
	16:25	17:22	18:17	3	07:22 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39	16:06	
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43		07:42	08:32	
	16:27	17:24	18:19	7	07:26 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37	16:05	
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:45		07:44	08:33	
	16:28	17:26	18:21	9	07:26 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36	16:05	
12	08:39	07:53	06:50		07:14 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46		07:46	08:34	
	16:30	17:28	18:23	12	07:26 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34	16:05	
13	08:38	07:51	06:48		07:12 (1)	06:33	05:29	04:55	05:11	05:59	06:54	07:48		07:48	08:35	
	16:31	17:30	18:25	14	07:26 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36		16:32	16:05	
14	08:37	07:49	06:45		07:09 (1)	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:50	08:36	
	16:33	17:32	18:27	16	07:25 (1)	20:24	21:19	21:58	21:51	20:59	19:47	18:34		16:31	16:05	
15	08:37	07:47	06:43		07:07 (1)	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51	08:37	
	16:35	17:34	18:29	18	07:25 (1)	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	16:05	
16	08:36	07:45	06:41		07:06 (1)	06:25	05:24	04:55	05:15	06:05	07:00	07:54		07:53	08:38	
	16:36	17:36	18:31	17	07:23 (1)	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28	16:05	
17	08:35	07:43	06:38		07:08 (1)	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55	08:39	
	16:38	17:38	18:32	14	07:22 (1)	20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26	16:05	
18	08:34	07:41	06:36		07:10 (1)	06:21	05:21	04:54	05:17	06:08	07:03	07:58		07:57	08:39	
	16:40	17:40	18:34	11	07:21 (1)	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25	16:05	
19	08:32	07:39	06:33		07:12 (1)	06:19	05:19	04:54	05:19	06:10	07:05	07:59		07:59	08:40	
	16:42	17:42	18:36	4	07:16 (1)	20:34	21:27	22:00	21:45	20:49	19:34	18:22		16:23	16:05	
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01		08:01	08:41	
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20		16:22	16:06	
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03		08:02	08:41	
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18		16:21	16:06	
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05		08:04	08:42	
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15		16:19	16:07	
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07		08:06	08:43	
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13		16:18	16:07	
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09		08:08	08:43	
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22		18:11		16:17	16:08	
25	08:25	07:26	06:19		06:05	05:11	04:56	05:28	06:21	07:15		07:53 (1)		08:10	08:43	
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	10	08:03 (1)		16:16	16:08	
26	08:23	07:23	06:16		06:03	05:10	04:56	05:29	06:22	07:17		07:50 (1)		08:11	08:44	
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	14	08:04 (1)		16:15	16:09	
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:48 (1)		08:13	08:44	
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	17	08:05 (1)		16:14	16:10	
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:47 (1)		08:15	08:44	
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	19	08:06 (1)		16:13	16:11	
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:49 (1)		08:16	08:44	
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17	08:06 (1)		16:12	16:12	
30	08:17		07:06		05:54	05:05	04:58	05:36	06:29	07:24		07:51 (1)		08:18	08:44	
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	15	08:06 (1)		16:11	16:13	
31	08:16		07:04			05:04		05:37	06:31			07:23			08:44	
	17:04		19:58			21:44		21:27	20:21			16:56			16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233	
Total, worst case				125						92		37				
Sun reduction				0.27						0.32		0.29				
Oper. time red.				1.00						1.00		1.00				
Wind dir. red.				0.66						0.66		0.66				
Total reduction				0.18						0.21		0.19				
Total, real				22						19		7				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: BP - H68

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	08:15 (1) 08:19 (1)	06:45 18:27	05:27 20:24	04:55 21:19	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	08:13 (1) 08:21 (1)	06:43 18:29	05:26 20:26	04:55 21:20	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	08:11 (1) 08:22 (1)	06:41 18:31	05:24 20:28	04:55 21:22	05:14 21:59	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	08:09 (1) 08:22 (1)	06:38 18:32	06:23 20:30	05:22 21:24	05:16 21:59	06:06 20:53	07:01 19:39	07:56 18:27	08:39 (1) 08:48 (1)	07:55 16:26
18	08:34 16:40	07:41 17:40	08:07 (1) 08:23 (1)	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	07:03 19:37	07:58 18:24	08:37 (1) 08:50 (1)	07:57 16:25
19	08:32 16:42	07:39 17:42	08:04 (1) 08:22 (1)	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	07:05 19:34	07:59 18:22	08:36 (1) 08:51 (1)	07:59 16:23
20	08:31 16:43	07:37 17:44	08:03 (1) 08:22 (1)	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:41 16:06
21	08:30 16:45	07:34 17:46	08:04 (1) 08:22 (1)	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 18:18	08:34 (1) 08:52 (1)	08:03 16:21
22	08:29 16:47	07:32 17:48	08:05 (1) 08:22 (1)	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:42 16:07
23	08:27 16:49	07:30 17:50	08:05 (1) 08:20 (1)	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:43 16:07
24	08:26 16:51	07:28 17:52	08:07 (1) 08:18 (1)	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:43 16:08
25	08:25 16:53	07:26 17:54	08:10 (1) 08:16 (1)	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:43 16:08
26	08:23 16:54	07:23 17:56	08:16 (1) 18:49	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:17 17:05	07:43 (1) 07:50 (1)	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	07:45 (1) 07:48 (1)	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21	07:23 16:56			08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		156									156	
Sun reduction		0.23									0.29	
Oper. time red.		1.00									1.00	
Wind dir. red.		0.64									0.64	
Total reduction		0.15									0.19	
Total, real		23									29	

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BQ - H69

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		10:49 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24			06:33	07:26	07:24		08:19		10:45 (2)		
	16:15	57	15:37 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54			19:05	16:54			16:10	42	15:25 (1)		
2	08:44		10:50 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26			06:35	07:28	07:26		08:21		10:44 (2)		
	16:16	58	15:38 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52			19:02	16:52			16:09	46	15:26 (1)		
3	08:44		10:51 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			06:36	07:30	07:28		08:22		10:42 (2)		
	16:17	56	15:38 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50			19:00	16:50			16:08	49	15:26 (1)		
4	08:43		10:52 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30			06:38	07:32	07:30		08:24		10:42 (2)		
	16:18	56	15:39 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48			18:57	16:48			16:08	50	15:26 (1)		
5	08:43		10:53 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32			06:40	07:33	07:32		08:25		10:40 (2)		
	16:20	55	15:39 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46			18:55	16:46			16:07	53	15:26 (1)		
6	08:43		10:54 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34			06:42	07:35	07:34		08:27		10:41 (2)		
	16:21	54	15:40 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44			18:52	16:44			16:07	54	15:27 (1)		
7	08:42		10:55 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36			06:43	07:37	07:36		08:28		10:40 (2)		
	16:22	53	15:41 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43			18:50	16:43			16:06	55	15:26 (1)		
8	08:42		10:56 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38			06:45	07:39	07:38		08:29		10:40 (2)		
	16:24	51	15:41 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41			18:48	16:41			16:06	56	15:27 (1)		
9	08:41		10:59 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			06:47	07:41	07:40		08:30		10:40 (2)		
	16:25	48	15:42 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39			18:45	16:39			16:05	56	15:27 (1)		
10	08:40		11:00 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42			06:49	07:43	07:42		08:32		10:40 (2)		
	16:26	47	15:43 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37			18:43	16:37			16:05	57	15:27 (1)		
11	08:40		11:03 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44			06:51	07:44	07:44		08:33		10:39 (2)		
	16:28	42	15:43 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36			18:40	16:36			16:05	57	15:27 (1)		
12	08:39		11:06 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46			06:52	07:46		15:03 (1)	08:34		10:39 (2)		
	16:30	37	15:44 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34			18:38	16:34	5	15:08 (1)	16:05	58	15:27 (1)		
13	08:38		15:14 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47			06:54	07:48	07:47		14:59 (1)	08:35	10:40 (2)		
	16:31	30	15:44 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32			18:36	16:32	13	15:12 (1)	16:05	57	15:27 (1)		
14	08:37		15:14 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49			06:56	07:50	07:49		14:57 (1)	08:36	10:41 (2)		
	16:33	31	15:45 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31			18:33	16:31	17	15:14 (1)	16:05	56	15:27 (1)		
15	08:36		15:15 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51			06:58	07:52	07:51		14:56 (1)	08:37	10:41 (2)		
	16:34	30	15:45 (1)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29			18:31	16:29	20	15:16 (1)	16:05	56	15:27 (1)		
16	08:35		15:15 (1)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53			06:59	07:54	07:53		14:55 (1)	08:38	10:40 (2)		
	16:36	31	15:46 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27			18:29	16:27	22	15:17 (1)	16:05	56	15:26 (1)		
17	08:34		15:15 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55			07:01	07:56	07:55		14:54 (1)	08:39	10:41 (2)		
	16:38	30	15:45 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26			18:27	16:26	24	15:18 (1)	16:05	57	15:27 (1)		
18	08:33		15:16 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57			07:03	07:57		14:53 (1)	08:39	10:41 (2)			
	16:40	30	15:46 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25			18:24	16:25	26	15:19 (1)	16:05	56	15:27 (1)		
19	08:32		15:16 (1)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59			07:05	07:59		14:53 (1)	08:40	10:42 (2)			
	16:41	30	15:46 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23			18:22	16:23	26	15:19 (1)	16:05	56	15:28 (1)		
20	08:31		15:16 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01			07:06	08:01		14:53 (1)	08:41	10:42 (2)			
	16:43	29	15:45 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22			18:20	16:22	27	15:20 (1)	16:06	55	15:27 (1)		
21	08:30		15:17 (1)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02			07:08	08:03		14:52 (1)	08:41	10:43 (2)			
	16:45	29	15:46 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20			18:17	16:20	29	15:21 (1)	16:06	55	15:28 (1)		
22	08:29		15:18 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04			07:10	08:05		14:52 (1)	08:42	10:43 (2)			
	16:47	27	15:45 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19			18:15	16:19	29	15:21 (1)	16:06	55	15:28 (1)		
23	08:27		15:19 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06			07:12	08:07		14:52 (1)	08:42	10:44 (2)			
	16:49	26	15:45 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18			18:13	16:18	30	15:22 (1)	16:07	55	15:29 (1)		
24	08:26		15:19 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08			07:14	08:09		14:53 (1)	08:43	10:44 (2)			
	16:51	26	15:45 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17			18:11	16:17	30	15:23 (1)	16:08	55	15:29 (1)		
25	08:25		15:21 (1)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09			07:15	08:11		14:53 (1)	08:43	10:44 (2)			
	16:52	24	15:45 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16			18:09	16:16	30	15:23 (1)	16:08	56	15:30 (1)		
26	08:23		15:22 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11			07:17	08:13		14:53 (1)	08:43	10:46 (2)			
	16:54	22	15:44 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15			17:07	16:15	31	15:24 (1)	16:09	56	15:31 (1)		
27	08:22		15:24 (1)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13			07:19	08:15		14:54 (1)	08:44	10:46 (2)			
	16:56	20	15:44 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13			17:04	16:13	30	15:24 (1)	16:10	56	15:32 (1)		
28	08:20		15:25 (1)	07:19	06:11	05:																		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Assumptions for shadow calculations

Shadow receptor: BR - H70

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	12:23 (2) 08:14	16:24 (1) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	15:50 (1) 08:19	12:13 (2)
2	08:44	12:24 (2) 08:12	16:23 (1) 07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	15:49 (1) 08:21	12:13 (2)
3	08:44	12:24 (2) 08:10	16:22 (1) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	15:49 (1) 08:22	12:12 (2)
4	08:43	12:25 (2) 08:08	16:21 (1) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	15:50 (1) 08:24	12:13 (2)
5	08:43	12:25 (2) 08:07	16:21 (1) 07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	15:50 (1) 08:25	12:12 (2)
6	08:43	12:27 (2) 08:05	16:20 (1) 07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	15:50 (1) 08:26	12:13 (2)
7	08:42	12:27 (2) 08:03	16:20 (1) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	15:51 (1) 08:28	12:12 (2)
8	08:42	12:28 (2) 08:01	16:20 (1) 07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	15:52 (1) 08:29	12:12 (2)
9	08:41	12:29 (2) 07:59	16:20 (1) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	15:54 (1) 08:30	12:13 (2)
10	08:40	12:30 (2) 07:57	16:20 (1) 06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	15:55 (1) 08:32	12:13 (2)
11	08:40	12:31 (2) 07:55	16:20 (1) 06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	15:57 (1) 08:33	12:13 (2)
12	08:39	12:32 (2) 07:53	16:21 (1) 06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	16:00 (1) 08:34	12:13 (2)
13	08:38	12:33 (2) 07:51	16:20 (1) 06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	16:01 (1) 08:35	12:14 (2)
14	08:37	12:34 (2) 07:49	16:21 (1) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	16:02 (1) 08:36	12:15 (2)
15	08:36	12:35 (2) 07:47	16:22 (1) 06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	16:03 (1) 08:37	12:16 (2)
16	08:35	12:37 (2) 07:45	16:24 (1) 06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	16:04 (1) 08:38	12:17 (2)
17	08:34	12:38 (2) 07:43	16:26 (1) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	16:05 (1) 08:39	12:18 (2)
18	08:33	12:40 (2) 07:41	16:28 (1) 06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	16:06 (1) 08:40	12:19 (2)
19	08:32	12:42 (2) 07:39	16:30 (1) 06:34	06:19	05:19	04:54	05:18	06:10	07:05	07:59	16:07 (1) 08:41	12:20 (2)
20	08:31	12:43 (2) 07:37	16:31 (1) 06:32	06:17	05:18	04:54	05:20	06:12	07:06	08:01	16:08 (1) 08:42	12:21 (2)
21	08:30	12:44 (2) 07:35	16:32 (1) 06:30	06:15	05:16	04:54	05:21	06:13	07:08	08:03	16:09 (1) 08:43	12:22 (2)
22	08:29	12:45 (2) 07:33	16:33 (1) 06:28	06:13	05:14	04:54	05:22	06:14	07:09	08:04	16:10 (1) 08:44	12:23 (2)
23	08:28	12:46 (2) 07:31	16:34 (1) 06:26	06:11	05:12	04:54	05:23	06:15	07:10	08:05	16:11 (1) 08:45	12:24 (2)
24	08:27	12:47 (2) 07:29	16:35 (1) 06:24	06:09	05:10	04:54	05:24	06:16	07:11	08:06	16:12 (1) 08:46	12:25 (2)
25	08:26	12:48 (2) 07:27	16:36 (1) 06:22	06:07	05:08	04:54	05:25	06:17	07:12	08:07	16:13 (1) 08:47	12:26 (2)
26	08:25	12:49 (2) 07:25	16:37 (1) 06:20	06:05	05:06	04:54	05:26	06:18	07:13	08:08	16:14 (1) 08:48	12:27 (2)
27	08:24	12:50 (2) 07:23	16:38 (1) 06:18	06:03	05:04	04:54	05:27	06:19	07:14	08:09	16:15 (1) 08:49	12:28 (2)
28	08:23	12:51 (2) 07:21	16:39 (1) 06:16	06:01	05:02	04:54	05:28	06:20	07:15	08:10	16:16 (1) 08:50	12:29 (2)
29	08:22	12:52 (2) 07:19	16:40 (1) 06:14	06:00	05:00	04:54	05:29	06:21	07:16	08:11	16:17 (1) 08:51	12:30 (2)
30	08:21	12:53 (2) 07:17	16:41 (1) 06:12	05:58	04:58	04:54	05:30	06:22	07:17	08:12	16:18 (1) 08:52	12:31 (2)
31	08:20	12:54 (2) 07:15	16:42 (1) 06:10	05:56	04:56	04:54	05:31	06:23	07:18	08:13	16:19 (1) 08:53	12:32 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	894	377										1589
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.63	0.66										0.63
Total reduction	0.15	0.15										0.13
Total, real	137	58										207

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: BS - H71

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		13:34 (2)	08:14	13:54 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26							07:24		08:19		13:20 (2)	
	16:15	61	14:35 (2)	17:06	14:38 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05							16:54		16:10	62	14:22 (2)	
2	08:44		13:35 (2)	08:12	13:55 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28							07:26		08:21		13:20 (2)	
	16:16	61	14:36 (2)	17:08	14:37 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02							16:52		16:09	62	14:22 (2)	
3	08:44		13:35 (2)	08:10	13:57 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30							07:28		08:22		13:21 (2)	
	16:17	61	14:36 (2)	17:10	14:35 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00							16:50		16:08	62	14:23 (2)	
4	08:43		13:35 (2)	08:08	13:59 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31							07:30		13:38 (2)		08:24	
	16:18	62	14:37 (2)	17:12	14:33 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57							16:48	18	13:56 (2)	61	14:23 (2)	
5	08:43		13:35 (2)	08:07	14:02 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33							07:32		13:34 (2)		08:25	
	16:19	62	14:37 (2)	17:14	14:31 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55							16:46	25	13:59 (2)	62	14:23 (2)	
6	08:43		13:36 (2)	08:05	14:05 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35							07:34		13:31 (2)		08:26	
	16:21	62	14:38 (2)	17:16	14:29 (2)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52							16:44	30	14:01 (2)	62	14:24 (2)	
7	08:42		13:36 (2)	08:03	14:09 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37							07:36		13:29 (2)		08:28	
	16:22	62	14:38 (2)	17:18	14:25 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50							16:43	34	14:03 (2)	62	14:24 (2)	
8	08:42		13:36 (2)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39							07:38		13:27 (2)		08:29	
	16:24	62	14:38 (2)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48							16:41	38	14:05 (2)	61	14:24 (2)	
9	08:41		13:38 (2)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41							07:40		13:26 (2)		08:30	
	16:25	61	14:39 (2)	17:22		18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45							16:39	41	14:07 (2)	61	14:25 (2)	
10	08:40		13:38 (2)	07:57		06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42							07:42		13:25 (2)		08:32	
	16:26	62	14:40 (2)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43							16:37	44	14:09 (2)	61	14:25 (2)	
11	08:40		13:38 (2)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44							07:44		13:24 (2)		08:33	
	16:28	62	14:40 (2)	17:26		18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40							16:35	46	14:10 (2)	61	14:25 (2)	
12	08:39		13:39 (2)	07:53	16:55 (1)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46							07:46		13:23 (2)		08:34	
	16:30	61	14:40 (2)	17:28	4	16:59 (1)	18:23	20:20	21:15	21:56	21:53	21:03	19:52							16:34	48	14:11 (2)	61	14:26 (2)	
13	08:38		13:39 (2)	07:51	16:52 (1)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48							07:47		13:22 (2)		08:35	
	16:31	62	14:41 (2)	17:30	8	17:00 (1)	18:25	20:22	21:17	21:57	21:52	21:01	19:49							16:32	50	14:12 (2)	61	14:26 (2)	
14	08:37		13:40 (2)	07:49	16:51 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50							17:28 (1)	07:49	13:21 (2)		08:36	
	16:33	61	14:41 (2)	17:32	17:02 (1)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	7						17:35 (1)	16:31	51	14:12 (2)	61	14:26 (2)
15	08:36		13:40 (2)	07:47	16:50 (1)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52							17:25 (1)	07:51	13:20 (2)		08:37	
	16:34	61	14:41 (2)	17:34	15	17:05 (1)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	13						17:38 (1)	16:29	53	14:13 (2)	61	14:26 (2)
16	08:35		13:40 (2)	07:45	16:49 (1)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54							17:23 (1)	07:53	13:20 (2)		08:38	
	16:36	61	14:41 (2)	17:36	18:07 (1)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	17						17:40 (1)	16:27	54	14:14 (2)	61	14:26 (2)
17	08:34		13:41 (2)	07:43	16:49 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56							17:21 (1)	07:55	13:19 (2)		08:39	
	16:38	60	14:41 (2)	17:38	20	17:09 (1)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	20						17:41 (1)	16:26	56	14:15 (2)	61	14:26 (2)
18	08:33		13:41 (2)	07:41	16:48 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57							17:20 (1)	07:57	13:19 (2)		08:39	
	16:40	61	14:42 (2)	17:40	23	17:11 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	22						17:42 (1)	16:24	56	14:15 (2)	61	14:26 (2)
19	08:32		13:42 (2)	07:39	16:47 (1)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59							17:19 (1)	07:59	13:19 (2)		08:40	
	16:41	60	14:42 (2)	17:42	25	17:12 (1)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	23						17:42 (1)	16:23	57	14:16 (2)	61	14:26 (2)
20	08:31		13:42 (2)	07:36	16:48 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01							17:19 (1)	08:01	13:18 (2)		08:41	
	16:43	59	14:41 (2)	17:44	24	17:12 (1)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	23						17:42 (1)	16:22	58	14:16 (2)	61	14:26 (2)
21	08:30		13:43 (2)	07:34	16:48 (1)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03							17:18 (1)	08:02	13:18 (2)		08:41	
	16:45	59	14:42 (2)	17:46	24	17:12 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	24						17:42 (1)	16:20	59	14:17 (2)	61	14:26 (2)
22	08:29		13:43 (2)	07:32	16:47 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05							17:18 (1)	08:04	13:18 (2)		08:42	
	16:47	58	14:41 (2)	17:48	24	17:11 (1)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	24						17:42 (1)	16:19	60	14:18 (2)	61	14:26 (2)
23	08:27		13:45 (2)	07:30	16:48 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07							17:18 (1)	08:06	13:18 (2)		08:42	
	16:49	57	14:42 (2)	17:50	23	17:11 (1)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	24						17:42 (1)	16:18	60	14:18 (2)	61	14:26 (2)
24	08:26		13:45 (2)	07:28	16:49 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09							17:18 (1)	08:08	13:18 (2)		08:43	
	16:50	56	14:41 (2)	17:52	21	17:10 (1)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	23						17:41 (1)	16:17	61	14:19 (2)	61	14:26 (2)
25	08:25		13:46 (2)	07:25	16:50 (1)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11							16:18 (1)	08:09	13:19 (2)		08:43	
	16:52	56	14:42 (2)	17:54	18	17:08 (1)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	20						16:38 (1)	16:16	60	14:19 (2)	61	14:26 (2)
26	08:23		13:47 (2)	07:23	16:51 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13							16:19 (1)	08:11	13:19 (2)		08:43	
	16:54	54	14:41 (2)	17:56	16	17:07 (1)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17						16:36 (1)	16:14	61	14:20 (2)	61	14:26 (2)
27	08:22		13:47 (2)	07:21	16:54 (1)	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:13							16:20 (1)	08:13	13:19 (2)		08:44	
	16:56	53	14:40 (2)	17:58	11	17:05 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:14	14						16:34 (1)	16:13	61	14:20 (2)	61	14:26 (2)
28	08:20		13:49 (2)	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17							16:21 (1)	08:14	13:20 (2)		08:44	
	16:58	52	14:41 (2)	18:00																					

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: BT - H72

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		16:11 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		15:37 (2)	08:19		15:25 (3)				
	16:15		17:06	23	16:34 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	35	16:12 (2)	16:10	9	15:34 (3)				
2	08:44		08:12		16:10 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28		07:26		15:37 (2)	08:21		15:25 (3)				
	16:16		17:08	27	16:37 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	34	16:11 (2)	16:09	7	15:32 (3)				
3	08:44		08:10		16:09 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		15:37 (2)	08:22		15:26 (3)				
	16:17		17:10	30	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00		16:50	34	16:11 (2)	16:08	6	15:32 (3)				
4	08:43		08:08		16:09 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31		07:30		15:37 (2)	08:24		15:27 (3)				
	16:18		17:12	30	16:39 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	34	16:11 (2)	16:08	5	15:32 (3)				
5	08:43		08:07		16:08 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33		07:32		15:38 (2)	08:25		15:28 (3)				
	16:19		17:14	32	16:40 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55		16:46	32	16:10 (2)	16:07	2	15:30 (3)				
6	08:43		08:05		16:08 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35		07:34		15:38 (2)	08:26		15:29 (3)				
	16:21	1	17:16	33	16:41 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52		16:44	32	16:10 (2)	16:07	1	15:30 (3)				
7	08:42		08:03		16:08 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37		07:36		15:39 (2)	08:28						
	16:22	2	17:18	33	16:41 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	30	16:09 (2)	16:06						
8	08:42		08:01		16:07 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39		07:38		15:39 (2)	08:29						
	16:24	4	17:20	35	16:42 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	29	16:08 (2)	16:06						
9	08:41		07:59		16:07 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		15:41 (2)	08:30						
	16:25	6	17:22	35	16:42 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45		16:39	26	16:07 (2)	16:05						
10	08:40		07:57		16:07 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42		07:42		15:42 (2)	08:31						
	16:26	7	17:24	35	16:42 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43		16:37	23	16:05 (2)	16:05						
11	08:40		07:55		16:08 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44		07:44		15:43 (2)	08:33						
	16:28	9	17:26	34	16:42 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40		16:35	20	16:03 (2)	16:05						
12	08:39		07:53		16:08 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46		07:46		15:45 (2)	08:34						
	16:30	11	17:28	34	16:42 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38		16:34	16	16:01 (2)	16:05						
13	08:38		07:51		16:07 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:47		07:47		15:47 (2)	08:35						
	16:31	12	17:30	34	16:41 (2)	18:24	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32	12	15:58 (2)	08:36						
14	08:37		07:49		16:08 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49		15:28 (3)	08:36						
	16:33	14	17:32	33	16:41 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31	13	15:57 (2)	16:04						
15	08:36		07:47		16:09 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52		07:51		15:25 (3)	08:37						
	16:34	15	17:34	32	16:41 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	11	15:36 (3)	16:04						
16	08:35		07:45		16:09 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54		07:53		15:23 (3)	08:38						
	16:36	17	17:36	31	16:40 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:27	14	15:37 (3)	16:05						
17	08:34		07:43		16:10 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55		07:55		15:22 (3)	08:38						
	16:38	18	17:38	29	16:39 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26		16:26	17	15:39 (3)	16:05						
18	08:33		07:41		16:11 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57		15:22 (3)	08:39						
	16:40	21	17:40	27	16:38 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24		16:24	18	15:40 (3)	16:05						
19	08:32		07:39		16:12 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		07:59		15:21 (3)	08:40						
	16:41	22	17:42	25	16:37 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22		16:23	19	15:40 (3)	16:05						
20	08:31		07:36		16:14 (2)	06:31	06:16	05:18	04:56	05:20	06:12	07:06	08:00			16:50 (2)	15:21 (3)	16:06						
	16:43	21	17:44	21	16:35 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20		16:22	20	15:58 (2)	16:06						
21	08:30		07:34		16:17 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		16:46 (2)	08:02	15:21 (3)	08:41						
	16:45	21	17:46	16	16:33 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17		16:44 (2)	16:20	21	15:42 (3)	16:06					
22	08:29		07:32		16:20 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		17:04 (2)	08:04	15:21 (3)	08:42						
	16:47	20	17:48	9	16:29 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15		17:06 (2)	16:19	21	15:42 (3)	16:06					
23	08:27		07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07			16:42 (2)	08:06	15:21 (3)	08:42						
	16:49	19	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	17:07		17:07 (2)	16:18	22	15:43 (3)	16:07					
24	08:26		07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09			16:41 (2)	08:08	15:21 (3)	08:43						
	16:50	18	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	17:08		17:08 (2)	16:17	21	15:42 (3)	16:08					
25	08:25		07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11			15:40 (2)	08:09	15:22 (3)	08:43						
	16:52	16	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	17:04		17:04 (2)	16:16	19	15:41 (3)	16:08					
26	08:23		07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13			15:39 (2)	08:11	15:22 (3)	08:43						
	16:54	13	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06			16:30 (2)	16:14	17	15:39 (3)	16:09					
27	08:22		07:21		06:13	06:00	05:06	04:53	05:26	06:24	07:19	08:15			15:38 (2)	08:13	15:23 (3)	08:44						
	16:56	11	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04			16:10 (2)	16:13	15	15:38 (3)	16:10					
28	08:20		07:18		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16			15:37 (2)	08:14	15:23 (3)	08:44						
	16:58	14	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02			16:10 (2)	16:12	14	15:37 (3)	16:10					
29	08:19				07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:17			15:37 (2)	08:16	15:23 (3)	08:44						
	17:00	12			19:54	20:52	21:41	22:01	21:30	20														

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: BU - H73

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:34 (3)	08:14		15:58 (2)	07:16	07:01	05:52	05:03	04:59	05:39	05:39	06:33	07:26		07:24		15:29 (2)	08:19		15:19 (3)		
	16:15	3	15:37 (3)	17:06	31	16:29 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	30	15:59 (2)	16:10	15	15:34 (3)			
2	08:44		15:35 (3)	08:12		15:57 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28		07:26		15:28 (2)	08:21		15:18 (3)			
	16:16	4	15:39 (3)	17:08	32	16:29 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	31	15:59 (2)	16:09	14	15:32 (3)			
3	08:44		15:34 (3)	08:10		15:57 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		15:28 (2)	08:22		15:19 (3)			
	16:17	5	15:39 (3)	17:10	33	16:30 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00		16:50	32	16:00 (2)	16:08	13	15:32 (3)			
4	08:43		15:35 (3)	08:08		15:57 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31		07:30		15:27 (2)	08:24		15:20 (3)			
	16:18	6	15:41 (3)	17:12	33	16:30 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	33	16:00 (2)	16:08	12	15:32 (3)			
5	08:43		15:35 (3)	08:07		15:57 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33		07:32		15:27 (2)	08:25		15:20 (3)			
	16:19	7	15:42 (3)	17:14	33	16:30 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55		16:46	33	16:00 (2)	16:07	10	15:30 (3)			
6	08:43		15:36 (3)	08:05		15:57 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35		07:34		15:27 (2)	08:26		15:22 (3)			
	16:21	8	15:44 (3)	17:16	33	16:30 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52		16:44	33	16:00 (2)	16:07	8	15:30 (3)			
7	08:42		15:35 (3)	08:03		15:58 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37		07:36		15:27 (2)	08:28		15:22 (3)			
	16:22	10	15:45 (3)	17:18	32	16:30 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	33	16:00 (2)	16:06	7	15:29 (3)			
8	08:42		15:35 (3)	08:01		15:58 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39		07:38		15:27 (2)	08:29		15:22 (3)			
	16:24	11	15:46 (3)	17:20	32	16:30 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	32	15:59 (2)	16:06	6	15:28 (3)			
9	08:41		15:36 (3)	07:59		15:58 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		15:28 (2)	08:30		15:24 (3)			
	16:25	13	15:49 (3)	17:22	32	16:30 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45		16:39	32	16:00 (2)	16:05	4	15:28 (3)			
10	08:40		15:36 (3)	07:57		15:59 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42		07:42		15:29 (2)	08:32		15:24 (3)			
	16:26	14	15:50 (3)	17:24	30	16:29 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43		16:37	31	16:00 (2)	16:05	4	15:28 (3)			
11	08:40		15:37 (3)	07:55		16:00 (2)	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44		07:44		15:29 (2)	08:33		15:24 (3)			
	16:28	15	15:52 (3)	17:26	29	16:29 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40		16:35	30	15:59 (2)	16:05	3	15:27 (3)			
12	08:39		15:37 (3)	07:53		16:01 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46		07:46		15:30 (2)	08:34		15:25 (3)			
	16:30	17	15:54 (3)	17:28	27	16:28 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38		16:34	29	15:59 (2)	16:05	2	15:27 (3)			
13	08:38		15:37 (3)	07:51		16:01 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48		07:47		15:30 (2)	08:35					
	16:31	18	15:55 (3)	17:30	25	16:26 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32	28	15:58 (2)	16:04					
14	08:37		15:38 (3)	07:49		16:03 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49		15:31 (2)	08:36					
	16:33	19	15:57 (3)	17:32	22	16:25 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33		16:31	26	15:57 (2)	16:04					
15	08:36		15:38 (3)	07:47		16:05 (2)	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52		07:51		15:32 (2)	08:37					
	16:34	21	15:59 (3)	17:34	19	16:24 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	24	15:56 (2)	16:04					
16	08:35		15:38 (3)	07:45		16:07 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54		07:53		15:33 (2)	08:38					
	16:36	20	15:58 (3)	17:36	15	16:22 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:27	21	15:54 (2)	16:05					
17	08:34		15:39 (3)	07:43		16:12 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55		07:55		15:34 (2)	08:38					
	16:38	20	15:59 (3)	17:38	5	16:17 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26		16:26	20	15:52 (2)	16:05					
18	08:33		15:39 (3)	07:41		06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57			07:57		15:30 (3)	08:39					
	16:40	20	15:59 (3)	17:40		18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24			16:24	23	15:50 (2)	16:05					
19	08:32		15:41 (3)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59			07:59		15:19 (3)	08:40					
	16:41	18	15:59 (3)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22			16:23	23	15:49 (2)	16:05					
20	08:31		15:41 (3)	07:36		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01			08:00		15:18 (3)	08:41					
	16:43	18	15:59 (3)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20			16:22	21	15:47 (2)	16:06					
21	08:30		15:42 (3)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03			08:02		15:17 (3)	08:41					
	16:45	17	15:59 (3)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17			16:20	17	15:34 (3)	16:06					
22	08:29		15:43 (3)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05			08:04		15:17 (3)	08:42					
	16:47	21	16:12 (2)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15			16:19	18	15:35 (3)	16:06					
23	08:27		15:45 (3)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07			08:06		15:17 (3)	08:42					
	16:49	23	16:15 (2)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13			16:18	18	15:35 (3)	16:07					
24	08:26		15:46 (3)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09			08:08		15:17 (3)	08:43					
	16:50	23	16:16 (2)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11			16:17	19	15:36 (3)	16:08					
25	08:25		15:51 (3)	07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11			16:17		15:17 (3)	08:43					
	16:52	19	16:19 (2)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09			16:16	20	15:37 (3)	16:09					
26	08:23		16:00 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13			16:16		15:17 (3)	08:43					
	16:54	21	16:21 (2)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06			16:14	21	15:38 (3)	16:08					
27	08:22		15:59 (2)	07:21		06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15			16:14		15:34 (2)	08:13					
	16:56	24	16:23 (2)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04			16:20	20	15:54 (2)	16:13	21	15:38 (3)	16:10		
28	08:20		15:59 (2)	07:18		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16			16:15		15:32 (2)	08:14					
	16:58	27	16:26 (2)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02			16:15	23	15:55 (2)	16:12	19	15:37 (3)	16:10		
29	08:19		15:58 (2)			07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18			16:15		15:30 (2)	08:16					
	17:00	28	16:26 (2)			19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00			16:26	26	15:56 (2)	16:11	19	15:36 (3)	16:11		
30	08:17		15:58 (2)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20			16:15								

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: BV - H74

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
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26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: BW - H75

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
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26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: BX - H76

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: BY - H77

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	09:02 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	09:19 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	09:04 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	09:17 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	09:06 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
	16:17	17:10	09:15 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:08
4	08:43	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25
	16:20	17:14		18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
9	08:41	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
	16:25	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:05
10	08:41	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
	16:28	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
12	08:39	09:11 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34
	16:30	09:12 (2)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
13	08:38	09:10 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
	16:31	09:14 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:05
14	08:37	09:09 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33	09:15 (2)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:05
15	08:37	09:08 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
	16:34	09:16 (2)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
16	08:36	09:07 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38
	16:36	09:17 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
17	08:35	09:05 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
	16:38	09:17 (2)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
18	08:33	09:04 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39
	16:40	09:18 (2)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
19	08:32	09:03 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:40
	16:41	09:19 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:05
20	08:31	09:01 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:41
	16:43	09:19 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:06
21	08:30	09:00 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:41
	16:45	09:20 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:06
22	08:29	08:59 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
	16:47	09:21 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:07
23	08:27	08:57 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
	16:49	09:21 (2)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:07
24	08:26	08:55 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
	16:51	09:21 (2)	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:07
25	08:25	08:56 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:43
	16:52	09:21 (2)	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:09	16:08
26	08:23	08:56 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:44
	16:54	09:21 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:09
27	08:22	08:58 (2)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:44
	16:56	09:22 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	16:10
28	08:20	08:58 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:44
	16:58	09:21 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:11
29	08:19	08:58 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:44
	17:00	09:21 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:11
30	08:17	08:59 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:44
	17:02	09:20 (2)		19:56	20:54	21:43	22:01	21:28	20:23	19:07	18:00	16:12
31	08:15	09:01 (2)		07:04		05:04		05:37	06:31		07:22	08:44
	17:04	09:20 (2)		19:58		21:44		21:27	20:21		16:56	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	341	39										382
Sun reduction	0.24	0.23										0.27
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.61	0.61										0.61
Total reduction	0.15	0.14										0.16
Total, real	50	6										62

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations**Shadow receptor:** BZ - H78

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:18 (4)	08:14		08:42 (2)	07:16	07:01	05:52		05:03	04:59	05:39	06:33	07:26		07:24		07:56 (2)	08:19		08:57 (4)		
	16:15	34	12:46 (1)	17:06	7	08:49 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05			16:54	28	08:24 (2)	16:10	16	09:13 (4)		
2	08:44		09:18 (4)	08:12		08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		07:56 (2)	08:21		08:57 (4)			
	16:16	34	12:46 (1)	17:08	11	08:51 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	28	08:24 (2)	16:09	17	09:14 (4)			
3	08:44		09:17 (4)	08:10		08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		07:58 (2)	08:22		08:57 (4)			
	16:17	33	12:45 (1)	17:10	13	08:51 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	26	08:24 (2)	16:08	17	09:14 (4)			
4	08:43		09:17 (4)	08:09		08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		08:00 (2)	08:24		08:59 (4)			
	16:18	31	12:45 (1)	17:12	16	08:52 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	24	08:24 (2)	16:08	16	09:15 (4)			
5	08:43		09:16 (4)	08:07		08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32		08:02 (2)	08:25		09:00 (4)			
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25	08:25		09:14 (4)	07:25		08:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:09		08:09		08:41	08:46		09:18 (4)			
	16:52		09:27 (4)	17:54		08:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	20	08:20 (2)		08:42	08:47		09:19 (4)			
26	08:23		09:13 (4)	07:23		08:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11		07:59		08:43	08:48		09:19 (4)			
	16:54		09:28 (4)	17:56		08:49	21:04	21:37	22:01	21:35	20:33	19:17	17:07	16:15	22	08:21 (2)		08:44	08:49	36	12:46 (1)			
27	08:22		09:12 (4)	07:21		08:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13		07:57		08:45	08:50		09:19 (4)			
	16:56		09:29 (4)	17:58		08:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:14	25	08:22 (2)		08:46	08:51	8	09:07 (4)			
28	08:20		09:11 (4)	07:19		08:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14		07:57		08:47	08:52		09:19 (4)			
	16:58		09:30 (4)	18:00		08:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:11	25	08:22 (2)		08:48	08:53	11	09:09 (4)			
29	08:19		09:10 (4)	07:18		08:10	05:56	0																

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn.Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Assumptions for shadow calculations

Shadow receptor: CA - H79

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	09:18 (4) 08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (2) 08:19
2	16:15	12:39 (1) 17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	08:13 (2) 16:10
3	08:44	09:18 (4) 08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	07:56 (2) 08:21
4	16:16	12:39 (1) 17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	08:12 (2) 16:09
5	08:44	09:17 (4) 08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	07:58 (2) 08:22
6	16:17	12:39 (1) 17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	08:11 (2) 16:08
7	08:43	09:17 (4) 08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:00 (2) 08:24
8	16:18	12:39 (1) 17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	08:10 (2) 16:08
9	08:43	09:16 (4) 08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:02 (2) 08:25
10	16:20	12:38 (1) 17:14	18:08	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	08:09 (2) 16:07
11	08:43	09:16 (4) 08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:04 (2) 08:27
12	16:21	12:39 (1) 17:16	18:09	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	08:08 (2) 16:07
13	08:42	09:15 (4) 08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:03 (2) 08:28
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15	08:42	09:14 (4) 08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:02 (2) 08:29
16	16:24	12:37 (1) 17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	08:06 (2) 16:06
17	08:41	09:14 (4) 07:59	06:42	06:57	06:42	05:36	04:57	05:52	06:47	07:41	07:40	08:03 (2) 08:30
18	16:25	12:37 (1) 17:22	18:17	20:15	21:10	21:54	21:56	21:10	20:00	18:45	16:39	08:05 (2) 16:05
19	08:40	09:13 (4) 07:57	06:40	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:42	08:02 (2) 08:32
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21	08:40	09:12 (4) 07:55	06:37	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:03 (2) 08:33
22	16:28	12:35 (1) 17:26	18:21	20:19	21:13	21:56	21:54	21:06	20:00	18:41	16:36	08:04 (2) 16:05
23	08:39	09:11 (4) 07:53	06:30	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:04 (2) 08:34
24	16:30	12:33 (1) 17:28	18:23	20:21	21:15	21:56	21:53	21:04	20:00	18:38	16:34	08:05 (2) 16:05
25	08:38	09:10 (4) 07:51	06:28	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:06 (2) 08:35
26	16:31	12:29 (1) 17:30	18:25	20:22	21:17	21:57	21:52	21:01	20:00	18:36	16:32	08:06 (2) 16:05
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54	16:56	12:14 (1) 17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	17:00	08:34 (2) 16:05
55	08:20	09:07 (4) 07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:17	08:35 (2) 16:05
56	16:58	12:13 (1) 18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	17:00	08:36 (2) 16:05
57	08:19	09:06 (4) 07:17	07:09	06:56	06:06	04:58	05:34	06:28	07:23	08:19	08:19	08:37 (2) 16:05
58	17:00	12:12 (1) 17:59	19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	17:00	08:38 (2) 16:05
59	08:17	09:05 (4) 07:15	07:06	06:54	06:05	04:58	05:35	06:29	07:24	08:20	08:20	08:39 (2) 16:05
60	17:02	12:11 (1) 17:54	19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	17:00	08:40 (2) 16:05
61	08:15	09:04 (4) 07:14	07:04	06:54	06:04	05:04	05:37	06:31	07:26	08:22	08:22	08:41 (2) 16:05
62	17:04	12:10 (1) 17:56	19:58	21:44	21:34	21:27	20:21	19:16	18:00	17:00	16:56	08:42 (2) 16:05
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	545	369										1191
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.61	0.63										0.62
Total reduction	0.15	0.15										0.13
Total, real	81	54										153

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CB - H80
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	11:45 (1) 08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (2) 08:19
2	16:15	12:23 (1) 17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	12:06 (2) 16:10
3	08:44	11:46 (1) 08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	07:56 (2) 08:21
4	16:16	12:23 (1) 17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	12:06 (2) 16:09
5	08:44	11:46 (1) 08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	07:58 (2) 08:22
6	16:17	12:23 (1) 17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	12:05 (2) 16:08
7	08:43	11:48 (1) 08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:00 (2) 08:24
8	16:18	12:23 (1) 17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	12:01 (2) 16:08
9	08:43	11:48 (1) 08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:00 (2) 08:25
10	16:20	12:23 (1) 17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	12:07 (2) 16:10
11	08:43	09:16 (4) 08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:02 (2) 08:27
12	16:21	12:23 (1) 17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	12:07 (2) 16:10
13	08:42	09:15 (4) 08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:02 (2) 08:27
14	16:22	12:22 (1) 17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	12:06 (2) 16:10
15	08:42	09:14 (4) 08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:02 (2) 08:27
16	16:24	12:21 (1) 17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	12:06 (2) 16:10
17	08:41	09:14 (4) 07:59	06:42	06:57	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:00 (2) 08:25
18	16:25	12:22 (1) 17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	12:05 (2) 16:10
19	08:41	09:13 (4) 07:57	06:40	06:55	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:02 (2) 08:27
20	16:27	12:21 (1) 17:24	18:19	20:17	21:12	21:55	21:58	21:08	19:57	18:43	16:37	12:05 (2) 16:10
21	08:40	09:12 (4) 07:55	06:37	06:53	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:02 (2) 08:27
22	16:28	12:20 (1) 17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	12:05 (2) 16:10
23	08:39	09:11 (4) 07:53	06:30	06:46	05:26	04:49	05:00	05:58	06:52	07:46	07:46	08:00 (2) 08:25
24	16:30	12:18 (1) 17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	12:05 (2) 16:10
25	08:38	09:10 (4) 07:51	06:28	06:44	05:24	04:47	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
26	16:31	12:16 (1) 17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	12:05 (2) 16:10
27	08:37	09:09 (4) 07:49	06:25	06:41	05:21	04:44	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
28	16:33	12:11 (1) 17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:31	12:05 (2) 16:10
29	08:36	09:08 (4) 07:47	06:23	06:39	05:19	04:42	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
30	16:35	12:10 (1) 17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	12:05 (2) 16:10
31	08:36	09:07 (4) 07:45	06:21	06:37	05:17	04:40	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
32	16:36	12:09 (1) 17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	12:05 (2) 16:10
33	08:35	09:05 (4) 07:43	06:20	06:36	05:16	04:39	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
34	16:38	12:08 (1) 17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	12:05 (2) 16:10
35	08:33	09:04 (4) 07:41	06:18	06:34	05:14	04:37	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
36	16:40	12:07 (1) 17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	12:05 (2) 16:10
37	08:32	09:06 (4) 07:39	06:16	06:32	05:12	04:35	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
38	16:41	12:06 (1) 17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:24	12:05 (2) 16:10
39	08:31	09:06 (4) 07:37	06:15	06:31	05:11	04:34	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
40	16:43	12:09 (1) 17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:26	12:05 (2) 16:10
41	08:30	09:08 (4) 07:34	06:14	06:30	05:10	04:33	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
42	16:45	12:10 (1) 17:46	18:40	20:37	21:30	22:00	21:42	20:44	19:29	18:18	16:28	12:05 (2) 16:10
43	08:29	09:10 (4) 07:32	06:12	06:28	05:08	04:31	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
44	16:47	12:11 (1) 17:48	18:42	20:39	21:31	22:00	21:41	20:42	19:27	18:15	16:29	12:05 (2) 16:10
45	08:27	09:09 (4) 07:30	06:11	06:27	05:07	04:30	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
46	16:49	12:12 (1) 17:50	18:43	20:41	21:33	22:00	21:40	20:39	19:24	18:13	16:30	12:05 (2) 16:10
47	08:26	09:08 (4) 07:28	06:10	06:26	05:06	04:29	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
48	16:51	12:13 (1) 17:52	18:45	20:43	21:34	22:00	21:38	20:37	19:22	18:11	16:31	12:05 (2) 16:10
49	08:25	09:07 (4) 07:25	06:09	06:25	05:05	04:28	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
50	16:52	12:14 (1) 17:54	18:47	20:45	21:36	22:00	21:37	20:35	19:19	17:09	16:32	12:05 (2) 16:10
51	08:23	09:06 (4) 07:23	06:08	06:24	05:04	04:27	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
52	16:54	12:15 (1) 17:56	18:49	20:46	21:37	22:00	21:35	20:33	19:17	17:07	16:33	12:05 (2) 16:10
53	08:22	09:05 (4) 07:21	06:07	06:23	05:03	04:26	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
54	16:56	12:16 (1) 17:58	18:51	20:48	21:39	22:00	21:33	20:30	19:15	17:04	16:34	12:05 (2) 16:10
55	08:20	09:04 (4) 07:19	06:06	06:22	05:02	04:25	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
56	16:58	12:17 (1) 18:00	18:53	20:50	21:40	22:00	21:32	20:28	19:12	17:02	16:35	12:05 (2) 16:10
57	08:19	09:03 (4) 07:17	06:05	06:21	05:01	04:24	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
58	17:00	12:18 (1) 18:01	18:55	20:52	21:42	22:00	21:30	20:25	19:10	17:00	16:36	12:05 (2) 16:10
59	08:17	09:02 (4) 07:14	06:04	06:20	05:00	04:23	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
60	17:02	12:19 (1) 18:02	18:57	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:37	12:05 (2) 16:10
61	08:15	09:01 (4) 07:11	06:03	06:19	05:00	04:22	05:00	05:54	06:48	07:42	07:42	08:00 (2) 08:25
62	17:04	12:20 (1) 18:04	19:00	20:56	21:45	22:00	21:27	20:21	19:05	16:56	16:38	12:05 (2) 16:10
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	551	327										1281
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.61	0.63										0.61
Total reduction	0.15	0.15										0.13
Total, real	82	48										161

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CC - H81

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	14:51 (4)	08:14	16:27 (3)	07:16	17:10 (2)	07:01	05:52	05:03		
	16:15	28	15:19 (4)	17:06	7	16:34 (3)	18:02	24	17:34 (2)	20:00	21:45
2	08:44		14:52 (4)	08:12		16:26 (3)	07:14		17:09 (2)	06:59	05:02
	16:16	27	15:19 (4)	17:08	11	16:37 (3)	18:04	27	17:36 (2)	20:02	21:46
3	08:44		14:52 (4)	08:10		16:26 (3)	07:12		17:08 (2)	06:56	05:01
	16:17	27	15:19 (4)	17:10	13	16:39 (3)	18:06	30	17:38 (2)	20:04	21:48
4	08:43		14:54 (4)	08:08		16:26 (3)	07:09		17:08 (2)	06:54	05:00
	16:18	26	15:20 (4)	17:12	15	16:41 (3)	18:07	33	17:41 (2)	20:06	21:49
5	08:43		14:54 (4)	08:07		16:26 (3)	07:07		17:06 (2)	06:51	04:59
	16:19	25	15:19 (4)	17:14	17	16:43 (3)	18:09	36	17:42 (2)	20:07	21:50
6	08:43		14:55 (4)	08:05		16:26 (3)	07:04		17:06 (2)	06:49	04:58
	16:21	25	15:20 (4)	17:16	19	16:45 (3)	18:11	36	17:42 (2)	20:09	21:51
7	08:42		14:56 (4)	08:03		16:26 (3)	07:02		17:06 (2)	06:47	04:58
	16:22	23	15:19 (4)	17:18	21	16:47 (3)	18:13	35	17:41 (2)	20:11	21:52
8	08:42		14:57 (4)	08:01		16:27 (3)	07:00		17:06 (2)	06:44	04:57
	16:24	22	15:19 (4)	17:20	21	16:48 (3)	18:15	36	17:42 (2)	20:13	21:53
9	08:41		14:58 (4)	07:59		16:28 (3)	06:57		17:05 (2)	06:42	04:57
	16:25	22	15:20 (4)	17:22	20	16:48 (3)	18:17	36	17:41 (2)	20:15	21:54
10	08:40		14:59 (4)	07:57		16:29 (3)	06:55		17:06 (2)	06:39	04:56
	16:26	20	15:19 (4)	17:24	18	16:47 (3)	18:19	35	17:41 (2)	20:17	21:55
11	08:40		15:01 (4)	07:55		16:30 (3)	06:53		17:06 (2)	06:37	04:56
	16:28	18	15:19 (4)	17:26	16	16:46 (3)	18:21	34	17:40 (2)	20:19	21:55
12	08:39		15:02 (4)	07:53		16:32 (3)	06:50		17:06 (2)	06:35	04:55
	16:30	16	15:18 (4)	17:28	13	16:45 (3)	18:23	33	17:39 (2)	20:20	21:56
13	08:38		15:04 (4)	07:51		16:33 (3)	06:48		17:07 (2)	06:32	04:55
	16:31	13	15:17 (4)	17:30	8	16:41 (3)	18:25	31	17:38 (2)	20:22	21:57
14	08:37		15:06 (4)	07:49		06:45			17:07 (2)	06:30	04:55
	16:33	9	15:15 (4)	17:32		18:27	30	17:37 (2)	20:24	21:18	21:58
15	08:36			07:47		06:43			17:09 (2)	06:28	04:54
	16:34			17:34		18:28	26	17:35 (2)	20:26	21:20	21:58
16	08:35			07:45		06:40			17:10 (2)	06:25	04:54
	16:36			17:36		18:30	23	17:33 (2)	20:28	21:22	21:59
17	08:34			07:43		06:38			17:12 (2)	06:23	04:54
	16:38			17:38		18:32	19	17:31 (2)	20:30	21:23	21:59
18	08:33			07:41		06:35			17:15 (2)	06:21	04:54
	16:40			17:40		18:34	12	17:27 (2)	20:31	21:25	22:00
19	08:32			07:39		06:33			06:18	05:19	04:54
	16:41			17:42		18:36			20:33	21:27	22:00
20	08:31			07:36		06:31			06:16	05:18	04:54
	16:43			17:44		18:38			20:35	21:28	22:00
21	08:30			07:34		06:28			06:14	05:16	04:54
	16:45			17:46		18:40			20:37	21:30	22:01
22	08:29			07:32		06:26			06:12	05:15	04:55
	16:47			17:48		18:42			20:39	21:31	22:01
23	08:27			07:30		06:23			06:09	05:13	04:55
	16:49			17:50		18:43			20:41	21:33	22:01
24	08:26			07:28		17:22 (2)	06:21		06:07	05:12	04:55
	16:50			17:52	2	17:24 (2)	18:45		20:43	21:34	22:01
25	08:24			07:25		17:17 (2)	06:18		06:05	05:11	04:55
	16:52			17:54	9	17:26 (2)	18:47		20:44	21:36	22:01
26	08:23			07:23		17:15 (2)	06:16		06:03	05:09	04:56
	16:54			17:56	13	17:28 (2)	18:49		20:46	21:37	22:01
27	08:22			07:21		17:13 (2)	06:13		06:00	05:08	04:56
	16:56			17:58	18	17:31 (2)	18:51		20:48	21:39	22:01
28	08:20			07:18		17:11 (2)	06:11		05:58	05:07	04:57
	16:58			18:00	21	17:32 (2)	18:53		20:50	21:40	22:01
29	08:19					07:08			05:56	05:06	04:57
	17:00					19:54			20:52	21:41	22:01
30	08:17		16:27 (3)			07:06			05:54	05:05	04:58
	17:02	2	16:29 (3)			19:56			20:54	21:43	22:00
31	08:15		16:26 (3)			07:04				05:04	
	17:04	5	16:31 (3)			19:58				21:44	
Potential sun hours	250		273			367			420	494	510
Total, worst case	308		262			536					
Sun reduction	0.24		0.23			0.27					
Oper. time red.	1.00		1.00			1.00					
Wind dir. red.	0.65		0.66			0.68					
Total reduction	0.16		0.15			0.18					
Total, real	48		40			98					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CC - H81

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:45 (2) 18:18 (2)	07:24 16:17 (3)	15:58 (3) 16:10	08:19 18	14:43 (4) 15:01 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:44 (2) 18:18 (2)	07:26 16:52	15:57 (3) 16:18 (3)	08:21 19	14:42 (4) 15:01 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:44 (2) 18:18 (2)	07:28 16:50	15:56 (3) 16:18 (3)	08:22 22	14:41 (4) 15:03 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:43 (2) 18:19 (2)	07:30 16:48	15:56 (3) 16:17 (3)	08:24 21	14:42 (4) 15:04 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:43 (2) 18:19 (2)	07:32 16:46	15:56 (3) 16:15 (3)	08:25 19	14:41 (4) 15:04 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:43 (2) 18:18 (2)	07:34 16:44	15:56 (3) 16:12 (3)	08:26 16	14:41 (4) 15:06 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:41 (2) 18:17 (2)	07:36 16:43	15:56 (3) 16:10 (3)	08:28 14	14:41 (4) 15:06 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:41 (2) 18:17 (2)	07:38 16:41	15:56 (3) 16:08 (3)	08:29 12	14:41 (4) 15:07 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:42 (2) 18:16 (2)	07:40 16:39	15:57 (3) 16:07 (3)	08:30 10	14:41 (4) 15:08 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:42 (2) 18:14 (2)	07:42 16:37	15:58 (3) 16:05 (3)	08:31 7	14:41 (4) 15:08 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:42 (2) 18:11 (2)	07:44 16:35	15:58 (3) 16:03 (3)	08:33 5	14:41 (4) 15:09 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:43 (2) 18:09 (2)	07:45 16:34	15:59 (3) 16:01 (3)	08:34 2	14:41 (4) 15:09 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:44 (2) 18:07 (2)	07:47 16:32	16:08 (3) 16:05	08:35 28	14:42 (4) 15:10 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:45 (2) 18:04 (2)	07:49 16:31	08:36 16:04	14:42 (4) 28	15:10 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:46 (2) 18:02 (2)	07:51 16:29	08:37 16:04	14:42 (4) 29	15:11 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:48 (2) 17:59 (2)	07:53 16:27	08:38 16:05	14:43 (4) 29	15:12 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:51 (2) 17:57 (2)	07:55 16:26	08:38 16:05	14:43 (4) 29	15:12 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:57 (2) 17:57 (2)	07:57 16:24	08:39 16:05	14:44 (4) 29	15:13 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:59 (2) 18:02 (2)	07:59 16:23	08:40 16:05	14:45 (4) 29	15:14 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	18:01 18:00	16:22 16:22	08:41 16:06	14:45 (4) 29	15:14 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	18:02 (2) 18:02 (2)	16:22 16:20	08:41 16:06	14:45 (4) 30	15:15 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	18:04 (2) 18:04 (2)	16:20 16:19	08:42 16:06	14:45 (4) 30	15:15 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	18:06 (2) 18:06 (2)	16:19 16:18	08:42 16:07	14:46 (4) 30	15:16 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	18:08 (2) 18:08 (2)	16:18 16:17	08:43 16:08	14:47 (4) 29	15:16 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	17:59 (2) 18:09 (2)	07:11 17:09	16:16 16:16	08:43 16:08	14:47 (4) 29	15:16 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	17:55 (2) 18:12 (2)	07:13 17:06	16:16 16:14	08:43 16:09	14:47 (4) 29	15:16 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	17:52 (2) 18:14 (2)	07:15 17:04	16:14 16:13	08:44 16:10	14:49 (4) 28	15:17 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	17:50 (2) 18:16 (2)	07:16 17:02	16:14 16:12	14:47 (4) 14:55 (4)	08:44 29	14:49 (4) 15:18 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	17:49 (2) 18:17 (2)	07:18 17:00	16:12 (3) 16:12	14:44 (4) 14:57 (4)	08:44 28	14:50 (4) 15:18 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:46 (2) 18:17 (2)	07:20 16:58	16:00 (3) 16:14 (3)	14:43 (4) 14:59 (4)	08:44 29	14:49 (4) 15:18 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	15:58 (3) 16:15 (3)	16:11 16:13	08:44 16:12	14:50 (4) 28	15:18 (4)
Potential sun hours	512	460	382	328	259	233			
Total, worst case			134	517	205	839			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.68	0.68	0.65	0.65			
Total reduction			0.22	0.20	0.17	0.13			
Total, real			29	102	36	112			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CD - H82

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June	
1	08:44		08:14	16:02 (5)	07:16	16:42 (4)	07:01		05:52	19:39 (2)	05:03	
	16:15		17:06	12 16:14 (5)	18:02	11 16:53 (4)	20:00		20:55	27 20:06 (2)	21:45	
2	08:44		08:12	16:05 (5)	07:14		06:59		05:50		05:02	
	16:16		17:08	5 16:10 (5)	18:04		20:02		20:57	25 20:05 (2)	21:46	
3	08:44		08:10		07:12	17:37 (3)	06:56		05:48		05:01	
	16:17		17:10		18:06	1 17:38 (3)	20:04		20:59	22 20:03 (2)	21:48	
4	08:43		08:08	16:38 (4)	07:09	17:36 (3)	06:54		05:46		05:00	
	16:18		17:12	3 16:41 (4)	18:07	5 17:41 (3)	20:06		21:01	20 20:02 (2)	21:49	
5	08:43		08:07	16:37 (4)	07:07	17:34 (3)	06:51		05:44		04:59	
	16:19		17:14	6 16:43 (4)	18:09	8 17:42 (3)	20:07		21:03	16 20:00 (2)	21:50	
6	08:43		08:05	16:35 (4)	07:04	17:33 (3)	06:49		05:42		04:59	
	16:21		17:16	10 16:45 (4)	18:11	12 17:45 (3)	20:09		21:04	11 19:57 (2)	21:51	
7	08:42		08:03	16:34 (4)	07:02	17:32 (3)	06:47		05:40		04:58	
	16:22		17:18	13 16:47 (4)	18:13	14 17:46 (3)	20:11		21:06		21:52	
8	08:42		08:01	16:33 (4)	07:00	17:32 (3)	06:44		05:38		04:57	
	16:24		17:20	17 16:50 (4)	18:15	16 17:48 (3)	20:13		21:08		21:53	
9	08:41		07:59	16:32 (4)	06:57	17:31 (3)	06:42		05:36		04:57	
	16:25		17:22	20 16:52 (4)	18:17	19 17:50 (3)	20:15		21:10		21:54	
10	08:40		07:57	16:32 (4)	06:55	17:31 (3)	06:39		05:34		04:56	
	16:26		17:24	22 16:54 (4)	18:19	21 17:52 (3)	20:17		21:11		21:55	
11	08:40		07:55	16:31 (4)	06:52	17:32 (3)	06:37		05:33		04:56	
	16:28		17:26	25 16:56 (4)	18:21	23 17:55 (3)	20:19		21:13		21:55	
12	08:39		07:53	16:30 (4)	06:50	17:32 (3)	06:35	19:51 (2)	05:31		04:55	
	16:30		17:28	28 16:58 (4)	18:23	22 17:54 (3)	20:20	2 19:53 (2)	21:15		21:56	
13	08:38	15:54 (5)	07:51	16:29 (4)	06:48	17:33 (3)	06:32		05:29		04:55	
	16:31	1 15:55 (5)	17:30	31 17:00 (4)	18:25	20 17:53 (3)	20:22	7 19:54 (2)	21:17		21:57	
14	08:37	15:54 (5)	07:49	16:29 (4)	06:45	17:34 (3)	06:30		05:27		04:55	
	16:33	3 15:57 (5)	17:32	33 17:02 (4)	18:27	17 17:51 (3)	20:24	11 19:56 (2)	21:18		21:58	
15	08:36	15:54 (5)	07:47	16:29 (4)	06:43	17:36 (3)	06:28		05:26		04:54	
	16:34	5 15:59 (5)	17:34	36 17:05 (4)	18:28	13 17:49 (3)	20:26	15 19:58 (2)	21:20		21:58	
16	08:35	15:53 (5)	07:45	16:29 (4)	06:40	17:38 (3)	06:25		05:24		04:54	
	16:36	7 16:00 (5)	17:36	38 17:07 (4)	18:30	7 17:45 (3)	20:28	18 20:00 (2)	21:22		21:59	
17	08:34	15:53 (5)	07:43	16:29 (4)	06:38		06:23		05:22		04:54	
	16:38	10 16:03 (5)	17:38	39 17:08 (4)	18:32		20:30	21 20:01 (2)	21:23		21:59	
18	08:33	15:53 (5)	07:41	16:29 (4)	06:35		06:21		05:21		04:54	
	16:40	12 16:05 (5)	17:40	38 17:07 (4)	18:34		20:31	24 20:03 (2)	21:25		22:00	
19	08:32	15:53 (5)	07:39	16:29 (4)	06:33		06:18		05:19		04:54	
	16:41	14 16:07 (5)	17:42	38 17:07 (4)	18:36		20:33	26 20:05 (2)	21:27		22:00	
20	08:31	15:53 (5)	07:36	16:30 (4)	06:31		06:16		05:18		04:54	
	16:43	15 16:08 (5)	17:44	37 17:07 (4)	18:38		20:35	29 20:07 (2)	21:28		22:00	
21	08:30	15:53 (5)	07:34	16:30 (4)	06:28		06:14		05:16		04:54	
	16:45	18 16:11 (5)	17:46	37 17:07 (4)	18:40		20:37	31 20:08 (2)	21:30		22:01	
22	08:29	15:53 (5)	07:32	16:30 (4)	06:26		06:12		05:15		04:55	
	16:47	19 16:12 (5)	17:48	35 17:05 (4)	18:42		20:39	34 20:10 (2)	21:31		22:01	
23	08:27	15:54 (5)	07:30	16:31 (4)	06:23		06:09		05:13		04:55	
	16:49	21 16:15 (5)	17:50	34 17:05 (4)	18:43		20:41	34 20:10 (2)	21:33		22:01	
24	08:26	15:54 (5)	07:28	16:32 (4)	06:21		06:07		05:12		04:55	
	16:50	23 16:17 (5)	17:52	32 17:04 (4)	18:45		20:43	34 20:10 (2)	21:34		22:01	
25	08:24	15:55 (5)	07:25	16:33 (4)	06:18		06:05		05:11		04:55	
	16:52	23 16:18 (5)	17:54	29 17:02 (4)	18:47		20:44	34 20:10 (2)	21:36		22:01	
26	08:23	15:55 (5)	07:23	16:34 (4)	06:16		06:03		05:09		04:56	
	16:54	22 16:17 (5)	17:56	27 17:01 (4)	18:49		20:46	34 20:10 (2)	21:37		22:01	
27	08:22	15:55 (5)	07:21	16:37 (4)	06:13		06:01		05:08		04:56	
	16:56	22 16:17 (5)	17:58	22 16:59 (4)	18:51		20:48	32 20:09 (2)	21:39		22:01	
28	08:20	15:57 (5)	07:18	16:38 (4)	06:11		05:58		05:07		04:57	
	16:58	20 16:17 (5)	18:00	18 16:56 (4)	18:53		20:50	32 20:09 (2)	21:40		22:01	
29	08:18	15:57 (5)			07:08		05:56		05:06		04:57	
	17:00	19 16:16 (5)			19:54		20:52	30 20:08 (2)	21:41		22:01	
30	08:17	15:58 (5)			07:06		05:54		05:05		04:58	
	17:02	18 16:16 (5)			19:56		20:54	29 20:07 (2)	21:43		22:00	
31	08:15	15:59 (5)			07:04				05:04			
	17:04	15 16:14 (5)			19:58				21:44			
Potential sun hours	250		273		367		420		494		510	
Total, worst case	287		685		209		477		121			
Sun reduction	0.24		0.23		0.27		0.35		0.38			
Oper. time red.	1.00		1.00		1.00		1.00		1.00			
Wind dir. red.	0.66		0.66		0.68		0.65		0.65			
Total reduction	0.16		0.15		0.18		0.23		0.25			
Total, real	46		105		38		109		30			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CD - H82

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:11 (3) 16:54	16:01 (4) 16:23 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:10 (3) 16:52	16:02 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:10 (3) 16:50	16:03 (4) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:09 (3) 16:48	16:04 (4) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:09 (3) 16:46	16:05 (4) 16:07
6	05:03 21:58	05:47 21:15	20:00 (2) 20:03 (2)	06:42 20:06	07:35 18:52	16:07 (4) 16:12 (4)
7	05:04 21:57	05:49 21:13	19:56 (2) 20:08 (2)	06:43 20:04	07:37 18:50	16:08 (4) 16:10 (4)
8	05:05 21:56	05:50 21:12	19:52 (2) 20:10 (2)	06:45 20:01	07:39 18:48	16:09 (4) 16:11
9	05:06 21:55	05:52 21:10	19:51 (2) 20:12 (2)	06:47 19:59	07:41 18:45	15:35 (5) 16:05
10	05:07 21:55	05:54 21:07	19:49 (2) 20:12 (2)	06:49 19:56	07:42 18:43	15:33 (5) 16:05
11	05:08 21:54	05:56 21:05	19:48 (2) 20:14 (2)	06:50 19:54	07:44 18:40	15:31 (5) 16:05
12	05:09 21:53	05:57 21:03	19:47 (2) 20:15 (2)	06:52 19:51	07:46 18:38	15:30 (5) 16:05
13	05:10 21:52	05:59 21:01	19:45 (2) 20:15 (2)	06:54 19:49	07:48 18:36	15:29 (5) 16:05
14	05:12 21:51	06:01 20:59	19:45 (2) 20:16 (2)	06:56 19:47	07:50 18:33	15:28 (5) 16:04
15	05:13 21:50	06:03 20:57	19:44 (2) 20:16 (2)	06:58 19:44	07:52 18:31	15:28 (5) 16:05
16	05:14 21:49	06:04 20:55	19:43 (2) 20:16 (2)	06:59 19:42	07:54 18:29	15:28 (5) 16:05
17	05:16 21:47	06:06 20:53	19:43 (2) 20:16 (2)	07:01 19:39	07:55 18:26	15:28 (5) 16:05
18	05:17 21:46	06:08 20:51	19:43 (2) 20:17 (2)	07:03 19:37	07:57 18:24	15:28 (5) 16:05
19	05:18 21:45	06:10 20:48	19:42 (2) 20:16 (2)	07:05 19:34	07:59 18:22	15:28 (5) 16:05
20	05:20 21:44	06:12 20:46	19:42 (2) 20:16 (2)	07:06 19:32	08:01 18:20	15:28 (5) 16:06
21	05:21 21:42	06:13 20:44	19:42 (2) 20:15 (2)	07:08 19:29	08:03 18:17	15:28 (5) 16:06
22	05:23 21:41	06:15 20:42	19:41 (2) 20:12 (2)	07:10 19:27	08:05 18:15	15:29 (5) 16:06
23	05:24 21:39	06:17 20:39	19:42 (2) 20:10 (2)	07:12 19:24	08:07 18:13	15:29 (5) 16:07
24	05:26 21:38	06:19 20:37	19:42 (2) 20:09 (2)	07:13 19:22	08:09 18:11	15:30 (5) 16:08
25	05:27 21:36	06:20 20:35	19:42 (2) 20:06 (2)	07:15 19:19	08:09 17:09	15:31 (5) 16:08
26	05:29 21:35	06:22 20:32	19:43 (2) 20:04 (2)	07:17 19:17	08:11 17:06	15:32 (5) 16:09
27	05:30 21:33	06:24 20:30	19:44 (2) 20:02 (2)	07:19 19:14	15:59 (4) 16:34 (4)	15:33 (5) 16:10
28	05:32 21:32	06:26 20:28	19:44 (2) 19:59 (2)	07:21 19:12	15:59 (4) 16:31 (4)	15:34 (5) 16:11
29	05:34 21:30	06:27 20:25	19:46 (2) 19:57 (2)	07:22 19:09	15:59 (4) 16:31 (3)	15:34 (5) 16:11
30	05:35 21:28	06:29 20:23	19:48 (2) 19:55 (2)	07:24 19:07	15:59 (4) 16:27 (4)	15:36 (5) 16:12
31	05:37 21:26	06:31 20:21	19:50 (2) 19:52 (2)	07:25 16:56	16:00 (4) 16:25 (4)	16:12 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		609	48	750	394	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.68	0.66	0.66	
Total reduction		0.22	0.22	0.19	0.18	
Total, real		135	10	146	69	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CE - H83

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:26 (5)	07:16	17:16 (4)	07:01	05:52	20:06 (2)	05:03		
	16:15	17:06	9 16:35 (5)	18:02	17:34 (4)	20:00	20:55	20	20:26 (2)	21:45	
2	08:44	08:12	16:25 (5)	07:14	17:14 (4)	06:59	05:50	20:05 (2)	05:02		
	16:16	17:08	12 16:37 (5)	18:04	17:36 (4)	20:02	20:57	22	20:27 (2)	21:46	
3	08:43	08:10	16:25 (5)	07:12	17:14 (4)	06:56	05:48	20:04 (2)	05:01		
	16:17	17:10	14 16:39 (5)	18:06	17:38 (4)	20:04	20:59	25	20:29 (2)	21:48	
4	08:43	08:08	16:24 (5)	07:09	17:13 (4)	06:54	05:46	20:04 (2)	05:00		
	16:18	17:12	17 16:41 (5)	18:07	17:41 (4)	20:06	21:01	26	20:30 (2)	21:49	
5	08:43	08:07	16:24 (5)	07:07	17:12 (4)	06:51	05:44	20:03 (2)	04:59		
	16:19	17:14	19 16:43 (5)	18:09	17:42 (4)	20:07	21:03	29	20:32 (2)	21:50	
6	08:42	08:05	16:24 (5)	07:04	17:12 (4)	06:49	05:42	20:03 (2)	04:59		
	16:21	17:16	21 16:45 (5)	18:11	17:45 (4)	20:09	21:04	30	20:33 (2)	21:51	
7	08:42	08:03	16:24 (5)	07:02	17:11 (4)	06:47	05:40	20:04 (2)	04:58		
	16:22	17:18	23 16:47 (5)	18:13	17:46 (4)	20:11	21:06	30	20:34 (2)	21:52	
8	08:42	08:01	16:25 (5)	07:00	17:11 (4)	06:44	05:38	20:04 (2)	04:57		
	16:24	17:20	23 16:48 (5)	18:15	17:48 (4)	20:13	21:08	29	20:33 (2)	21:53	
9	08:41	07:59	16:25 (5)	06:57	17:10 (4)	06:42	05:36	20:03 (2)	04:57		
	16:25	17:22	23 16:48 (5)	18:17	17:47 (4)	20:15	21:10	30	20:33 (2)	21:54	
10	08:40	07:57	16:26 (5)	06:55	17:11 (4)	06:39	05:34	20:03 (2)	04:56		
	16:26	17:24	21 16:47 (5)	18:19	17:47 (4)	20:17	21:11	29	20:32 (2)	21:55	
11	08:40	07:55	16:27 (5)	06:52	17:11 (4)	06:37	05:33	20:04 (2)	04:56		
	16:28	17:26	20 16:47 (5)	18:21	17:47 (4)	20:19	21:13	29	20:33 (2)	21:55	
12	08:39	07:53	16:27 (5)	06:50	17:11 (4)	06:35	05:31	20:04 (2)	04:55		
	16:30	17:28	18 16:45 (5)	18:23	17:46 (4)	20:20	21:15	28	20:32 (2)	21:56	
13	08:38	07:51	16:29 (5)	06:48	17:12 (4)	06:32	05:29	20:05 (2)	04:55		
	16:31	17:30	14 16:43 (5)	18:25	17:45 (4)	20:22	21:17	26	20:31 (2)	21:57	
14	08:37	07:49	16:31 (5)	06:45	17:12 (4)	06:30	05:27	20:06 (2)	04:55		
	16:33	17:32	10 16:41 (5)	18:27	17:44 (4)	20:24	21:18	25	20:31 (2)	21:57	
15	08:36	07:47		06:43	17:13 (4)	06:28	05:26	20:06 (2)	04:55		
	16:34	17:34		18:28	18:02 (3)	20:26	21:20	23	20:29 (2)	21:58	
16	08:35	07:45		06:40	17:14 (4)	06:25	05:24	20:08 (2)	04:54		
	16:36	17:36		18:30	18:04 (3)	20:28	21:22	21	20:29 (2)	21:59	
17	08:34	07:43		06:38	17:16 (4)	06:23	05:22	20:08 (2)	04:54		
	16:38	17:38		18:32	18:06 (3)	20:30	21:23	20	20:28 (2)	21:59	
18	08:33	07:41		06:35	17:17 (4)	06:21	05:21	20:10 (2)	04:54		
	16:40	17:40		18:34	18:07 (3)	20:31	21:25	17	20:27 (2)	22:00	
19	08:32	07:39		06:33	17:21 (4)	06:18	05:19	20:12 (2)	04:54		
	16:41	17:42		18:36	18:10 (3)	20:33	21:27	14	20:26 (2)	22:00	
20	08:31	07:36		06:31	17:54 (3)	06:16	05:18	20:13 (2)	04:54		
	16:43	17:44		18:38	18:11 (3)	20:35	21:28	10	20:23 (2)	22:00	
21	08:30	07:34		06:28	17:54 (3)	06:14	05:16		04:54		
	16:45	17:46		18:40	18:13 (3)	20:37	21:30		22:01		
22	08:28	07:32		06:26	17:54 (3)	06:12	05:15		04:55		
	16:47	17:48		18:41	18:15 (3)	20:39	21:31		22:01		
23	08:27	07:30		06:23	17:55 (3)	06:09	05:13		04:55		
	16:49	17:50		18:43	18:16 (3)	20:41	21:33		22:01		
24	08:26	07:28		06:21	17:55 (3)	06:07	05:12		04:55		
	16:50	17:52		18:45	18:14 (3)	20:42	21:34		22:01		
25	08:24	07:25	17:23 (4)	06:18	17:56 (3)	06:05	05:11		04:55		
	16:52	17:54	3 17:26 (4)	18:47	18:13 (3)	20:44	21:36		22:01		
26	08:23	07:23	17:21 (4)	06:16	17:57 (3)	06:03	20:12 (2)	05:09	04:56		
	16:54	17:56	7 17:28 (4)	18:49	18:11 (3)	20:46	5 20:17 (2)	21:37	22:01		
27	08:22	07:21	17:19 (4)	06:13	18:00 (3)	06:01	20:10 (2)	05:08	04:56		
	16:56	17:58	12 17:31 (4)	18:51	8 18:08 (3)	20:48	9 20:19 (2)	21:39	22:01		
28	08:20	07:18	17:17 (4)	06:11		05:58	20:09 (2)	05:07	04:57		
	16:58	18:00	15 17:32 (4)	18:53		20:50	12 20:21 (2)	21:40	22:01		
29	08:18			07:08		05:56	20:07 (2)	05:06	04:57		
	17:00			19:54		20:52	15 20:22 (2)	21:41	22:01		
30	08:17	16:27 (5)		07:06		05:54	20:06 (2)	05:05	04:58		
	17:02	3 16:30 (5)		19:56		20:53	18 20:24 (2)	21:43	22:00		
31	08:15	16:26 (5)		07:04				05:04			
	17:04	6 16:32 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case	9		281	727		59		483			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	1		43	133		13		119			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** CE - H83

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:15 (2) 20:42 (2)	06:33 20:18	07:26 19:05	17:50 (4) 16:54
2	04:59 22:00	05:40 21:23	20:15 (2) 20:43 (2)	06:35 20:16	07:28 19:02	17:49 (4) 16:52
3	05:00 21:59	05:42 21:21	20:14 (2) 20:43 (2)	06:36 20:13	07:30 19:00	17:49 (4) 16:50
4	05:01 21:59	05:44 21:19	20:14 (2) 20:43 (2)	06:38 20:11	07:31 18:57	17:48 (4) 16:48
5	05:02 21:58	05:45 21:17	20:13 (2) 20:43 (2)	06:40 20:09	07:33 18:55	17:48 (4) 16:46
6	05:03 21:58	05:47 21:15	20:13 (2) 20:43 (2)	06:42 20:06	07:35 18:52	17:48 (4) 16:44
7	05:04 21:57	05:49 21:13	20:13 (2) 20:43 (2)	06:43 20:04	07:37 18:50	17:47 (4) 16:43
8	05:05 21:56	05:50 21:12	20:13 (2) 20:41 (2)	06:45 20:01	07:39 18:48	17:47 (4) 16:41
9	05:06 21:55	05:52 21:10	20:13 (2) 20:39 (2)	06:47 19:59	07:41 18:45	17:47 (4) 16:39
10	05:07 21:55	05:54 21:07	20:13 (2) 20:37 (2)	06:49 19:56	07:42 18:43	17:47 (4) 16:37
11	05:08 21:54	05:56 21:05	20:13 (2) 20:35 (2)	06:50 19:54	07:44 18:40	17:48 (4) 16:35
12	05:09 21:53	05:57 21:03	20:14 (2) 20:34 (2)	06:52 19:51	07:46 18:38	17:49 (4) 16:34
13	05:10 21:52	05:59 21:01	20:14 (2) 20:31 (2)	06:54 19:49	07:48 18:36	17:50 (4) 16:32
14	05:12 21:51	06:01 20:59	20:15 (2) 20:29 (2)	06:56 19:47	07:50 18:33	17:51 (4) 16:31
15	05:13 21:50	06:03 20:57	20:16 (2) 20:28 (2)	06:58 19:44	07:52 18:31	17:52 (4) 16:29
16	05:14 21:49	06:04 20:55	20:17 (2) 20:25 (2)	06:59 19:42	07:54 18:29	17:54 (4) 16:27
17	05:16 21:47	06:06 20:53	20:19 (2) 20:23 (2)	07:01 19:39	07:55 18:26	17:55 (4) 16:26
18	05:17 21:46	06:08 20:50	07:03 19:37	18:56 (3) 18:59 (3)	18:26 18:26	16:26 16:26
19	05:18 21:45	06:10 20:48	07:05 19:34	18:42 (3) 19:01 (3)	18:24 18:22	16:24 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	18:41 (3) 19:02 (3)	08:01 18:20	16:22 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	18:40 (3) 19:01 (3)	08:03 18:17	16:22 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	18:39 (3) 18:58 (3)	08:05 18:15	16:20 16:19
23	05:24 21:39	20:26 (2) 20:32 (2)	06:17 20:39	07:12 19:24	18:39 (3) 18:13	16:19 16:18
24	05:26 21:38	20:23 (2) 20:35 (2)	06:19 20:37	07:13 19:22	18:06 (4) 18:54 (3)	16:18 16:17
25	05:27 21:36	20:21 (2) 20:37 (2)	06:20 20:35	07:15 19:19	18:01 (4) 18:51 (3)	16:17 16:16
26	05:29 21:35	20:20 (2) 20:38 (2)	06:22 20:32	07:17 19:17	17:58 (4) 18:48 (3)	16:16 16:14
27	05:30 21:33	20:18 (2) 20:38 (2)	06:24 20:30	07:19 19:14	17:56 (4) 18:46 (3)	16:15 16:13
28	05:32 21:32	20:18 (2) 20:40 (2)	06:26 20:28	07:21 19:12	17:54 (4) 18:44 (3)	16:13 16:12
29	05:34 21:30	20:16 (2) 20:40 (2)	06:27 20:25	07:22 19:09	17:53 (4) 18:24 (4)	16:12 16:11
30	05:35 21:28	20:16 (2) 20:41 (2)	06:29 20:23	07:24 19:07	17:51 (4) 18:24 (4)	16:11 16:10
31	05:37 21:26	20:16 (2) 20:42 (2)	06:31 20:21	07:22 16:56	15:55 (5) 16:15 (5)	16:11 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case	169	378	349	494	186	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.65	0.65	0.68	0.67	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.17	
Total, real	35	83	76	98	32	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CF - H84

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44		08:14	16:21 (5)	07:16		17:09 (4)	07:01	05:52	20:06 (2)	05:03
	16:15		17:06	16:35 (5)	18:02	25	17:34 (4)	20:00	20:55	20:26 (2)	21:45
2	08:44		08:12	16:20 (5)	07:14		17:08 (4)	06:59	05:50	20:05 (2)	05:02
	16:16		17:08	16:37 (5)	18:04	28	17:36 (4)	20:02	20:57	20:27 (2)	21:46
3	08:43		08:10	16:20 (5)	07:12		17:08 (4)	06:56	05:48	20:04 (2)	05:01
	16:17		17:10	16:39 (5)	18:06	30	17:38 (4)	20:04	20:59	20:29 (2)	21:48
4	08:43		08:08	16:20 (5)	07:09		17:07 (4)	06:54	05:46	20:04 (2)	05:00
	16:18		17:12	16:41 (5)	18:07	34	17:41 (4)	20:06	21:01	20:30 (2)	21:49
5	08:43		08:07	16:20 (5)	07:07		17:06 (4)	06:51	05:44	20:03 (2)	04:59
	16:19		17:14	16:43 (5)	18:09	36	17:42 (4)	20:07	21:03	20:32 (2)	21:50
6	08:42		08:05	16:20 (5)	07:04		17:06 (4)	06:49	05:42	20:03 (2)	04:59
	16:21		17:16	16:44 (5)	18:11	39	17:45 (4)	20:09	21:04	20:33 (2)	21:51
7	08:42		08:03	16:21 (5)	07:02		17:06 (4)	06:47	05:40	20:03 (2)	04:58
	16:22		17:18	16:44 (5)	18:13	38	17:44 (4)	20:11	21:06	20:35 (2)	21:52
8	08:42		08:01	16:21 (5)	07:00		17:06 (4)	06:44	05:38	20:03 (2)	04:57
	16:24		17:20	16:43 (5)	18:15	38	17:44 (4)	20:13	21:08	20:34 (2)	21:53
9	08:41		07:59	16:22 (5)	06:57		17:06 (4)	06:42	05:36	20:03 (2)	04:57
	16:25		17:22	16:43 (5)	18:17	37	17:43 (4)	20:15	21:10	20:34 (2)	21:54
10	08:40		07:57	16:23 (5)	06:55		17:06 (4)	06:39	05:34	20:03 (2)	04:56
	16:26		17:24	16:42 (5)	18:19	37	17:43 (4)	20:17	21:11	20:33 (2)	21:55
11	08:40		07:55	16:24 (5)	06:52		17:07 (4)	06:37	05:33	20:04 (2)	04:56
	16:28		17:26	16:41 (5)	18:21	36	17:43 (4)	20:19	21:13	20:34 (2)	21:55
12	08:39		07:53	16:25 (5)	06:50		17:07 (4)	06:35	05:31	20:04 (2)	04:55
	16:30		17:28	16:39 (5)	18:23	34	17:41 (4)	20:20	21:15	20:33 (2)	21:56
13	08:38		07:51	16:28 (5)	06:48		17:08 (4)	06:32	05:29	20:04 (2)	04:55
	16:31		17:30	16:36 (5)	18:25	32	17:40 (4)	20:22	21:17	20:32 (2)	21:57
14	08:37		07:49		06:45		17:09 (4)	06:30	05:27	20:05 (2)	04:55
	16:33		17:32		18:27	31	18:00 (3)	20:24	21:18	20:32 (2)	21:57
15	08:36		07:47		06:43		17:10 (4)	06:28	05:26	20:05 (2)	04:55
	16:34		17:34		18:28	32	18:02 (3)	20:26	21:20	20:31 (2)	21:58
16	08:35		07:45		06:40		17:11 (4)	06:25	05:24	20:07 (2)	04:54
	16:36		17:36		18:30	33	18:04 (3)	20:28	21:22	20:31 (2)	21:59
17	08:34		07:43		06:38		17:14 (4)	06:23	05:22	20:07 (2)	04:54
	16:38		17:38		18:32	31	18:06 (3)	20:30	21:23	20:29 (2)	21:59
18	08:33		07:41		06:35		17:17 (4)	06:21	05:21	20:08 (2)	04:54
	16:40		17:40		18:34	25	18:07 (3)	20:31	21:25	20:29 (2)	22:00
19	08:32		07:39		06:33		17:53 (3)	06:18	05:19	20:10 (2)	04:54
	16:41		17:42		18:36	17	18:10 (3)	20:33	21:27	20:28 (2)	22:00
20	08:31		07:36		06:31		17:52 (3)	06:16	05:18	20:11 (2)	04:54
	16:43		17:44		18:38	19	18:11 (3)	20:35	21:28	20:26 (2)	22:00
21	08:30		07:34		06:28		17:53 (3)	06:14	05:16	20:13 (2)	04:54
	16:45		17:46		18:40	20	18:13 (3)	20:37	21:30	20:25 (2)	22:01
22	08:28		07:32		06:26		17:52 (3)	06:12	05:15	20:16 (2)	04:55
	16:47		17:48		18:41	22	18:14 (3)	20:39	21:31	20:22 (2)	22:01
23	08:27		07:30	17:19 (4)	06:23		17:53 (3)	06:09	05:13		04:55
	16:49		17:50	3	17:22 (4)	21	18:14 (3)	20:41	21:33		22:01
24	08:26		07:28	17:17 (4)	06:21		17:53 (3)	06:07	05:12		04:55
	16:50		17:52	7	17:24 (4)	19	18:12 (3)	20:42	21:34		22:01
25	08:24		07:25	17:14 (4)	06:18		17:55 (3)	06:05	05:11		04:55
	16:52		17:54	12	17:26 (4)	16	18:11 (3)	20:44	21:36		22:01
26	08:23		07:23	17:13 (4)	06:16		17:57 (3)	06:03	20:12 (2)	05:09	04:56
	16:54		17:56	15	17:28 (4)	11	18:08 (3)	20:46	5	20:17 (2)	21:37
27	08:22		07:21	17:12 (4)	06:13		06:01	20:10 (2)	05:08		04:56
	16:56		17:58	19	17:31 (4)		20:48	9	20:19 (2)	21:39	22:01
28	08:20		07:18	17:10 (4)	06:11		05:58		20:09 (2)	05:07	04:57
	16:58	3	16:26 (5)	18:00	22	17:32 (4)	18:53	12	20:21 (2)	21:40	22:01
29	08:18		16:22 (5)		07:08		05:56		20:08 (2)	05:06	04:57
	17:00	6	16:28 (5)		19:54		20:52	14	20:22 (2)	21:41	22:01
30	08:17		16:21 (5)		07:06		05:54		20:07 (2)	05:05	04:58
	17:02	9	16:30 (5)		19:56		20:53	17	20:24 (2)	21:43	22:00
31	08:15		16:20 (5)		07:04				05:04		
	17:04	12	16:32 (5)		19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case	30		320		741		57		534		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.66		0.68		0.64		0.64		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	5		49		136		13		131		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** CF - H84

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:14 (2)	06:33		07:26	17:46 (4)	07:24		15:52 (5)	08:19
	22:00	21:25	29 20:43 (2)	20:18		19:05	34 18:20 (4)	16:54	20	16:12 (5)	16:10
2	04:59	05:40	20:14 (2)	06:35		07:28	17:45 (4)	07:26		15:52 (5)	08:21
	22:00	21:23	30 20:44 (2)	20:16		19:02	35 18:20 (4)	16:52	21	16:13 (5)	16:09
3	05:00	05:42	20:13 (2)	06:36		07:30	17:44 (4)	07:28		15:51 (5)	08:22
	21:59	21:21	31 20:44 (2)	20:13		19:00	37 18:21 (4)	16:50	22	16:13 (5)	16:08
4	05:01	05:44	20:13 (2)	06:38		07:31	17:44 (4)	07:30		15:50 (5)	08:24
	21:59	21:19	31 20:44 (2)	20:11		18:57	37 18:21 (4)	16:48	24	16:14 (5)	16:08
5	05:02	05:45	20:13 (2)	06:40		07:33	17:43 (4)	07:32		15:50 (5)	08:25
	21:58	21:17	31 20:44 (2)	20:09		18:55	38 18:21 (4)	16:46	24	16:14 (5)	16:07
6	05:03	05:47	20:13 (2)	06:42		07:35	17:43 (4)	07:34		15:50 (5)	08:26
	21:58	21:15	31 20:44 (2)	20:06		18:52	38 18:21 (4)	16:44	22	16:12 (5)	16:07
7	05:04	05:49	20:13 (2)	06:43		07:37	17:42 (4)	07:36		15:50 (5)	08:28
	21:57	21:13	30 20:43 (2)	20:04		18:50	38 18:20 (4)	16:43	20	16:10 (5)	16:06
8	05:05	05:50	20:13 (2)	06:45		07:39	17:41 (4)	07:38		15:50 (5)	08:29
	21:56	21:12	28 20:41 (2)	20:01		18:48	37 18:18 (4)	16:41	18	16:08 (5)	16:06
9	05:06	05:52	20:13 (2)	06:47		07:41	17:41 (4)	07:40		15:50 (5)	08:30
	21:55	21:10	26 20:39 (2)	19:59		18:45	35 18:16 (4)	16:39	16	16:06 (5)	16:05
10	05:07	05:54	20:13 (2)	06:49		07:42	17:42 (4)	07:42		15:51 (5)	08:31
	21:55	21:07	24 20:37 (2)	19:56		18:43	32 18:14 (4)	16:37	14	16:05 (5)	16:05
11	05:08	05:56	20:13 (2)	06:50		07:44	17:42 (4)	07:44		15:52 (5)	08:33
	21:54	21:05	22 20:35 (2)	19:54		18:40	29 18:11 (4)	16:35	11	16:03 (5)	16:05
12	05:09	05:57	20:14 (2)	06:52		07:46	17:42 (4)	07:45		15:53 (5)	08:34
	21:53	21:03	20 20:34 (2)	19:51		18:38	27 18:09 (4)	16:34	8	16:01 (5)	16:05
13	05:10	05:59	20:14 (2)	06:54		07:48	17:43 (4)	07:47		15:54 (5)	08:35
	21:52	21:01	17 20:31 (2)	19:49		18:36	24 18:07 (4)	16:32	5	15:59 (5)	16:05
14	05:12	06:01	20:15 (2)	06:56		07:50	17:43 (4)	07:49		15:55 (5)	08:36
	21:51	20:59	14 20:29 (2)	19:47		18:33	21 18:04 (4)	16:31	3	15:58 (5)	16:04
15	05:13	06:03	20:17 (2)	06:58		07:52	17:44 (4)	07:51			08:37
	21:50	20:57	11 20:28 (2)	19:44		18:31	18 18:02 (4)	16:29			16:05
16	05:14	06:04	20:17 (2)	06:59		07:54	17:45 (4)	07:53			08:38
	21:49	20:55	8 20:25 (2)	19:42		18:29	14 17:59 (4)	16:27			16:05
17	05:16	06:06	20:20 (2)	07:01	18:46 (3)	07:55	17:47 (4)	07:55			08:38
	21:47	20:53	3 20:23 (2)	19:39	9 18:55 (3)	18:26	10 17:57 (4)	16:26			16:05
18	05:17	06:08		07:03	18:43 (3)	07:57	17:49 (4)	07:57			08:39
	21:46	20:50		19:37	15 18:58 (3)	18:24	6 17:55 (4)	16:24			16:05
19	05:18	06:10		07:05	18:41 (3)	07:59		07:59			08:40
	21:45	20:48		19:34	18 18:59 (3)	18:22		16:23			16:05
20	05:20	06:12		07:06	18:40 (3)	08:01		08:00			08:41
	21:44	20:46		19:32	20 19:00 (3)	18:20		16:22			16:06
21	05:21	06:13		07:08	18:38 (3)	08:03		08:02			08:41
	21:42	20:44		19:29	22 19:00 (3)	18:17		16:20			16:06
22	05:23	20:24 (2)	06:15	07:10	18:37 (3)	08:05		08:04			08:42
	21:41	9 20:33 (2)	20:42	19:27	21 18:58 (3)	18:15		16:19			16:06
23	05:24	20:22 (2)	06:17	07:12	18:37 (3)	08:07		08:06			08:42
	21:39	14 20:36 (2)	20:39	19:24	19 18:56 (3)	18:13		16:18			16:07
24	05:26	20:20 (2)	06:19	07:13	18:37 (3)	08:09		08:08			08:43
	21:38	17 20:37 (2)	20:37	19:22	17 18:54 (3)	18:11		16:17			16:08
25	05:27	20:20 (2)	06:20	07:15	18:01 (4)	07:11		08:09			08:43
	21:36	19 20:39 (2)	20:35	19:19	23 18:51 (3)	17:09		16:16			16:08
26	05:29	20:18 (2)	06:22	07:17	17:57 (4)	07:13		08:11			08:43
	21:35	22 20:40 (2)	20:32	19:17	28 18:48 (3)	17:06		16:14			16:09
27	05:30	20:17 (2)	06:24	07:19	17:54 (4)	07:15		08:13			08:44
	21:33	23 20:40 (2)	20:30	19:14	32 18:46 (3)	17:04		16:13			16:10
28	05:32	20:17 (2)	06:26	07:21	17:52 (4)	07:16		08:14			08:44
	21:32	24 20:41 (2)	20:28	19:12	32 18:44 (3)	17:02		16:12			16:11
29	05:34	20:15 (2)	06:27	07:22	17:50 (4)	07:18	15:57 (5)	08:16			08:44
	21:30	27 20:42 (2)	20:25	19:09	32 18:41 (3)	17:00	9 16:06 (5)	16:12			16:11
30	05:35	20:15 (2)	06:29	07:24	17:47 (4)	07:20	15:54 (5)	08:18			08:44
	21:28	28 20:43 (2)	20:23	19:07	32 18:19 (4)	16:58	15 16:09 (5)	16:11			16:12
31	05:37	20:15 (2)	06:31			07:22	15:53 (5)				08:44
	21:26	29 20:44 (2)	20:21			16:56	17 16:10 (5)				16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case		212		386		320		551		228	
Sun reduction		0.32		0.34		0.32		0.29		0.27	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.64		0.64		0.68		0.68		0.66	
Total reduction		0.21		0.22		0.22		0.20		0.17	
Total, real		44		85		69		109		40	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CG - H85

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44			08:14	16:15 (5)	07:16	17:02 (4)	07:01		05:52		20:05 (2)	05:03					
	16:15			17:06	20	16:35 (5)	18:02	32	17:34 (4)	20:00	20:55	21	20:26 (2)	21:45				
2	08:44			08:12	16:15 (5)	07:14	17:01 (4)	06:59		05:50		20:04 (2)	05:02					
	16:16			17:08	22	16:37 (5)	18:04	35	17:36 (4)	20:02	20:57	23	20:27 (2)	21:46				
3	08:43			08:10	16:15 (5)	07:12	17:01 (4)	06:56		05:48		20:04 (2)	05:01					
	16:17			17:10	24	16:39 (5)	18:06	37	17:38 (4)	20:04	20:59	25	20:29 (2)	21:48				
4	08:43			08:08	16:15 (5)	07:09	17:01 (4)	06:54		05:46		20:03 (2)	05:00					
	16:18			17:12	25	16:40 (5)	18:07	40	17:41 (4)	20:06	21:01	27	20:30 (2)	21:49				
5	08:43			08:07	16:16 (5)	07:07	17:00 (4)	06:51		05:44		20:03 (2)	04:59					
	16:19			17:14	24	16:40 (5)	18:09	40	17:40 (4)	20:07	21:03	29	20:32 (2)	21:50				
6	08:42			08:05	16:16 (5)	07:04	17:01 (4)	06:49		05:42		20:02 (2)	04:59					
	16:21			17:16	23	16:39 (5)	18:11	39	17:40 (4)	20:09	21:04	31	20:33 (2)	21:51				
7	08:42			08:03	16:17 (5)	07:02	17:00 (4)	06:47		05:40		20:03 (2)	04:58					
	16:22			17:18	22	16:39 (5)	18:13	39	17:39 (4)	20:11	21:06	32	20:35 (2)	21:52				
8	08:42			08:01	16:18 (5)	07:00	17:01 (4)	06:44		05:38		20:03 (2)	04:57					
	16:24			17:20	20	16:38 (5)	18:15	38	17:39 (4)	20:13	21:08	32	20:35 (2)	21:53				
9	08:41			07:59	16:19 (5)	06:57	17:01 (4)	06:42		05:36		20:02 (2)	04:57					
	16:25			17:22	18	16:37 (5)	18:17	37	17:38 (4)	20:15	21:10	32	20:34 (2)	21:54				
10	08:40			07:57	16:21 (5)	06:55	17:01 (4)	06:39		05:34		20:02 (2)	04:56					
	16:26			17:24	15	16:36 (5)	18:19	36	17:37 (4)	20:17	21:11	32	20:34 (2)	21:55				
11	08:40			07:55	16:23 (5)	06:52	17:03 (4)	06:37		05:33		20:03 (2)	04:56					
	16:28			17:26	11	16:34 (5)	18:21	34	17:37 (4)	20:19	21:13	31	20:34 (2)	21:55				
12	08:39			07:53		06:50	17:03 (4)	06:35		05:31		20:03 (2)	04:55					
	16:30			17:28		18:23	17:35 (4)	20:20		21:15	31	20:34 (2)	21:56					
13	08:38			07:51		06:48	17:04 (4)	06:32		05:29		20:03 (2)	04:55					
	16:31			17:30		18:25	17:58 (3)	20:22		21:17	30	20:33 (2)	21:57					
14	08:37			07:49		06:45	17:05 (4)	06:30		05:27		20:04 (2)	04:55					
	16:33			17:32		18:27	18:00 (3)	20:24		21:18	29	20:33 (2)	21:58					
15	08:36			07:47		06:43	17:07 (4)	06:28		05:26		20:04 (2)	04:55					
	16:34			17:34		18:28	18:02 (3)	20:26		21:20	28	20:32 (2)	21:58					
16	08:35			07:45		06:40	17:09 (4)	06:25		05:24		20:05 (2)	04:54					
	16:36			17:36		18:30	18:04 (3)	20:28		21:22	27	20:32 (2)	21:59					
17	08:34			07:43		06:38	17:15 (4)	06:23		05:22		20:05 (2)	04:54					
	16:38			17:38		18:32	18:06 (3)	20:30		21:23	26	20:31 (2)	21:59					
18	08:33			07:41		06:35	17:50 (3)	06:21		05:21		20:07 (2)	04:54					
	16:40			17:40		18:34	18:07 (3)	20:31		21:25	23	20:30 (2)	22:00					
19	08:32			07:39		06:33	17:51 (3)	06:18		05:19		20:08 (2)	04:54					
	16:41			17:42		18:36	18:10 (3)	20:33		21:27	22	20:30 (2)	22:00					
20	08:31			07:36		06:31	17:50 (3)	06:16		05:18		20:09 (2)	04:54					
	16:43			17:44		18:38	18:11 (3)	20:35		21:28	19	20:28 (2)	22:00					
21	08:30			07:34		17:13 (4)	17:50 (3)	06:14		05:16		20:10 (2)	04:54					
	16:45			17:46	5	17:18 (4)	18:40	23	18:13 (3)	20:37	21:30	17	20:27 (2)	22:01				
22	08:29			07:32		17:10 (4)	17:50 (3)	06:12		05:15		20:12 (2)	04:55					
	16:47			17:48	9	17:19 (4)	18:42	22	18:12 (3)	20:39	21:31	14	20:26 (2)	22:01				
23	08:27			07:30		17:09 (4)	17:51 (3)	06:09		05:13		20:14 (2)	04:55					
	16:49			17:50	13	17:22 (4)	18:43	20	18:11 (3)	20:41	21:33	9	20:23 (2)	22:01				
24	08:26			07:28		17:07 (4)	17:52 (3)	06:07		05:12			04:55					
	16:50			17:52	17	17:24 (4)	18:45	17	18:09 (3)	20:42	21:34		22:01					
25	08:24		16:18 (5)	07:25		17:05 (4)	17:54 (3)	06:05		05:11			04:55					
	16:52	1	16:19 (5)	17:54	21	17:26 (4)	18:47	13	18:07 (3)	20:44	21:36		22:01					
26	08:23		16:17 (5)	07:23		17:05 (4)	17:58 (3)	06:03		20:13 (2)	05:09		04:56					
	16:54	4	16:21 (5)	17:56	23	17:28 (4)	18:49	6	18:04 (3)	20:46	4	20:17 (2)	21:37					
27	08:22		16:16 (5)	07:21		17:04 (4)	17:51 (3)	06:01		20:10 (2)	05:08		04:56					
	16:56	7	16:23 (5)	17:58	27	17:31 (4)	18:51	20:48		9	20:19 (2)	21:39	22:01					
28	08:20		16:16 (5)	07:18		17:03 (4)	17:53 (3)	06:11		05:58	20:09 (2)	05:07	04:57					
	16:58	10	16:26 (5)	18:00	29	17:32 (4)	18:53	20:50		12	20:21 (2)	21:40	22:01					
29	08:18		16:15 (5)			07:08		05:56			20:07 (2)	05:06	04:57					
	17:00	13	16:28 (5)			19:54		20:52		15	20:22 (2)	21:41	22:01					
30	08:17		16:15 (5)			07:06		05:54			20:06 (2)	05:05	04:58					
	17:02	15	16:30 (5)			19:56		20:53		18	20:24 (2)	21:43	22:00					
31	08:15		16:15 (5)			07:04					05:04							
	17:04	17	16:32 (5)			19:58					21:44							
Potential sun hours	250			273		367		420		494			510					
Total, worst case	67			368		744		58		590								
Sun reduction	0.24			0.23		0.27		0.35		0.38								
Oper. time red.	1.00			1.00		1.00		1.00		1.00								
Wind dir. red.	0.66			0.67		0.68		0.64		0.64								
Total reduction	0.16			0.15		0.18		0.23		0.25								
Total, real	11			57		136		13		145								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CG - H85

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	31 20:13 (2)	06:33 20:18		07:26 19:05	17:42 (4) 31 18:13 (4)	07:24 16:54	15:50 (5) 16 16:06 (5)	08:19 16:10	
2	04:59 22:00	05:40 21:23	32 20:13 (2)	06:35 20:16		07:28 19:02	17:41 (4) 33 18:14 (4)	07:26 16:52	15:49 (5) 18 16:07 (5)	08:21 16:09	
3	05:00 21:59	05:42 21:21	32 20:12 (2)	06:36 20:13		07:30 19:00	17:40 (4) 35 18:15 (4)	07:28 16:50	15:47 (5) 21 16:08 (5)	08:22 16:08	
4	05:01 21:59	05:44 21:19	32 20:13 (2)	06:38 20:11		07:31 18:57	17:39 (4) 37 18:16 (4)	07:30 16:48	15:47 (5) 22 16:09 (5)	08:24 16:08	
5	05:02 21:58	05:45 21:17	32 20:12 (2)	06:40 20:09		07:33 18:55	17:38 (4) 38 18:16 (4)	07:32 16:46	15:46 (5) 23 16:09 (5)	08:25 16:07	
6	05:03 21:58	05:47 21:15	33 20:12 (2)	06:42 20:06		07:35 18:52	17:37 (4) 39 18:16 (4)	07:34 16:44	15:46 (5) 23 16:09 (5)	08:26 16:07	
7	05:04 21:57	05:49 21:13	30 20:13 (2)	06:43 20:04		07:37 18:50	17:36 (4) 39 18:15 (4)	07:36 16:43	15:45 (5) 25 16:10 (5)	08:28 16:06	
8	05:05 21:56	05:51 21:12	29 20:12 (2)	06:45 20:01		07:39 18:48	17:36 (4) 39 18:15 (4)	07:38 16:41	15:45 (5) 23 16:08 (5)	08:29 16:06	
9	05:06 21:55	05:52 21:10	26 20:13 (2)	06:47 19:59		07:41 18:45	17:35 (4) 40 18:15 (4)	07:40 16:39	15:45 (5) 21 16:06 (5)	08:30 16:05	
10	05:07 21:55	05:54 21:07	25 20:12 (2)	06:49 19:56		07:42 18:43	17:35 (4) 39 18:14 (4)	07:42 16:37	15:46 (5) 19 16:05 (5)	08:31 16:05	
11	05:08 21:54	05:56 21:05	22 20:13 (2)	06:50 19:54		07:44 18:40	17:35 (4) 36 18:11 (4)	07:44 16:35	15:46 (5) 17 16:03 (5)	08:33 16:05	
12	05:09 21:53	05:57 21:03	20 20:14 (2)	06:52 19:51		07:46 18:38	17:35 (4) 34 18:09 (4)	07:45 16:34	15:47 (5) 14 16:01 (5)	08:34 16:05	
13	05:10 21:52	05:59 21:01	17 20:14 (2)	06:54 19:49		07:48 18:36	17:36 (4) 31 18:07 (4)	07:47 16:32	15:47 (5) 12 15:59 (5)	08:35 16:05	
14	05:12 21:51	06:01 20:59	14 20:15 (2)	06:56 19:47		07:50 18:33	17:36 (4) 28 18:04 (4)	07:49 16:31	15:48 (5) 10 15:58 (5)	08:36 16:04	
15	05:13 21:50	06:03 20:57	11 20:17 (2)	06:58 19:44		07:52 18:31	17:36 (4) 26 18:02 (4)	07:51 16:29	15:49 (5) 7 15:56 (5)	08:37 16:05	
16	05:14 21:49	06:04 20:55	8 20:17 (2)	06:59 19:42		07:54 18:29	17:37 (4) 22 17:59 (4)	07:53 16:27	15:50 (5) 4 15:54 (5)	08:38 16:05	
17	05:16 21:47	06:06 20:53	3 20:20 (2)	07:01 19:39	18:47 (3) 3 18:50 (3)	07:55 18:26	17:38 (4) 19 17:57 (4)	07:55 16:26	15:51 (5) 1 15:52 (5)	08:38 16:05	
18	05:17 21:46	06:08 20:50		07:03 19:37	18:42 (3) 12 18:54 (3)	07:57 18:24	17:39 (4) 16 17:55 (4)	07:57 16:24		08:39 16:05	
19	05:18 21:45	06:10 20:48		07:05 19:34	18:40 (3) 16 18:56 (3)	07:59 18:22	17:40 (4) 12 17:52 (4)	07:59 16:23		08:40 16:05	
20	05:20 21:44	20:26 (2) 6 20:32 (2)	06:12 20:46	07:06 19:32	18:38 (3) 19 18:57 (3)	08:01 18:20	17:42 (4) 8 17:50 (4)	08:00 16:22		08:41 16:06	
21	05:21 21:42	20:23 (2) 12 20:35 (2)	06:13 20:44	07:08 19:29	18:36 (3) 21 18:57 (3)	08:03 18:17	17:44 (4) 4 17:48 (4)	08:02 16:20		08:41 16:06	
22	05:23 21:41	20:21 (2) 15 20:36 (2)	06:15 20:42	07:10 19:27	18:35 (3) 23 18:58 (3)	08:05 18:15		08:04 16:19		08:42 16:06	
23	05:24 21:39	20:20 (2) 18 20:38 (2)	06:17 20:39	07:12 19:24	18:35 (3) 21 18:56 (3)	08:07 18:13		08:06 16:18		08:42 16:07	
24	05:26 21:38	20:19 (2) 20 20:39 (2)	06:19 20:37	07:13 19:22	18:34 (3) 20 18:54 (3)	08:09 18:11		08:08 16:17		08:43 16:08	
25	05:27 21:36	20:18 (2) 23 20:41 (2)	06:20 20:35	07:15 19:19	18:33 (3) 18 18:51 (3)	07:11 17:09		08:09 16:16		08:43 16:08	
26	05:29 21:35	20:17 (2) 24 20:41 (2)	06:22 20:32	07:17 19:17	18:33 (3) 15 18:48 (3)	07:13 17:06		08:11 16:14		08:43 16:09	
27	05:30 21:33	20:16 (2) 25 20:41 (2)	06:24 20:30	07:19 19:14	17:53 (4) 27 18:46 (3)	07:15 17:04		08:13 16:13		08:44 16:10	
28	05:32 21:32	20:15 (2) 27 20:42 (2)	06:26 20:28	07:21 19:12	17:49 (4) 31 18:44 (3)	07:16 17:02		08:14 16:12		08:44 16:11	
29	05:34 21:30	20:14 (2) 29 20:43 (2)	06:27 20:25	07:22 19:09	17:47 (4) 32 18:41 (3)	07:18 17:00		08:16 16:12		08:44 16:11	
30	05:35 21:28	20:14 (2) 29 20:43 (2)	06:29 20:23	07:24 19:07	17:44 (4) 31 18:38 (3)	07:20 16:58	15:55 (5) 4 15:59 (5)	08:18 16:11		08:44 16:12	
31	05:37 21:26	20:14 (2) 30 20:44 (2)	06:31 20:21			07:22 16:56	15:51 (5) 12 16:03 (5)			08:44 16:13	
Potential sun hours	512	460		382		328		259		233	
Total, worst case	258	397		289		622		276			
Sun reduction	0.32	0.34		0.32		0.29		0.27			
Oper. time red.	1.00	1.00		1.00		1.00		1.00			
Wind dir. red.	0.64	0.64		0.67		0.68		0.66			
Total reduction	0.21	0.22		0.22		0.20		0.18			
Total, real	54	87		62		123		48			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CH - H86

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:09 (5)	07:16	16:53 (4)	07:01	05:52	20:06 (2)	05:03		
	16:15	17:06	25 16:34 (5)	18:02	41 17:34 (4)	20:00	20:55	20	20:26 (2)	21:45	
2	08:44	08:12	16:09 (5)	07:14	16:53 (4)	06:59	05:50	20:05 (2)	05:02		
	16:16	17:08	25 16:34 (5)	18:04	41 17:34 (4)	20:02	20:57	22	20:27 (2)	21:46	
3	08:44	08:10	16:10 (5)	07:12	16:53 (4)	06:56	05:48	20:04 (2)	05:01		
	16:17	17:10	24 16:34 (5)	18:06	42 17:35 (4)	20:04	20:59	25	20:29 (2)	21:48	
4	08:43	08:08	16:10 (5)	07:09	16:53 (4)	06:54	05:46	20:03 (2)	05:00		
	16:18	17:12	23 16:33 (5)	18:07	42 17:35 (4)	20:06	21:01	27	20:30 (2)	21:49	
5	08:43	08:07	16:11 (5)	07:07	16:53 (4)	06:51	05:44	20:03 (2)	04:59		
	16:19	17:14	22 16:33 (5)	18:09	41 17:34 (4)	20:07	21:03	29	20:32 (2)	21:50	
6	08:42	08:05	16:12 (5)	07:04	16:53 (4)	06:49	05:42	20:02 (2)	04:59		
	16:21	17:16	20 16:32 (5)	18:11	40 17:33 (4)	20:09	21:04	31	20:33 (2)	21:51	
7	08:42	08:03	16:13 (5)	07:02	16:53 (4)	06:47	05:40	20:03 (2)	04:58		
	16:22	17:18	18 16:31 (5)	18:13	39 17:32 (4)	20:11	21:06	33	20:36 (2)	21:52	
8	08:42	08:01	16:15 (5)	07:00	16:54 (4)	06:44	05:38	20:02 (2)	04:57		
	16:24	17:20	15 16:30 (5)	18:15	38 17:32 (4)	20:13	21:08	34	20:36 (2)	21:53	
9	08:41	07:59	16:17 (5)	06:57	16:54 (4)	06:42	05:36	20:02 (2)	04:57		
	16:25	17:22	11 16:28 (5)	18:17	36 17:30 (4)	20:15	21:10	34	20:36 (2)	21:54	
10	08:40	07:57	06:55	18:19	34 17:29 (4)	20:17	05:34	20:02 (2)	04:56		
	16:26	17:24	06:52	18:21	31 17:28 (4)	20:19	21:11	33	20:35 (2)	21:55	
11	08:40	07:55	18:21	18:23	31 17:28 (4)	20:19	05:33	20:02 (2)	04:56		
	16:28	17:26	06:50	18:23	31 17:28 (4)	20:19	21:13	34	20:36 (2)	21:55	
12	08:39	07:53	18:23	18:25	30 17:58 (3)	20:22	05:31	20:02 (2)	04:55		
	16:30	17:28	06:48	18:25	30 17:58 (3)	20:22	21:17	33	20:35 (2)	21:57	
13	08:38	07:51	18:25	18:27	29 18:00 (3)	20:24	05:27	20:03 (2)	04:55		
	16:31	17:30	06:45	18:27	29 18:00 (3)	20:24	21:18	32	20:35 (2)	21:58	
14	08:37	07:49	18:27	18:28	24 18:02 (3)	20:26	05:26	20:03 (2)	04:55		
	16:33	17:32	06:43	18:28	24 18:02 (3)	20:26	21:20	31	20:34 (2)	21:58	
15	08:36	07:47	18:28	18:30	16 18:04 (3)	20:28	05:24	20:04 (2)	04:54		
	16:34	17:34	06:38	18:30	16 18:04 (3)	20:28	21:22	30	20:34 (2)	21:59	
16	08:35	07:45	17:08 (4)	18:32	18 18:06 (3)	20:30	05:22	20:04 (2)	04:54		
	16:36	17:36	17:09 (4)	18:32	18 18:06 (3)	20:30	21:23	29	20:33 (2)	21:59	
17	08:34	07:43	17:05 (4)	18:35	17 17:47 (3)	20:31	05:21	20:05 (2)	04:54		
	16:38	17:38	17:11 (4)	18:34	20 18:07 (3)	20:31	21:25	28	20:33 (2)	22:00	
18	08:33	07:41	17:03 (4)	18:33	22 18:10 (3)	20:33	05:19	20:06 (2)	04:54		
	16:40	17:40	17:13 (4)	18:36	22 18:10 (3)	20:33	21:27	27	20:33 (2)	22:00	
19	08:32	07:39	17:01 (4)	18:31	24 18:11 (3)	20:35	05:18	20:06 (2)	04:54		
	16:41	17:42	17:16 (4)	18:38	24 18:11 (3)	20:35	21:28	25	20:31 (2)	22:00	
20	08:31	07:36	17:00 (4)	18:28	22 18:10 (3)	20:37	05:16	20:08 (2)	04:54		
	16:43	17:44	17:18 (4)	18:40	22 18:10 (3)	20:37	21:30	23	20:31 (2)	22:01	
21	08:30	07:34	16:58 (4)	18:26	21 18:09 (3)	20:39	05:15	20:09 (2)	04:55		
	16:45	17:46	16:57 (4)	18:23	21 18:09 (3)	20:39	21:31	21	20:30 (2)	22:01	
22	08:29	16:10 (5)	16:57 (4)	18:42	19 18:08 (3)	20:41	05:13	20:10 (2)	04:55		
	16:47	16:12 (5)	17:22 (4)	18:43	19 18:08 (3)	20:41	21:33	18	20:28 (2)	22:01	
23	08:27	16:10 (5)	16:57 (4)	18:45	15 18:05 (3)	20:43	05:12	20:11 (2)	04:55		
	16:49	16:15 (5)	17:52	18:45	15 18:05 (3)	20:43	21:34	16	20:27 (2)	22:01	
24	08:26	16:09 (5)	16:55 (4)	18:47	9 18:02 (3)	20:44	05:11	20:13 (2)	04:55		
	16:50	16:09 (5)	17:54	18:47	9 18:02 (3)	20:44	21:36	13	20:26 (2)	22:01	
25	08:24	16:19 (5)	16:55 (4)	18:46		06:03	05:09	20:15 (2)	04:56		
	16:52	16:21 (5)	17:56	18:49		20:46	3 20:17 (2)	21:37	9 20:24 (2)	22:01	
26	08:23	16:19 (5)	16:54 (4)	18:51		06:01	20:12 (2)	05:08		04:56	
	16:54	16:23 (5)	17:58	18:51		20:48	7 20:19 (2)	21:39		22:01	
27	08:22	16:09 (5)	16:53 (4)	18:53		05:58	20:10 (2)	05:07		04:57	
	16:56	16:26 (5)	18:00	19:56		20:50	11 20:21 (2)	21:40		22:01	
28	08:20	16:08 (5)	17:32 (4)	19:54		05:56	20:08 (2)	05:06		04:57	
	16:58	16:28 (5)	19:54	20:52		05:54	14 20:22 (2)	21:41		22:01	
29	08:18	16:08 (5)	19:54	20:52		20:53	17 20:24 (2)	21:43		04:58	
	17:00	16:28 (5)	19:54	20:52		20:53	17 20:24 (2)	21:43		22:00	
30	08:17	16:08 (5)	19:54	20:52		20:53	17 20:24 (2)	21:43		22:00	
	17:02	16:30 (5)	19:54	20:52		20:53	17 20:24 (2)	21:43		22:00	
31	08:15	16:08 (5)	19:54	20:52		20:53	17 20:24 (2)	21:43		22:00	
	17:04	16:32 (5)	19:54	20:52		20:53	17 20:24 (2)	21:43		22:00	
Potential sun hours	250	273	367	420	494	510					
Total, worst case	135	446	725	52	690						
Sun reduction	0.24	0.23	0.27	0.35	0.38						
Oper. time red.	1.00	1.00	1.00	1.00	1.00						
Wind dir. red.	0.66	0.67	0.67	0.64	0.64						
Total reduction	0.16	0.16	0.18	0.23	0.25						
Total, real	22	69	133	12	169						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CH - H86

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December	
1	04:59		05:39	20:13 (2)	06:33		07:26	17:37 (4)	07:24	15:51 (5)	08:19	
	22:00		21:25	33 20:46 (2)	20:18		19:05	32 18:36 (3)	16:54	3 15:54 (5)	16:10	
2	04:59		05:40	20:13 (2)	06:35		07:28	17:36 (4)	07:26	15:46 (5)	08:21	
	22:00		21:23	33 20:46 (2)	20:16		19:02	30 18:06 (4)	16:52	12 15:58 (5)	16:09	
3	05:00		05:42	20:12 (2)	06:36		07:30	17:34 (4)	07:28	15:44 (5)	08:22	
	21:59		21:21	34 20:46 (2)	20:13		19:00	33 18:07 (4)	16:50	16 16:00 (5)	16:08	
4	05:01		05:44	20:12 (2)	06:38		07:31	17:33 (4)	07:30	15:43 (5)	08:24	
	21:59		21:19	34 20:46 (2)	20:11		18:57	35 18:08 (4)	16:48	18 16:01 (5)	16:08	
5	05:02		05:45	20:12 (2)	06:40		07:33	17:31 (4)	07:32	15:41 (5)	08:25	
	21:58		21:17	34 20:46 (2)	20:09		18:55	37 18:08 (4)	16:46	21 16:02 (5)	16:07	
6	05:03		05:47	20:12 (2)	06:42		07:35	17:31 (4)	07:34	15:41 (5)	08:26	
	21:58		21:15	33 20:45 (2)	20:06		18:52	38 18:09 (4)	16:44	22 16:03 (5)	16:07	
7	05:04		05:49	20:13 (2)	06:43		07:37	17:29 (4)	07:36	15:40 (5)	08:28	
	21:57		21:13	30 20:43 (2)	20:04		18:50	39 18:08 (4)	16:43	23 16:03 (5)	16:06	
8	05:05		05:51	20:12 (2)	06:45		07:39	17:28 (4)	07:38	15:39 (5)	08:29	
	21:56		21:12	29 20:41 (2)	20:01		18:48	41 18:09 (4)	16:41	25 16:04 (5)	16:06	
9	05:06		05:52	20:13 (2)	06:47		07:41	17:28 (4)	07:40	15:39 (5)	08:30	
	21:55		21:10	26 20:39 (2)	19:59		18:45	41 18:09 (4)	16:39	25 16:04 (5)	16:05	
10	05:07		05:54	20:13 (2)	06:49		07:42	17:27 (4)	07:42	15:40 (5)	08:31	
	21:55		21:07	24 20:37 (2)	19:56		18:43	42 18:09 (4)	16:37	25 16:05 (5)	16:05	
11	05:08		05:56	20:14 (2)	06:50		07:44	17:27 (4)	07:44	15:40 (5)	08:33	
	21:54		21:05	21 20:35 (2)	19:54		18:40	42 18:09 (4)	16:35	23 16:03 (5)	16:05	
12	05:09		05:57	20:15 (2)	06:52		07:46	17:27 (4)	07:45	15:40 (5)	08:34	
	21:53		21:03	19 20:34 (2)	19:51		18:38	42 18:09 (4)	16:34	21 16:01 (5)	16:05	
13	05:10		05:59	20:15 (2)	06:54		07:48	17:27 (4)	07:47	15:40 (5)	08:35	
	21:52		21:01	16 20:31 (2)	19:49		18:36	40 18:07 (4)	16:32	19 15:59 (5)	16:05	
14	05:12		06:01	20:16 (2)	06:56		07:50	17:27 (4)	07:49	15:41 (5)	08:36	
	21:51		20:59	13 20:29 (2)	19:47		18:33	37 18:04 (4)	16:31	17 15:58 (5)	16:04	
15	05:13		06:03	20:18 (2)	06:58		07:52	17:27 (4)	07:51	15:41 (5)	08:37	
	21:50		20:57	10 20:28 (2)	19:44		18:31	35 18:02 (4)	16:29	15 15:56 (5)	16:05	
16	05:14		06:04	20:19 (2)	06:59		07:54	17:27 (4)	07:53	15:42 (5)	08:38	
	21:49		20:55	6 20:25 (2)	19:42		18:29	32 17:59 (4)	16:27	12 15:54 (5)	16:05	
17	05:16		20:27 (2)	06:06	20:22 (2)	07:01	07:55	17:27 (4)	07:55	15:42 (5)	08:38	
	21:47	5	20:32 (2)	20:53	1 20:23 (2)	19:39	18:26	30 17:57 (4)	16:26	10 15:52 (5)	16:05	
18	05:17		20:24 (2)	06:08		07:03	18:42 (3)	07:57	17:28 (4)	07:57	15:43 (5)	
	21:46	11	20:35 (2)	20:51		19:37	7 18:49 (3)	18:24	27 17:55 (4)	16:24	8 15:51 (5)	
19	05:18		20:22 (2)	06:10		07:05	18:38 (3)	07:59	17:29 (4)	07:59	15:44 (5)	
	21:45	14	20:36 (2)	20:48		19:34	14 18:52 (3)	18:22	23 17:52 (4)	16:23	5 15:49 (5)	
20	05:20		20:21 (2)	06:12		07:06	18:36 (3)	08:01	17:30 (4)	08:00	15:45 (5)	
	21:44	17	20:38 (2)	20:46		19:32	18 18:54 (3)	18:20	20 17:50 (4)	16:22	2 15:47 (5)	
21	05:21		20:19 (2)	06:13		07:08	18:34 (3)	08:03	17:31 (4)	08:02		
	21:42	20	20:39 (2)	20:44		19:29	20 18:54 (3)	18:17	17 17:48 (4)	16:20		
22	05:23		20:18 (2)	06:15		07:10	18:33 (3)	08:05	17:32 (4)	08:04		
	21:41	22	20:40 (2)	20:42		19:27	22 18:55 (3)	18:15	13 17:45 (4)	16:19		
23	05:24		20:18 (2)	06:17		07:12	18:32 (3)	08:07	17:34 (4)	08:06		
	21:39	24	20:42 (2)	20:39		19:24	23 18:55 (3)	18:13	9 17:43 (4)	16:18		
24	05:26		20:16 (2)	06:19		07:13	18:31 (3)	08:09	17:36 (4)	08:08		
	21:38	26	20:42 (2)	20:37		19:22	23 18:54 (3)	18:11	5 17:41 (4)	16:17		
25	05:27		20:16 (2)	06:20		07:15	21 18:30 (3)	07:11		08:09		
	21:36	27	20:43 (2)	20:35		19:19	21 18:51 (3)	17:09		16:16		
26	05:29		20:15 (2)	06:22		07:17	18:30 (3)	07:13		08:11		
	21:35	29	20:44 (2)	20:32		19:17	18 18:48 (3)	17:06		16:14		
27	05:30		20:14 (2)	06:24		07:19	18:30 (3)	07:15		08:13		
	21:33	30	20:44 (2)	20:30		19:14	16 18:46 (3)	17:04		16:13		
28	05:32		20:14 (2)	06:26		07:21	17:50 (4)	07:16		08:14		
	21:32	31	20:45 (2)	20:28		19:12	19 18:44 (3)	17:02		16:12		
29	05:34		20:13 (2)	06:27		07:22	17:44 (4)	07:18		08:16		
	21:30	32	20:45 (2)	20:25		19:09	28 18:41 (3)	17:00		16:12		
30	05:35		20:13 (2)	06:29		07:24	17:40 (4)	07:20		08:18		
	21:28	32	20:45 (2)	20:23		19:07	30 18:38 (3)	16:58		16:11		
31	05:37		20:13 (2)	06:31				07:22				
	21:26	33	20:46 (2)	20:21				16:56				
Potential sun hours	512		460		382		328		259		233	
Total, worst case	353		396		259		740		322			
Sun reduction	0.32		0.34		0.32		0.29		0.27			
Oper. time red.	1.00		1.00		1.00		1.00		1.00			
Wind dir. red.	0.64		0.64		0.67		0.67		0.66			
Total reduction	0.21		0.22		0.22		0.20		0.18			
Total, real	74		87		56		146		56			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CI - H87

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CJ - H88

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:22 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CK - H89

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CL - H90

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
Total, real												

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CM - H91

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CN - H92

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CO - H93

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CP - H94

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CQ - H95

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CR - H96

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CS - H97

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CT - H98
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	05:52	05:03
	16:15	17:06	18:02	20:00	20:55	20:45 (4)
2	08:44	08:12	07:14	06:59	05:50	21:02 (4)
	16:16	17:08	18:04	20:02	20:57	20:46 (4)
3	08:43	08:10	07:11	06:56	05:48	21:03 (4)
	16:17	17:10	18:05	20:04	20:59	20:47 (4)
4	08:43	08:08	07:09	06:54	05:46	21:02 (4)
	16:18	17:12	18:07	20:06	21:01	20:47 (4)
5	08:43	08:07	07:07	06:51	05:44	21:01 (4)
	16:20	17:14	18:09	20:07	21:02	20:48 (4)
6	08:42	08:05	07:04	06:49	05:42	21:01 (4)
	16:21	17:16	18:11	20:09	21:04	20:49 (4)
7	08:42	08:03	07:02	06:47	19:41 (5)	21:01 (4)
	16:22	17:18	18:13	20:11	19:43 (5)	21:01 (4)
8	08:41	08:01	07:00	06:44	19:39 (5)	21:00 (4)
	16:24	17:20	18:15	20:13	19:46 (5)	20:51 (4)
9	08:41	07:59	06:57	06:42	19:38 (5)	21:00 (4)
	16:25	17:22	18:17	20:15	19:48 (5)	20:51 (4)
10	08:40	07:57	06:55	06:39	19:36 (5)	20:59 (4)
	16:26	17:24	18:19	20:17	19:49 (5)	20:53 (4)
11	08:40	07:55	06:52	06:37	19:36 (5)	20:59 (4)
	16:28	17:26	18:21	20:18	19:51 (5)	20:55 (4)
12	08:39	07:53	06:50	06:35	19:36 (5)	20:58 (4)
	16:30	17:28	18:23	20:20	19:53 (5)	20:55 (4)
13	08:38	07:51	06:48	06:32	19:35 (5)	20:56 (4)
	16:31	17:30	18:25	20:22	19:54 (5)	20:55 (4)
14	08:37	07:49	06:45	06:30	19:36 (5)	21:57
	16:33	17:32	18:26	20:24	19:53 (5)	20:55 (4)
15	08:36	07:47	06:43	06:28	19:36 (5)	20:55 (4)
	16:34	17:34	18:28	20:26	19:52 (5)	20:48 (4)
16	08:35	07:45	06:40	06:25	19:36 (5)	20:58 (4)
	16:36	17:36	18:30	20:28	19:50 (5)	20:45 (4)
17	08:34	07:43	06:38	06:23	19:38 (5)	20:50 (4)
	16:38	17:38	18:32	20:30	19:49 (5)	20:43 (4)
18	08:33	07:41	06:35	06:21	19:41 (5)	20:51 (4)
	16:40	17:40	18:34	20:31	19:46 (5)	20:43 (4)
19	08:32	07:39	06:33	06:18	05:19	20:52 (4)
	16:41	17:42	18:36	20:33	21:26	20:43 (4)
20	08:31	07:36	06:31	06:16	05:18	20:54 (4)
	16:43	17:44	18:38	20:35	21:28	20:42 (4)
21	08:30	07:34	06:28	06:14	05:16	20:55 (4)
	16:45	17:46	18:40	20:37	21:30	20:43 (4)
22	08:28	07:32	06:26	06:12	05:15	20:57 (4)
	16:47	17:48	18:41	20:39	21:31	20:43 (4)
23	08:27	07:30	06:23	06:09	05:13	20:54 (4)
	16:49	17:50	18:43	20:41	21:33	20:42 (4)
24	08:26	07:28	06:21	06:07	05:12	20:59 (4)
	16:50	17:52	18:45	20:42	21:34	20:42 (4)
25	08:24	07:25	06:18	06:05	05:11	21:01 (4)
	16:52	17:54	18:47	20:44	21:36	20:43 (4)
26	08:23	07:23	06:16	06:03	05:09	20:43 (4)
	16:54	17:56	18:49	20:46	21:37	20:42 (4)
27	08:21	07:21	06:13	06:01	05:08	21:03 (4)
	16:56	17:58	18:51	20:48	21:39	20:43 (4)
28	08:20	07:18	06:11	05:58	05:07	21:04 (4)
	16:58	18:00	18:53	20:50	21:40	20:44 (4)
29	08:18		07:08	05:56	05:06	21:04 (4)
	17:00		19:54	20:52	21:41	20:44 (4)
30	08:17		07:06	05:54	05:05	21:03 (4)
	17:02		19:56	20:53	21:43	20:44 (4)
31	08:15		07:04		05:04	21:03 (4)
	17:04		19:58		21:44	20:45 (4)
Potential sun hours	250	273	367	420	494	510
Total, worst case				146	251	126
Sun reduction				0.35	0.38	0.32
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.66	0.63	0.63
Total reduction				0.23	0.24	0.20
Total, real				34	60	25

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CT - H98

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59		05:39		06:33		19:35 (5)		07:26		07:24
	22:00		21:25		20:18	15	19:50 (5)		19:05		16:54
2	05:00		20:58 (4)		06:35		19:35 (5)		07:28		07:26
	21:59	5	21:03 (4)		20:16	13	19:48 (5)		19:02		16:52
3	05:00		20:57 (4)		06:36		19:35 (5)		07:30		07:28
	21:59	7	21:04 (4)		20:13	10	19:45 (5)		19:00		16:50
4	05:01		20:56 (4)		06:38		19:36 (5)		07:31		07:30
	21:59	9	21:05 (4)		20:11	7	19:43 (5)		18:57		16:48
5	05:02		20:56 (4)		06:40		19:38 (5)		07:33		07:32
	21:58	10	21:06 (4)		20:09	3	19:41 (5)		18:55		16:46
6	05:03		20:56 (4)		06:42				07:35		07:34
	21:57	11	21:07 (4)		20:06				18:52		16:44
7	05:04		20:55 (4)		06:43				07:37		07:36
	21:57	13	21:08 (4)		20:04				18:50		16:43
8	05:05		20:55 (4)		06:45				07:39		07:38
	21:56	14	21:09 (4)		20:01				18:48		16:41
9	05:06		20:54 (4)		06:47				07:41		07:40
	21:55	16	21:10 (4)		19:59				18:45		16:39
10	05:07		20:54 (4)		06:49				07:42		07:42
	21:54	16	21:10 (4)		19:56				18:43		16:37
11	05:08		20:54 (4)		06:50				07:44		07:43
	21:54	17	21:11 (4)		19:54				18:40		16:35
12	05:09		20:53 (4)		06:52				07:46		07:45
	21:53	18	21:11 (4)		19:51				18:38		16:34
13	05:11		20:53 (4)		06:54				07:48		07:47
	21:52	19	21:12 (4)		19:49				18:36		16:32
14	05:12		20:53 (4)		06:56				07:50		07:49
	21:51	19	21:12 (4)		19:46				18:33		16:31
15	05:13		20:52 (4)		06:57				07:52		07:51
	21:50	20	21:12 (4)		19:44				18:31		16:29
16	05:14		20:52 (4)		06:59				07:54		07:53
	21:48	20	21:12 (4)		19:42				18:29		16:27
17	05:16		20:53 (4)		07:01				07:55		07:55
	21:47	20	21:13 (4)		19:39				18:26		16:26
18	05:17		20:52 (4)		07:03				07:57		07:57
	21:46	20	21:12 (4)		19:37				18:24		16:24
19	05:18		20:52 (4)		07:05				07:59		07:58
	21:45	19	21:11 (4)		19:34				18:22		16:23
20	05:20		20:53 (4)		07:06				08:01		08:00
	21:43	17	21:10 (4)		19:32				18:20		16:22
21	05:21		20:52 (4)		07:08				08:03		08:02
	21:42	17	21:09 (4)		19:29				18:17		16:20
22	05:23		20:52 (4)		07:10				08:05		08:04
	21:41	15	21:07 (4)		19:27				18:15		16:19
23	05:24		20:53 (4)		07:12				08:07		08:06
	21:39	14	21:07 (4)		19:24				18:13		16:18
24	05:26		20:53 (4)		07:13				08:09		08:07
	21:38	12	21:05 (4)		19:22				18:11		16:17
25	05:27		20:54 (4)		19:43 (5)				07:11		08:09
	21:36	10	21:04 (4)		19:50 (5)				17:09		16:16
26	05:29		20:54 (4)		19:41 (5)				07:13		08:11
	21:35	8	21:02 (4)		19:52 (5)				17:06		16:14
27	05:30		20:54 (4)		19:39 (5)				07:14		08:13
	21:33	6	21:00 (4)		19:53 (5)				17:04		16:13
28	05:32		20:55 (4)		19:37 (5)				07:16		08:14
	21:31	4	20:59 (4)		19:53 (5)				17:02		16:12
29	05:34		20:56 (4)		19:37 (5)				07:18		08:16
	21:30	1	20:57 (4)		19:54 (5)				17:00		16:12
30	05:35				19:36 (5)				07:20		08:17
	21:28				19:54 (5)				16:58		16:11
31	05:37				19:35 (5)				07:22		08:18
	21:26				19:52 (5)				16:56		16:13
Potential sun hours	512		460		382				328		259
Total, worst case		377		100		48					233
Sun reduction		0.32		0.34		0.32					
Oper. time red.		1.00		1.00		1.00					
Wind dir. red.		0.63		0.66		0.66					
Total reduction		0.20		0.23		0.21					
Total, real		76		23		10					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CU - H99

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:53 (4)	20:18	19:04	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:46	21:59	21:23	20:52 (4)	20:16	19:02	16:09
3	08:43	08:10	07:11	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	17:10	18:05	20:04	20:59	21:47	21:59	21:21	20:50 (4)	20:13	19:00	16:08
4	08:43	08:08	07:09	06:54	05:46	20:29 (4)	05:00	05:44	06:38	07:31	07:30	08:23
	16:18	17:12	18:07	20:06	21:01	20:30 (4)	21:49	21:19	20:48 (4)	20:11	18:57	16:08
5	08:43	08:07	07:07	06:51	05:44	20:27 (4)	04:59	05:45	06:40	07:33	07:32	08:25
	16:19	17:14	18:09	20:07	21:02	20:32 (4)	21:50	21:17	20:46 (4)	20:09	18:55	16:07
6	08:42	08:05	07:04	06:49	05:42	20:26 (4)	04:59	05:47	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	20:33 (4)	21:51	21:15	20:45 (4)	20:06	18:52	16:07
7	08:42	08:03	07:02	06:47	05:40	20:26 (4)	04:58	05:49	06:37 (4)	06:43	07:37	08:28
	16:22	17:18	18:13	20:11	21:06	20:36 (4)	21:52	21:13	20:43 (4)	20:04	18:50	16:06
8	08:41	08:01	07:00	06:44	05:38	20:26 (4)	04:57	05:50	20:37 (4)	06:45	07:39	08:29
	16:24	17:20	18:15	20:13	21:08	20:37 (4)	21:53	21:11	20:41 (4)	20:01	18:48	16:06
9	08:41	07:59	06:57	06:42	05:36	20:25 (4)	04:57	05:52	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	20:38 (4)	21:54	21:09	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34	20:25 (4)	04:56	05:54	06:49	07:42	07:42	08:31
	16:26	17:24	18:19	20:17	21:11	20:40 (4)	21:54	21:07	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33	20:25 (4)	04:56	05:56	06:50	07:44	07:43	08:32
	16:28	17:26	18:21	20:18	21:13	20:42 (4)	21:55	21:05	19:54	18:40	16:35	16:05
12	08:39	07:53	06:50	06:35	05:31	20:25 (4)	04:55	05:57	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15	20:43 (4)	21:56	21:03	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29	20:25 (4)	04:55	05:59	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17	20:44 (4)	21:57	21:01	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27	20:26 (4)	04:55	06:01	06:56	07:50	07:49	08:36
	16:33	17:32	18:26	20:24	21:18	20:45 (4)	21:57	20:59	19:46	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26	20:26 (4)	04:55	06:03	06:57	07:52	07:51	08:37
	16:34	17:34	18:28	20:26	21:20	20:44 (4)	21:58	20:57	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24	20:27 (4)	04:54	06:04	06:59	07:54	07:53	08:37
	16:36	17:36	18:30	20:28	21:22	20:44 (4)	21:59	20:55	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	05:22	20:27 (4)	04:54	06:06	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30	21:23	20:42 (4)	21:59	20:53	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	05:21	20:29 (4)	04:54	06:08	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31	21:25	20:42 (4)	21:59	20:50	19:37	18:24	16:24	16:05
19	08:32	07:39	06:33	06:18	05:19	20:30 (4)	04:54	06:10	07:05	07:59	07:58	08:40
	16:41	17:42	18:36	20:33	21:26	20:41 (4)	22:00	20:48	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	05:18	20:32 (4)	04:54	06:12	07:06	08:01	08:00	08:40
	16:43	17:44	18:38	20:35	21:28	20:39 (4)	22:00	20:46	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30	22:00	21:42	20:44	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:11	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42
	16:47	17:48	18:41	20:39	21:31	22:01	21:41	20:41	19:27	18:15	16:19	16:06
23	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	21:33	22:01	21:39	3	20:47 (4)	20:39	19:24	16:18
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:07	08:43
	16:50	17:52	18:45	20:42	21:34	22:01	21:38	9	20:50 (4)	20:37	19:22	16:17
25	08:24	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09	08:43
	16:52	17:54	18:47	20:44	21:36	22:01	21:36	12	20:52 (4)	20:35	19:19	16:16
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:43
	16:54	17:56	18:49	20:46	21:37	22:01	21:35	14	20:53 (4)	20:32	19:17	16:09
27	08:21	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:14	08:13	08:43
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	16	20:53 (4)	20:30	19:14	16:10
28	08:20	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	08:44
	16:58	18:00	18:53	20:50	21:40	22:01	21:31	17	20:54 (4)	20:28	19:12	16:12
29	08:18		07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16	08:44
	17:00		19:54	20:52	21:41	22:00	21:30	18	20:54 (4)	20:25	19:09	16:11
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:17	08:44
	17:02		19:56	20:53	21:43	22:00	21:28	19	20:55 (4)	20:23	19:07	16:12
31	08:15		07:04		05:04		05:37	06:31	07:22	08:18	08:16	08:44
	17:04		19:58		21:44		21:26	19	20:55 (4)	20:21	16:56	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					216		127	91				
Sun reduction					0.38		0.32	0.34				
Oper. time red.					1.00		1.00	1.00				
Wind dir. red.					0.64		0.64	0.64				
Total reduction					0.24		0.21	0.22				
Total, real					53		26	20				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CV - H100

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:13 (4) 21:24 (4)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	21:10 (4) 21:59	05:00 21:24 (4)	21:14 (4) 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	21:09 (4) 21:59	05:00 21:23 (4)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:09 (4) 21:59	05:01 21:24 (4)	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	21:09 (4) 21:58	05:02 21:15 (4)	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:09 (4) 21:57	05:03 21:16 (4)	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:08 (4) 21:57	05:04 21:16 (4)	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:09 (4) 21:56	05:05 21:21 (4)	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:08 (4) 21:55	05:06 21:21 (4)	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:09 (4) 21:54	05:07 21:20 (4)	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:09 (4) 21:54	05:08 21:20 (4)	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:08 (4) 21:53	05:09 21:16 (4)	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:09 (4) 21:52	05:11 21:21 (4)	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:09 (4) 21:51	05:12 21:22 (4)	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:57 (5) 21:20	05:26 21:58	21:09 (4) 21:50	05:13 21:22 (4)	06:03 20:57	20:03 (5) 19:44	06:57 19:44	07:52 18:31	08:37 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:54 (5) 21:22	05:24 21:59	21:10 (4) 21:48	05:14 21:23 (4)	06:04 20:55	20:00 (5) 19:42	06:59 18:29	07:54 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:53 (5) 20:01 (5)	05:22 21:23	21:10 (4) 21:47	05:16 21:23 (4)	06:06 20:53	19:59 (5) 20:13 (5)	07:01 19:39	07:55 18:26	08:38 16:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:52 (5) 20:03 (5)	05:21 21:25	21:10 (4) 21:46	05:17 21:46	06:08 20:50	19:58 (5) 20:14 (5)	07:03 19:37	07:57 18:24	08:39 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	19:51 (5) 20:05 (5)	05:19 21:26	21:10 (4) 22:00	05:18 21:45	20:50 20:48	19:56 (5) 20:14 (5)	07:05 19:34	07:59 18:22	08:40 16:23
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:51 (5) 20:07 (5)	05:18 21:28	21:10 (4) 22:00	05:20 21:43	20:46 20:46	19:56 (5) 20:15 (5)	07:06 19:32	08:01 18:20	08:40 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:50 (5) 20:08 (5)	05:16 21:30	21:10 (4) 22:00	05:21 21:42	20:44 20:44	19:56 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:41 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	19:50 (5) 20:09 (5)	05:15 21:31	21:11 (4) 22:01	05:23 21:41	06:15 20:41	19:55 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:42 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:50 (5) 20:09 (5)	05:13 21:33	21:11 (4) 22:01	05:24 21:39	20:41 20:39	19:55 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:18
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	19:51 (5) 20:08 (5)	05:12 21:34	21:11 (4) 22:01	05:26 21:38	06:19 20:37	19:55 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:43 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19:51 (5) 20:07 (5)	05:11 21:36	21:12 (4) 22:01	05:27 21:36	20:30 20:35	19:55 (5) 20:06 (5)	07:15 19:19	07:11 17:09	08:09 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:52 (5) 20:06 (5)	05:09 21:37	21:12 (4) 22:01	05:29 21:35	20:32	19:56 (5) 20:04 (5)	07:17 19:17	07:13 17:06	08:11 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:54 (5) 20:05 (5)	05:08 21:39	21:11 (4) 22:01	05:30 21:33	06:24 20:30	19:57 (5) 20:02 (5)	07:19 19:14	07:14 17:04	08:13 16:13
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	19:57 (5) 20:02 (5)	05:07 21:40	21:12 (4) 22:01	05:32 21:31	06:26 20:28	19:58 (5) 19:59 (5)	07:21 19:12	07:16 17:02	08:14 16:12
29	08:18 17:00	07:08 19:54	05:56 20:52	05:06	05:06	04:57	21:13 (4)	05:34	06:27	07:22	07:18	16:16	08:44
30	08:17 17:02	07:06 19:56	05:54 20:53	05:05	05:05	04:58	21:13 (4)	05:35	06:29	07:24	17:00	16:12	08:44
31	08:15 17:04	07:04 19:58	05:04	05:04	05:04	22:00	21:24 (4)	05:37	06:31	19:07	07:20	16:11	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case				174		320		74		176			
Sun reduction				0.35		0.32		0.32		0.34			
Oper. time red.				1.00		1.00		1.00		1.00			
Wind dir. red.				0.65		0.61		0.61		0.65			
Total reduction				0.23		0.19		0.20		0.22			
Total, real				40		62		15		39			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CW - H101

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	[January	[February	[March	[April	[May	[June	[July	[August	[September	[October	[November	[December	
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	21:18 (4)	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	21:45	22:00	6	21:24 (4)	21:25	20:18	19:05	16:54
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00		21:18 (4)	05:40	06:35	07:28	07:26
	16:16	17:08	18:04	20:02	20:57	21:46	21:59	6	21:24 (4)	21:23	20:16	19:02	16:52
3	08:43	08:10	07:11	06:56	05:48	05:01	05:00		21:18 (4)	05:42	06:36	07:30	07:28
	16:17	17:10	18:05	20:04	20:59	21:47	21:59	5	21:23 (4)	21:21	20:13	19:00	16:50
4	08:43	08:08	07:09	06:54	05:46	05:00	05:01		21:19 (4)	05:44	06:38	07:31	07:30
	16:18	17:12	18:07	20:06	21:01	21:49	21:59	4	21:23 (4)	21:19	20:11	18:57	16:48
5	08:43	08:07	07:07	06:51	05:44	04:59	05:02		21:19 (4)	05:45	06:40	07:33	07:32
	16:20	17:14	18:09	20:07	21:02	21:50	21:58	4	21:23 (4)	21:17	20:09	18:55	16:46
6	08:42	08:05	07:04	06:49	05:42	04:59	05:03		21:20 (4)	05:47	06:42	07:35	07:34
	16:21	17:16	18:11	20:09	21:04	21:51	21:16 (4)	21:57	2	21:22 (4)	20:06	18:52	16:44
7	08:42	08:03	07:02	06:47	05:40	04:58	05:13 (4)	05:04		21:21 (4)	05:49	06:43	07:37
	16:22	17:18	18:13	20:11	21:06	21:52	3	21:16 (4)	21:57	1	21:22 (4)	20:04	18:50
8	08:41	08:01	07:00	06:44	05:38	04:57	21:13 (4)	05:05		05:51	06:45	07:39	07:38
	16:24	17:20	18:15	20:13	21:08	21:53	4	21:17 (4)	21:56		20:01	18:48	16:41
9	08:41	07:59	06:57	06:42	05:36	04:57	21:13 (4)	05:06		05:52	06:47	07:41	07:40
	16:25	17:22	18:17	20:15	21:10	21:54	5	21:18 (4)	21:55	21:09	19:59	18:45	16:39
10	08:40	07:57	06:55	06:39	05:34	04:56	21:13 (4)	05:07		05:54	06:49	07:42	07:42
	16:27	17:24	18:19	20:17	21:11	21:54	6	21:19 (4)	21:54	21:07	19:56	18:43	16:37
11	08:40	07:55	06:52	06:37	05:33	04:56	21:13 (4)	05:08		05:56	06:50	07:44	07:43
	16:28	17:26	18:21	20:18	21:13	21:55	7	21:20 (4)	21:54	21:05	19:54	18:40	16:35
12	08:39	07:53	06:50	06:35	05:31	04:55	21:13 (4)	05:09		05:57	06:52	07:46	07:45
	16:30	17:28	18:23	20:20	21:15	21:56	7	21:20 (4)	21:53	21:03	19:51	18:38	16:34
13	08:38	07:51	06:48	06:32	05:29	04:55	21:13 (4)	05:11		05:59	06:54	07:48	07:47
	16:31	17:30	18:25	20:22	21:17	21:57	8	21:21 (4)	21:52	21:01	19:49	18:36	16:32
14	08:37	07:49	06:45	06:30	05:27	04:55	21:13 (4)	05:12		06:01	20:04 (5)	06:56	07:50
	16:33	17:32	18:27	20:24	21:18	21:57	9	21:22 (4)	21:51	20:59	7	20:11 (5)	19:46
15	08:36	07:47	06:43	06:28	05:26	04:55	21:14 (4)	05:13		06:03	20:01 (5)	06:57	07:52
	16:34	17:34	18:28	20:26	21:20	21:58	8	21:22 (4)	21:50	20:57	12	20:13 (5)	19:44
16	08:35	07:45	06:40	06:25	19:55 (5)	05:24	04:54	21:14 (4)	05:14	06:04	19:59 (5)	06:59	07:54
	16:36	17:36	18:30	20:28	4	19:59 (5)	21:22	21:59	9	21:23 (4)	20:55	15	20:14 (5)
17	08:34	07:43	06:38	06:23	19:54 (5)	05:22	04:54	21:14 (4)	05:16	06:06	19:58 (5)	07:01	07:55
	16:38	17:38	18:32	20:30	7	20:01 (5)	21:23	21:59	9	21:23 (4)	20:53	17	20:15 (5)
18	08:33	07:41	06:35	06:21	19:53 (5)	05:21	04:54	21:14 (4)	05:17	06:08	19:58 (5)	07:03	07:57
	16:40	17:40	18:34	20:31	10	20:03 (5)	21:25	21:59	10	21:24 (4)	20:50	18	20:16 (5)
19	08:32	07:39	06:33	06:18	19:52 (5)	05:19	04:54	21:14 (4)	05:18	06:10	19:56 (5)	07:05	07:59
	16:41	17:42	18:36	20:33	13	20:05 (5)	21:26	22:00	10	21:24 (4)	20:48	19	20:15 (5)
20	08:31	07:36	06:31	06:16	19:52 (5)	05:18	04:54	21:14 (4)	05:20	06:12	19:56 (5)	07:06	08:01
	16:43	17:44	18:38	20:35	15	20:07 (5)	21:28	22:00	10	21:24 (4)	20:46	20	20:16 (5)
21	08:30	07:34	06:28	06:14	19:50 (5)	05:16	04:54	21:14 (4)	05:21	06:13	19:56 (5)	07:08	08:03
	16:45	17:46	18:40	20:37	18	20:08 (5)	21:30	22:00	10	21:24 (4)	20:44	19	20:15 (5)
22	08:28	07:32	06:26	06:12	19:50 (5)	05:15	04:55	21:15 (4)	05:23	06:15	19:55 (5)	07:10	08:05
	16:47	17:48	18:41	20:39	20	20:10 (5)	21:31	22:01	10	21:25 (4)	20:41	17	20:12 (5)
23	08:27	07:30	06:23	06:09	19:50 (5)	05:13	04:55	21:15 (4)	05:24	06:17	19:55 (5)	07:12	08:07
	16:49	17:50	18:43	20:41	20	20:10 (5)	21:33	22:01	10	21:25 (4)	20:39	15	20:10 (5)
24	08:26	07:28	06:21	06:07	19:51 (5)	05:12	04:55	21:15 (4)	05:26	06:19	19:56 (5)	07:13	08:09
	16:51	17:52	18:45	20:42	19	20:10 (5)	21:34	22:01	10	21:25 (4)	20:37	13	20:09 (5)
25	08:24	07:25	06:18	06:05	19:51 (5)	05:11	04:56	21:16 (4)	05:27	06:20	19:56 (5)	07:15	07:11
	16:52	17:54	18:47	20:44	18	20:09 (5)	21:36	22:01	9	21:25 (4)	20:35	10	20:06 (5)
26	08:23	07:23	06:16	06:03	19:52 (5)	05:09	04:56	21:16 (4)	05:29	06:22	19:57 (5)	07:17	07:13
	16:54	17:56	18:49	20:46	16	20:08 (5)	21:37	22:01	9	21:25 (4)	20:32	7	20:04 (5)
27	08:21	07:21	06:13	06:01	19:53 (5)	05:08	04:56	21:16 (4)	05:30	06:24	19:58 (5)	07:19	07:14
	16:56	17:58	18:51	20:48	14	20:07 (5)	21:39	22:01	8	21:24 (4)	20:30	4	20:02 (5)
28	08:20	07:18	06:11	05:58	19:54 (5)	05:07	04:57	21:16 (4)	05:32	06:26	07:21	07:16	
	16:58	18:00	18:53	20:50	11	20:05 (5)	21:40	22:01	9	21:25 (4)	20:28		19:12
29	08:18		07:08	05:56	19:57 (5)	05:06	04:58	21:17 (4)	05:34	06:27	07:22	07:18	
	17:00		19:54	20:52	5	20:02 (5)	21:41	22:00	8	21:25 (4)	20:25	19:09	17:00
30	08:17		07:06	05:54		05:05	04:58	21:17 (4)	05:35	06:29	07:24	07:20	
	17:02		19:56	20:53		21:43	22:00	7	21:24 (4)	21:28	20:23	19:07	16:58
31	08:15		07:04			05:04			05:37	06:31			07:22
	17:04		19:58			21:44			21:26	20:21			16:56
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233
Total, worst case				190		197		28		193			
Sun reduction				0.35		0.32		0.32		0.34			
Oper. time red.				1.00		1.00		1.00		1.00			
Wind dir. red.				0.65		0.61		0.61		0.65			
Total reduction				0.23		0.19		0.20		0.22			
Total, real				43		38		5		43			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: CX - H102

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April		May		June	July	August		September	October	November	December			
1	08:44	08:14	07:16	07:01		05:52		19:57 (5)	05:03	04:59		05:39		06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00		20:55	24	20:21 (5)	21:45	22:00		21:25		20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59		05:50		19:57 (5)	05:02	05:00		05:40		06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02		20:57	23	20:20 (5)	21:46	22:00		21:23		20:16	19:02	16:52	16:09	
3	08:43	08:10	07:11	06:56		05:48		19:58 (5)	05:01	05:00		05:42		06:36	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04		20:59	21	20:19 (5)	21:48	21:59		21:21		20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54		05:46		19:58 (5)	05:00	05:01		05:44	20:16 (5)	06:38	07:31	07:30	08:23	
	16:18	17:12	18:07	20:06		21:01	20	20:18 (5)	21:49	21:59		21:19	5	20:21 (5)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51		05:44		19:59 (5)	04:59	05:02		05:45		20:12 (5)	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07		21:02	18	20:17 (5)	21:50	21:58		21:17	11	20:23 (5)	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49		05:42		20:00 (5)	04:59	05:03		05:47		20:11 (5)	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09		21:04	16	20:16 (5)	21:51	21:57		21:15	14	20:25 (5)	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47		05:40		20:02 (5)	04:58	05:04		05:49		20:10 (5)	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11		21:06	13	20:15 (5)	21:52	21:57		21:13	17	20:27 (5)	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44		05:38		20:04 (5)	04:57	05:05		05:51		20:08 (5)	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13		21:08	9	20:13 (5)	21:53	21:56		21:11	19	20:27 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42		05:36			04:57	05:06		05:52		20:07 (5)	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15		21:10			21:54	21:55		21:09	21	20:28 (5)	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39		05:34			04:56	05:07		05:54		20:06 (5)	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17		21:11			21:54	21:54		21:07	22	20:28 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37		05:33			04:56	05:08		05:56		20:06 (5)	06:50	07:44	07:43	08:33
	16:28	17:26	18:21	20:18		21:13			21:55	21:54		21:05	23	20:29 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35		05:31			04:55	05:09		05:57		20:05 (5)	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20		21:15			21:56	21:53		21:03	24	20:29 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32		05:29			04:55	05:11		05:59		20:04 (5)	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22		21:17			21:57	21:52		21:01	25	20:29 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30		05:27			04:55	05:12		06:01		20:05 (5)	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24		21:18			21:57	21:51		20:59	24	20:29 (5)	19:47	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28		05:26			04:55	05:13		06:03		20:05 (5)	06:58	07:52	07:51	08:37
	16:34	17:34	18:28	20:26		21:20			21:58	21:50		20:57	23	20:28 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25		05:24			04:54	05:14		06:05		20:04 (5)	06:59	07:54	07:53	08:37
	16:36	17:36	18:30	20:28		21:22			21:59	21:48		20:55	21	20:25 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23		05:22			04:54	05:16		06:06		20:05 (5)	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30		21:23			21:59	21:47		20:53	18	20:23 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21		05:21			04:54	05:17		06:08		20:05 (5)	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31		21:25			21:59	21:46		20:50	17	20:22 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18		05:19			04:54	05:18		06:10		20:05 (5)	07:05	07:59	07:59	08:40
	16:41	17:42	18:36	20:33		21:27			22:00	21:45		20:48	14	20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16		05:18			04:54	05:20		06:12		20:06 (5)	07:06	08:01	08:00	08:41
	16:43	17:44	18:38	20:35		21:28			22:00	21:43		20:46	11	20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14		05:16			04:54	05:21		06:13		20:08 (5)	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	4	20:08 (5)	21:30		22:00	21:42		20:44	7	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12		05:15			04:55	05:23		06:15		20:09 (5)	07:10	08:05	08:04	08:42
	16:47	17:48	18:41	20:39	8	20:10 (5)	21:31		22:01	21:41		20:42	3	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09		05:13			04:55	05:24		06:17			07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	12	20:12 (5)	21:33		22:01	21:39		20:39			19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07		05:12			04:55	05:26		06:19			07:13	08:09	08:07	08:43
	16:51	17:52	18:45	20:42	14	20:13 (5)	21:34		22:01	21:38		20:37			19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05		05:11			04:56	05:27		06:20			07:15	07:11	08:09	08:43
	16:52	17:54	18:47	20:44	16	20:15 (5)	21:36		22:01	21:36		20:35			19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03		05:09			04:56	05:29		06:22			07:17	07:13	08:11	08:43
	16:54	17:56	18:49	20:46	19	20:17 (5)	21:37		22:01	21:35		20:32			19:17	17:06	16:15	16:09
27	08:21	07:21	06:13	06:01		05:08			04:56	05:30		06:24			07:19	07:14	08:13	08:43
	16:56	17:58	18:51	20:48	21	20:19 (5)	21:39		22:01	21:33		20:30			19:14	17:04	16:13	16:10
28	08:20	07:18	06:11	05:58		05:07			04:57	05:32		06:26			07:21	07:16	08:14	08:44
	16:58	18:00	18:53	20:50	24	20:21 (5)	21:40		22:01	21:32		20:28			19:12	17:02	16:13	16:11
29	08:18		07:08	05:56		05:06			04:58	05:34		06:28			07:22	07:18	08:16	08:44
	17:00		19:54	20:52	24	20:21 (5)	21:41		22:00	21:30		20:25			19:09	17:00	16:12	16:11
30	08:17		07:06	05:54		05:05			04:58	05:35		06:29			07:24	07:20	08:17	08:44
	17:02		19:56	20:53	24	20:21 (5)	21:43		22:00	21:28		20:23			19:07	16:58	16:11	16:12
31	08:15		07:04			05:04				05:37		06:31			07:22			08:44
	17:04		19:58			21:44				21:26		20:21			16:56			16:13
Potential sun hours	250	273	367	420		494			510	512		460		382	328	259		233
Total, worst case				166		144						319						
Sun reduction				0.35		0.38						0.34						
Oper. time red.				1.00		1.00						1.00						
Wind dir. red.				0.65		0.65						0.65						
Total reduction				0.23		0.25						0.22						
Total, real				38		36						71						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CY - H103

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:13 (5) 20:26 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:20 (5) 20:45 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10	
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	20:11 (5) 20:27 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:20 (5) 20:45 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	20:11 (5) 20:29 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:19 (5) 20:45 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08	
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	20:10 (5) 20:30 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:19 (5) 20:45 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08	
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	20:09 (5) 20:32 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:18 (5) 20:45 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07	
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:09 (5) 20:33 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:19 (5) 20:45 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:09 (5) 20:36 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:19 (5) 20:43 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06	
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:09 (5) 20:35 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:19 (5) 20:41 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06	
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:09 (5) 20:35 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:19 (5) 20:39 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05	
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:09 (5) 20:34 (5)	04:56 21:54	05:07 21:54	05:54 21:07	20:19 (5) 20:37 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05	
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:09 (5) 20:35 (5)	04:56 21:55	05:08 21:54	05:56 21:05	20:20 (5) 20:35 (5)	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05	
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:09 (5) 20:34 (5)	04:55 21:56	05:09 21:53	05:58 21:03	20:21 (5) 20:34 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05	
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:09 (5) 20:33 (5)	04:55 21:57	05:11 21:52	05:59 21:01	20:22 (5) 20:31 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05	
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:11 (5) 20:33 (5)	04:55 21:57	05:12 21:51	06:01 20:59	20:23 (5) 20:29 (5)	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05	
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:11 (5) 20:32 (5)	04:55 21:58	05:13 21:50	06:03 20:57	20:26 (5) 20:28 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05	
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:12 (5) 20:32 (5)	04:54 21:59	05:14 21:48	06:05 20:55		06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05	
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:13 (5) 20:30 (5)	04:54 21:59	05:16 21:47	06:06 20:53		07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05	
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	20:14 (5) 20:30 (5)	04:54 21:59	05:17 21:46	06:08 20:50		07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05	
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:16 (5) 20:29 (5)	04:54 22:00	05:18 21:45	06:10 20:48		07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05	
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:18 (5) 20:26 (5)	04:54 22:00	05:20 21:43	06:12 20:46		07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06	
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30		04:54 22:00	05:21 21:42	06:13 20:44		07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06	
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31		04:55 22:01	05:23 21:41	06:15 20:42		07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07	
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33		04:55 22:01	05:24 21:39		20:30 (5) 20:35 (5)	06:17 20:39	07:12 19:24	08:07 18:13	08:42 16:18	
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34		04:55 22:01	05:26 21:38	5	20:27 (5) 20:37 (5)	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36		04:56 22:01	05:27 21:36	10	20:26 (5) 20:40 (5)	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37		04:56 22:01	05:29 21:35	14	20:24 (5) 20:40 (5)	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39		04:56 22:01	05:30 21:33	16	20:24 (5) 20:42 (5)	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 20:21 (5)	20:18 (5) 20:21 (5)	04:57 21:40	05:32 22:01	18	20:22 (5) 20:42 (5)	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	20:15 (5) 20:22 (5)	05:06 21:41	04:58 22:00	05:34 21:30	20	20:22 (5) 20:44 (5)	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	20:14 (5) 20:24 (5)	05:05 21:43	04:58 22:00	05:35 21:28	22	20:21 (5) 20:44 (5)	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58			05:04 21:44		05:37 21:26	23	20:21 (5) 20:45 (5)	06:31 20:21	07:22 20:21		08:44 16:13	
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233	
Total, worst case				20	410			152			284				
Sun reduction				0.35	0.38			0.32			0.34				
Oper. time red.				1.00	1.00			1.00			1.00				
Wind dir. red.				0.64	0.64			0.64			0.64				
Total reduction				0.23	0.25			0.21			0.22				
Total, real				5	101			32			62				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: CZ - H104

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:14 (5) 20:26 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:18 (5) 20:48 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	20:12 (5) 20:27 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:18 (5) 20:48 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	20:11 (5) 20:29 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:18 (5) 20:48 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	20:10 (5) 20:30 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:18 (5) 20:48 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	20:09 (5) 20:32 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:18 (5) 20:46 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:09 (5) 20:33 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:18 (5) 20:45 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:09 (5) 20:36 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:19 (5) 20:43 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:08 (5) 20:37 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:19 (5) 20:41 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:08 (5) 20:38 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:20 (5) 20:39 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:07 (5) 20:37 (5)	04:56 21:55	05:07 21:54	05:54 21:07	20:20 (5) 20:37 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:08 (5) 20:38 (5)	04:56 21:55	05:08 21:54	05:56 21:05	20:21 (5) 20:35 (5)	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:08 (5) 20:38 (5)	04:55 21:56	05:09 21:53	05:58 21:03	20:23 (5) 20:34 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:07 (5) 20:37 (5)	04:55 21:57	05:11 21:52	05:59 21:01	20:24 (5) 20:31 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	20:08 (5) 20:37 (5)	04:55 21:57	05:12 21:51	06:01 20:59	20:26 (5) 20:29 (5)	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	20:08 (5) 20:37 (5)	04:55 21:58	05:13 21:50	06:03 20:57		06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	20:09 (5) 20:37 (5)	04:54 21:59	05:14 21:48	06:05 20:55		06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	20:09 (5) 20:36 (5)	04:54 21:59	05:16 21:47	7 20:30 (5) 20:37 (5)	06:06 20:53		07:01 19:39	07:55 18:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	20:10 (5) 20:36 (5)	04:54 21:59	05:17 21:46	12 20:27 (5) 20:39 (5)	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	20:11 (5) 20:36 (5)	04:54 22:00	05:18 21:45	15 20:25 (5) 20:40 (5)	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	20:11 (5) 20:34 (5)	04:54 22:00	05:20 21:43	17 20:25 (5) 20:42 (5)	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	20:12 (5) 20:34 (5)	04:54 22:00	05:21 21:42	19 20:24 (5) 20:43 (5)	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	20:13 (5) 20:33 (5)	04:55 22:01	05:23 21:41	21 20:22 (5) 20:43 (5)	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:14 (5) 20:32 (5)	04:55 22:01	05:24 21:39	23 20:22 (5) 20:45 (5)	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	20:15 (5) 20:31 (5)	04:55 22:01	05:26 21:38	24 20:21 (5) 20:45 (5)	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:17 (5) 20:30 (5)	04:56 22:01	05:27 21:36	25 20:21 (5) 20:46 (5)	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	20:19 (5) 20:28 (5)	04:56 22:01	05:29 21:35	26 20:20 (5) 20:46 (5)	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:22 (5) 20:25 (5)	04:56 22:01	05:31 21:33	27 20:20 (5) 20:47 (5)	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40		04:57 22:01	05:32 21:32	28 20:19 (5) 20:47 (5)	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 20:22 (5)	20:18 (5) 21:41	04:58 22:00	05:34 21:30	29 20:19 (5) 20:48 (5)	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 20:24 (5)	20:16 (5) 21:43	04:58 22:00	05:35 21:28	30 20:18 (5) 20:48 (5)	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:04 21:44	05:37 21:26	31 20:19 (5) 20:48 (5)	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259		233
Total, worst case				12	606		332	292						
Sun reduction				0.35	0.38		0.32	0.34						
Oper. time red.				1.00	1.00		1.00	1.00						
Wind dir. red.				0.64	0.64		0.64	0.64						
Total reduction				0.23	0.25		0.21	0.22						
Total, real				3	148		69	64						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DA - H105

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:18 (5) 21:24 (5)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	21:19 (5) 21:24 (5)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	21:19 (5) 21:23 (5)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	21:20 (5) 21:23 (5)	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	21:22 (5) 21:23 (5)	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:15 (5) 21:17 (5)	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	21:14 (5) 21:19 (5)	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	21:14 (5) 21:20 (5)	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:44 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:14 (5) 21:21 (5)	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:13 (5) 21:21 (5)	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:13 (5) 21:21 (5)	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:13 (5) 21:22 (5)	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:13 (5) 21:23 (5)	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:13 (5) 21:23 (5)	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:13 (5) 21:24 (5)	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	21:13 (5) 21:24 (5)	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:13 (5) 21:24 (5)	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:16 (5) 21:25 (5)	05:32 21:32	06:26 20:28	07:21 19:12	18:14 17:02	16:19 16:13
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case						199						
Sun reduction						0.32						
Oper. time red.						1.00						
Wind dir. red.						0.61						
Total reduction						0.19						
Total, real						39						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DB - H106

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
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11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DC - H107

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DD - H108

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01	18:50 (5)	05:52				05:03	20:40 (3)	
	16:15	17:06	18:02						20:00	38	19:28 (5)	20:55			21:45	27	21:07 (3)
2	08:44	08:12	07:14						06:59		18:49 (5)	05:50			05:02		20:41 (3)
	16:16	17:08	18:04						20:02	38	19:27 (5)	20:57			21:46	27	21:08 (3)
3	08:43	08:10	07:12						06:56		18:49 (5)	05:48			05:01		20:42 (3)
	16:17	17:10	18:06						20:04	38	19:27 (5)	20:59			21:48	26	21:08 (3)
4	08:43	08:08	07:09						06:54		18:50 (5)	05:46			05:00		20:42 (3)
	16:18	17:12	18:07						20:06	37	19:27 (5)	21:01			21:49	25	21:07 (3)
5	08:43	08:07	07:07						06:51		18:49 (5)	05:44			04:59		20:43 (3)
	16:20	17:14	18:09						20:07	37	19:26 (5)	21:03			21:50	25	21:08 (3)
6	08:42	08:05	07:04						06:49		18:50 (5)	05:42			04:59		20:43 (3)
	16:21	17:16	18:11						20:09	35	19:25 (5)	21:04			21:51	24	21:07 (3)
7	08:42	08:03	07:02						06:47		18:49 (5)	05:40			04:58		20:43 (3)
	16:22	17:18	18:13						20:11	35	19:24 (5)	21:06			21:52	24	21:07 (3)
8	08:41	08:01	07:00						06:44		18:50 (5)	05:38			04:57		20:43 (3)
	16:24	17:20	18:15						20:13	33	19:23 (5)	21:08			21:53	24	21:07 (3)
9	08:41	07:59	06:57						06:42		18:51 (5)	05:36			04:57		20:44 (3)
	16:25	17:22	18:17						20:15	31	19:22 (5)	21:10			21:54	24	21:08 (3)
10	08:40	07:57	06:55						06:39		18:51 (5)	05:34			04:56		20:44 (3)
	16:27	17:24	18:19						20:17	29	19:20 (5)	21:11			21:55	23	21:07 (3)
11	08:40	07:55	06:52						06:37		18:53 (5)	05:33			04:56		20:45 (3)
	16:28	17:26	18:21						20:19	26	19:19 (5)	21:13			21:55	22	21:07 (3)
12	08:39	07:53	06:50						06:35		18:55 (5)	05:31			04:55		20:46 (3)
	16:30	17:28	18:23						20:20	23	19:18 (5)	21:15			21:56	22	21:08 (3)
13	08:38	07:51	06:48						06:32		18:56 (5)	05:29			04:55		20:45 (3)
	16:31	17:30	18:25						20:22	19	19:15 (5)	21:17			21:57	22	21:07 (3)
14	08:37	07:49	06:45						06:30		18:59 (5)	05:27	20:45 (3)		04:55		20:46 (3)
	16:33	17:32	18:27						20:24	12	19:11 (5)	21:18	2	20:47 (3)	21:57	21	21:07 (3)
15	08:36	07:47	06:43						06:28			05:26		20:43 (3)	04:55		20:46 (3)
	16:34	17:34	18:28						20:26			21:20	5	20:48 (3)	21:58	21	21:07 (3)
16	08:35	07:45	06:40						06:25			05:24		20:43 (3)	04:54		20:47 (3)
	16:36	17:36	18:30						20:28			21:22	7	20:50 (3)	21:59	20	21:07 (3)
17	08:34	07:43	06:38						06:23			05:22		20:41 (3)	04:54		20:47 (3)
	16:38	17:38	18:32						20:30			21:23	10	20:51 (3)	21:59	20	21:07 (3)
18	08:33	07:41	06:35						06:21			05:21		20:41 (3)	04:54		20:47 (3)
	16:40	17:40	18:34						20:31			21:25	12	20:53 (3)	22:00	21	21:08 (3)
19	08:32	07:39	06:33						06:18			05:19		20:41 (3)	04:54		20:48 (3)
	16:41	17:42	18:36						20:33			21:27	13	20:54 (3)	22:00	20	21:08 (3)
20	08:31	07:36	06:31						06:16			05:18		20:40 (3)	04:54		20:48 (3)
	16:43	17:44	18:38						20:35			21:28	15	20:55 (3)	22:00	20	21:08 (3)
21	08:30	07:34	06:28						06:14			05:16		20:40 (3)	04:54		20:48 (3)
	16:45	17:46	18:40						20:37			21:30	17	20:57 (3)	22:00	20	21:08 (3)
22	08:28	07:32	06:26					18:05 (5)	06:12			05:15		20:40 (3)	04:55		20:49 (3)
	16:47	17:48	18:42	10				18:15 (5)	20:39			21:31	19	20:59 (3)	22:01	20	21:09 (3)
23	08:27	07:30	06:23					18:02 (5)	06:09			05:13		20:39 (3)	04:55		20:49 (3)
	16:49	17:50	18:43	15				18:17 (5)	20:41			21:33	20	20:59 (3)	22:01	20	21:09 (3)
24	08:26	07:28	06:21					17:59 (5)	06:07			05:12		20:39 (3)	04:55		20:48 (3)
	16:51	17:52	18:45	19				18:18 (5)	20:42			21:34	22	21:01 (3)	22:01	21	21:09 (3)
25	08:24	07:25	06:18					17:58 (5)	06:05			05:11		20:39 (3)	04:56		20:49 (3)
	16:52	17:54	18:47	23				18:21 (5)	20:44			21:36	23	21:02 (3)	22:01	20	21:09 (3)
26	08:23	07:23	06:16					17:56 (5)	06:03			05:09		20:40 (3)	04:56		20:49 (3)
	16:54	17:56	18:49	27				18:23 (5)	20:46			21:37	24	21:04 (3)	22:01	20	21:09 (3)
27	08:22	07:21	06:13					17:54 (5)	06:01			05:08		20:40 (3)	04:56		20:48 (3)
	16:56	17:58	18:51	30				18:24 (5)	20:48			21:39	25	21:05 (3)	22:01	21	21:09 (3)
28	08:20	07:18	06:11					17:54 (5)	05:58			05:07		20:40 (3)	04:57		20:49 (3)
	16:58	18:00	18:53	32				18:26 (5)	20:50			21:40	26	21:06 (3)	22:01	21	21:10 (3)
29	08:18		07:09					18:52 (5)	05:56			05:06		20:40 (3)	04:58		20:49 (3)
	17:00		19:54	35				19:27 (5)	20:52			21:41	27	21:07 (3)	22:01	22	21:11 (3)
30	08:17		07:06					18:52 (5)	05:54			05:05		20:40 (3)	04:58		20:49 (3)
	17:02		19:56	36				19:28 (5)	20:53			21:43	27	21:07 (3)	22:00	22	21:11 (3)
31	08:15		07:04					18:50 (5)				05:04		20:40 (3)			
	17:04		19:58	37				19:27 (5)				21:44	27	21:07 (3)			
Potential sun hours	250	273	367					420				494		510			
Total, worst case				264				431				321		665			
Sun reduction				0.27				0.35				0.38		0.32			
Oper. time red.				1.00				1.00				1.00		1.00			
Wind dir. red.				0.68				0.68				0.63		0.63			
Total reduction				0.18				0.24				0.24		0.20			
Total, real				48				103				76		133			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DD - H108

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:49 (3)	05:39	06:33	18:52 (5)	07:26	07:24	08:19			
	22:00	21:11 (3)	21:25	20:18	26	19:18 (5)	19:05	16:54	16:10		
2	05:00	20:49 (3)	05:40	06:35	18:50 (5)	07:28	07:26	08:21			
	22:00	21:12 (3)	21:23	20:16	29	19:19 (5)	19:02	16:52	16:09		
3	05:00	20:49 (3)	05:42	06:36	18:49 (5)	07:30	07:28	08:22			
	21:59	21:12 (3)	21:21	20:13	31	19:20 (5)	19:00	16:50	16:08		
4	05:01	20:49 (3)	05:44	06:38	18:47 (5)	07:31	07:30	08:24			
	21:59	21:12 (3)	21:19	20:11	33	19:20 (5)	18:57	16:48	16:08		
5	05:02	20:49 (3)	05:45	06:40	18:46 (5)	07:33	07:32	08:25			
	21:58	21:13 (3)	21:17	20:09	35	19:21 (5)	18:55	16:46	16:07		
6	05:03	20:49 (3)	05:47	06:42	18:46 (5)	07:35	07:34	08:26			
	21:57	21:14 (3)	21:15	20:06	35	19:21 (5)	18:52	16:44	16:07		
7	05:04	20:49 (3)	05:49	06:43	18:44 (5)	07:37	07:36	08:28			
	21:57	21:14 (3)	21:13	20:04	37	19:21 (5)	18:50	16:43	16:06		
8	05:05	20:49 (3)	05:51	06:45	18:44 (5)	07:39	07:38	08:29			
	21:56	21:14 (3)	21:11	20:01	37	19:21 (5)	18:48	16:41	16:06		
9	05:06	20:49 (3)	05:52	06:47	18:44 (5)	07:41	07:40	08:30			
	21:55	21:15 (3)	21:09	19:59	37	19:21 (5)	18:45	16:39	16:05		
10	05:07	20:49 (3)	05:54	06:49	18:43 (5)	07:42	07:42	08:31			
	21:55	21:15 (3)	21:07	19:56	37	19:20 (5)	18:43	16:37	16:05		
11	05:08	20:49 (3)	05:56	06:50	18:43 (5)	07:44	07:44	08:33			
	21:54	21:15 (3)	21:05	19:54	37	19:20 (5)	18:40	16:36	16:05		
12	05:09	20:49 (3)	05:58	06:52	18:43 (5)	07:46	07:45	08:34			
	21:53	21:16 (3)	21:03	19:51	37	19:20 (5)	18:38	16:34	16:05		
13	05:11	20:49 (3)	05:59	06:54	18:43 (5)	07:48	07:47	08:35			
	21:52	21:16 (3)	21:01	19:49	36	19:19 (5)	18:36	16:32	16:05		
14	05:12	20:49 (3)	06:01	06:56	18:42 (5)	07:50	07:49	08:36			
	21:51	21:16 (3)	20:59	19:47	36	19:18 (5)	18:33	16:31	16:05		
15	05:13	20:48 (3)	06:03	06:58	18:43 (5)	07:52	07:51	08:37			
	21:50	21:15 (3)	20:57	19:44	33	19:16 (5)	18:31	16:29	16:05		
16	05:14	20:49 (3)	06:05	06:59	18:44 (5)	07:54	07:53	08:38			
	21:49	21:15 (3)	20:55	19:42	30	19:14 (5)	18:29	16:27	16:05		
17	05:16	20:49 (3)	06:06	07:01	18:44 (5)	07:55	07:55	08:38			
	21:47	21:14 (3)	20:53	19:39	27	19:11 (5)	18:26	16:26	16:05		
18	05:17	20:49 (3)	06:08	07:03	18:45 (5)	07:57	07:57	08:39			
	21:46	21:12 (3)	20:50	19:37	23	19:08 (5)	18:24	16:25	16:05		
19	05:18	20:49 (3)	06:10	07:05	18:46 (5)	07:59	07:59	08:40			
	21:45	21:11 (3)	20:48	19:34	20	19:06 (5)	18:22	16:23	16:05		
20	05:20	20:50 (3)	06:12	07:06	18:48 (5)	08:01	08:00	08:41			
	21:44	21:10 (3)	20:46	19:32	16	19:04 (5)	18:20	16:22	16:06		
21	05:21	20:50 (3)	06:13	07:08	18:50 (5)	08:03	08:02	08:41			
	21:42	21:09 (3)	20:44	19:29	11	19:01 (5)	18:17	16:20	16:06		
22	05:23	20:50 (3)	06:15	07:10	08:05	08:04	08:42				
	21:41	21:07 (3)	20:42	19:27	18:15	16:19	16:07				
23	05:24	20:50 (3)	06:17	07:12	08:07	08:06	08:42				
	21:39	21:07 (3)	20:39	19:24	18:13	16:18	16:07				
24	05:26	20:50 (3)	06:19	07:13	08:09	08:08	08:43				
	21:38	21:05 (3)	20:37	19:22	18:11	16:17	16:08				
25	05:27	20:52 (3)	06:20	07:15	07:11	08:09	08:43				
	21:36	21:04 (3)	20:35	19:19	17:09	16:16	16:08				
26	05:29	20:52 (3)	06:22	07:17	07:13	08:11	08:43				
	21:35	21:02 (3)	20:32	19:17	17:07	16:15	16:09				
27	05:30	20:53 (3)	06:24	07:19	07:15	08:13	08:44				
	21:33	21:01 (3)	20:30	19:14	17:04	16:13	16:10				
28	05:32	20:53 (3)	06:26	07:21	07:16	08:14	08:44				
	21:32	20:59 (3)	20:28	19:12	17:02	16:13	16:11				
29	05:34	20:55 (3)	06:28	19:00 (5)	07:22	07:18	08:16	08:44			
	21:30	20:58 (3)	20:25	13	19:13 (5)	19:09	17:00	16:12	16:11		
30	05:35		06:29	18:57 (5)	07:24	07:20	08:18	08:44			
	21:28		20:23	19	19:16 (5)	19:07	16:58	16:11	16:12		
31	05:37		06:31	18:53 (5)		07:22		08:44			
	21:26		20:21	24	19:17 (5)		16:56		16:13		
Potential sun hours	512		460		382		328		259		233
Total, worst case	599		56		643						
Sun reduction	0.32		0.34		0.32						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.63		0.68		0.68						
Total reduction	0.20		0.23		0.22						
Total, real	121		13		139						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DE - H109

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	18:36 (5)	05:52
	16:15	17:06	18:02	20:00	29	19:05 (5)
2	08:44	08:12	07:14	06:59	18:37 (5)	05:50
	16:16	17:08	18:04	20:02	25	19:02 (5)
3	08:43	08:10	07:12	06:56	18:39 (5)	05:48
	16:17	17:10	18:06	20:04	22	19:01 (5)
4	08:43	08:08	07:09	06:54	18:41 (5)	05:46
	16:18	17:12	18:07	20:06	17	18:58 (5)
5	08:43	08:07	07:07	06:51	18:44 (5)	05:44
	16:20	17:14	18:09	20:07	10	18:54 (5)
6	08:42	08:05	07:04	06:49	05:42	04:59
	16:21	17:16	18:11	20:09	21:04	21:51
7	08:42	08:03	07:02	06:47	05:40	20:32 (3)
	16:22	17:18	18:13	20:11	21:06	4
8	08:42	08:01	07:00	06:44	05:38	20:31 (3)
	16:24	17:20	18:15	20:13	21:08	6
9	08:41	07:59	06:57	06:42	05:36	20:29 (3)
	16:25	17:22	18:17	20:15	21:10	10
10	08:40	07:57	06:55	06:39	05:34	20:28 (3)
	16:27	17:24	18:19	20:17	21:11	12
11	08:40	07:55	06:53	06:37	05:33	20:28 (3)
	16:28	17:26	18:21	20:19	21:13	14
12	08:39	07:53	06:50	06:35	05:31	20:27 (3)
	16:30	17:28	18:23	20:20	21:15	16
13	08:38	07:51	06:48	17:51 (5)	06:32	05:29
	16:31	17:30	18:25	7	17:58 (5)	20:22
14	08:37	07:49	06:45	17:47 (5)	06:30	05:27
	16:33	17:32	18:27	13	18:00 (5)	20:24
15	08:36	07:47	06:43	17:44 (5)	06:28	05:26
	16:34	17:34	18:28	18	18:02 (5)	20:26
16	08:35	07:45	06:40	17:42 (5)	06:25	05:24
	16:36	17:36	18:30	22	18:04 (5)	20:28
17	08:34	07:43	06:38	17:40 (5)	06:23	05:22
	16:38	17:38	18:32	26	18:06 (5)	20:30
18	08:33	07:41	06:35	17:38 (5)	06:21	05:21
	16:40	17:40	18:34	29	18:07 (5)	20:31
19	08:32	07:39	06:33	17:38 (5)	06:18	05:19
	16:41	17:42	18:36	32	18:10 (5)	20:33
20	08:31	07:36	06:31	17:36 (5)	06:16	05:18
	16:43	17:44	18:38	35	18:11 (5)	20:35
21	08:30	07:34	06:28	17:36 (5)	06:14	05:16
	16:45	17:46	18:40	36	18:12 (5)	20:37
22	08:28	07:32	06:26	17:35 (5)	06:12	05:15
	16:47	17:48	18:42	36	18:11 (5)	20:39
23	08:27	07:30	06:23	17:34 (5)	06:09	05:13
	16:49	17:50	18:43	38	18:12 (5)	20:41
24	08:26	07:28	06:21	17:33 (5)	06:07	05:12
	16:51	17:52	18:45	38	18:11 (5)	20:42
25	08:24	07:25	06:18	17:34 (5)	06:05	05:11
	16:52	17:54	18:47	37	18:11 (5)	20:44
26	08:23	07:23	06:16	17:34 (5)	06:03	05:09
	16:54	17:56	18:49	37	18:11 (5)	20:46
27	08:22	07:21	06:13	17:33 (5)	06:01	05:08
	16:56	17:58	18:51	37	18:10 (5)	20:48
28	08:20	07:18	06:11	17:34 (5)	05:58	05:07
	16:58	18:00	18:53	36	18:10 (5)	20:50
29	08:18		07:09	18:34 (5)	05:56	05:06
	17:00		19:54	34	19:08 (5)	20:52
30	08:17		07:06	18:35 (5)	05:54	05:05
	17:02		19:56	33	19:08 (5)	20:53
31	08:15		07:04	18:35 (5)		05:04
	17:04		19:58	31	19:06 (5)	21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case			575	103	517	107
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.67	0.63	0.63
Total reduction			0.18	0.24	0.24	0.20
Total, real			105	24	125	21

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DE - H109

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59		05:39	20:38 (3)	06:33		07:26	07:24	08:19		
	22:00		21:25	15 20:53 (3)	20:18		19:05	16:54	16:10		
2	05:00		05:40		20:39 (3)	06:35		07:28	07:26	08:21	
	22:00		21:23	13 20:52 (3)	20:16		19:02	16:52	16:09		
3	05:00		05:42		20:39 (3)	06:36		07:30	07:28	08:22	
	21:59		21:21	11 20:50 (3)	20:13		19:00	16:50	16:08		
4	05:01		05:44		20:40 (3)	06:38		07:31	07:30	08:24	
	21:59		21:19	8 20:48 (3)	20:11		18:57	16:48	16:08		
5	05:02		05:45		20:40 (3)	06:40		07:33	07:32	08:25	
	21:58		21:17	6 20:46 (3)	20:09		18:55	16:46	16:07		
6	05:03		05:47		20:42 (3)	06:42		07:35	07:34	08:26	
	21:57	6 20:52 (3)	21:15	3 20:45 (3)	20:06		18:52	16:44	16:07		
7	05:04		05:49		06:43	18:40 (5)	07:37	07:36	08:28		
	21:57	9 20:54 (3)	21:13		20:04	8 18:48 (5)	18:50	16:43	16:06		
8	05:05		05:51		06:45	18:36 (5)	07:39	07:38	08:29		
	21:56	11 20:55 (3)	21:11		20:01	16 18:52 (5)	18:48	16:41	16:06		
9	05:06		05:52		06:47	18:33 (5)	07:41	07:40	08:30		
	21:55	13 20:56 (3)	21:09		19:59	22 18:55 (5)	18:45	16:39	16:05		
10	05:07		05:54		06:49	18:30 (5)	07:42	07:42	08:31		
	21:55	15 20:57 (3)	21:07		19:56	25 18:55 (5)	18:43	16:37	16:05		
11	05:08		05:56		06:50	18:29 (5)	07:44	07:44	08:33		
	21:54	17 20:58 (3)	21:05		19:54	28 18:57 (5)	18:40	16:36	16:05		
12	05:09		05:58		06:52	18:27 (5)	07:46	07:45	08:34		
	21:53	18 20:59 (3)	21:03		19:51	31 18:58 (5)	18:38	16:34	16:05		
13	05:11		05:59		06:54	18:26 (5)	07:48	07:47	08:35		
	21:52	20 21:00 (3)	21:01		19:49	33 18:59 (5)	18:36	16:32	16:05		
14	05:12		06:01		06:56	18:24 (5)	07:50	07:49	08:36		
	21:51	21 21:00 (3)	20:59		19:47	34 18:58 (5)	18:33	16:31	16:05		
15	05:13		06:03		06:58	18:24 (5)	07:52	07:51	08:37		
	21:50	22 21:01 (3)	20:57		19:44	35 18:59 (5)	18:31	16:29	16:05		
16	05:14		06:05		06:59	18:23 (5)	07:54	07:53	08:38		
	21:49	23 21:02 (3)	20:55		19:42	36 18:59 (5)	18:29	16:27	16:05		
17	05:16		06:06		07:01	18:21 (5)	07:55	07:55	08:38		
	21:47	25 21:03 (3)	20:53		19:39	37 18:58 (5)	18:26	16:26	16:05		
18	05:17		06:08		07:03	18:21 (5)	07:57	07:57	08:39		
	21:46	25 21:03 (3)	20:50		19:37	37 18:58 (5)	18:24	16:25	16:05		
19	05:18		06:10		07:05	18:21 (5)	07:59	07:59	08:40		
	21:45	26 21:03 (3)	20:48		19:34	37 18:58 (5)	18:22	16:23	16:05		
20	05:20		06:12		07:06	18:21 (5)	08:01	08:00	08:41		
	21:44	26 21:04 (3)	20:46		19:32	37 18:58 (5)	18:20	16:22	16:06		
21	05:21		06:13		07:08	18:20 (5)	08:03	08:02	08:41		
	21:42	27 21:04 (3)	20:44		19:29	37 18:57 (5)	18:17	16:20	16:06		
22	05:23		06:15		07:10	18:20 (5)	08:05	08:04	08:42		
	21:41	28 21:04 (3)	20:42		19:27	36 18:56 (5)	18:15	16:19	16:07		
23	05:24		06:17		07:12	18:21 (5)	08:07	08:06	08:42		
	21:39	28 21:05 (3)	20:39		19:24	35 18:56 (5)	18:13	16:18	16:07		
24	05:26		06:19		07:13	18:21 (5)	08:09	08:08	08:43		
	21:38	29 21:05 (3)	20:37		19:22	33 18:54 (5)	18:11	16:17	16:08		
25	05:27		06:20		07:15	18:21 (5)	07:11	08:09	08:43		
	21:36	27 21:04 (3)	20:35		19:19	30 18:51 (5)	17:09	16:16	16:08		
26	05:29		06:22		07:17	18:22 (5)	07:13	08:11	08:43		
	21:35	26 21:02 (3)	20:32		19:17	26 18:48 (5)	17:07	16:15	16:09		
27	05:30		06:24		07:19	18:23 (5)	07:15	08:13	08:44		
	21:33	24 21:01 (3)	20:30		19:14	23 18:46 (5)	17:04	16:13	16:10		
28	05:32		06:26		07:21	18:24 (5)	07:16	08:14	08:44		
	21:32	22 20:59 (3)	20:28		19:12	20 18:44 (5)	17:02	16:13	16:11		
29	05:34		06:28		07:22	18:26 (5)	07:18	08:16	08:44		
	21:30	21 20:58 (3)	20:25		19:09	15 18:41 (5)	17:00	16:12	16:11		
30	05:35		06:29		07:24	18:28 (5)	07:20	08:18	08:44		
	21:28	19 20:56 (3)	20:23		19:07	10 18:38 (5)	16:58	16:11	16:12		
31	05:37		06:31				07:22		08:44		
	21:26	17 20:55 (3)	20:21				16:56		16:13		
Potential sun hours	512		460		382		328	259	233		
Total, worst case	545		56		681						
Sun reduction	0.32		0.34		0.32						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.63		0.63		0.67						
Total reduction	0.21		0.22		0.22						
Total, real	112		12		147						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DF - H110

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:20 (3) 20:26 (3)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	20:19 (3) 20:57	21:45 21:46
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	20:18 (3) 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	20:17 (3) 21:01	05:00 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	20:16 (3) 21:03	04:59 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	20:15 (3) 21:04	04:59 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	17:39 (5) 20:11	20:15 (3) 21:06	04:58 21:52
8	08:42 16:24	08:01 17:20	07:00 18:15	17:36 (5) 20:13	20:15 (3) 21:08	04:57 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	17:33 (5) 20:15	20:14 (3) 21:10	04:57 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	17:31 (5) 20:17	20:14 (3) 21:11	04:56 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	17:30 (5) 20:19	20:15 (3) 21:13	04:56 21:55
12	08:39 16:30	07:53 17:28	06:50 18:23	17:28 (5) 20:20	20:14 (3) 21:15	04:55 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	17:27 (5) 20:22	20:14 (3) 21:17	04:55 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	17:26 (5) 20:24	20:15 (3) 21:18	04:55 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	17:25 (5) 20:26	20:15 (3) 21:20	04:55 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	17:24 (5) 20:28	20:16 (3) 21:22	04:54 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	17:24 (5) 20:30	20:16 (3) 21:23	04:54 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	17:23 (5) 20:31	20:17 (3) 21:25	04:54 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	17:24 (5) 20:33	20:18 (3) 21:27	04:54 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	17:23 (5) 20:35	20:18 (3) 21:28	04:54 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	17:24 (5) 20:37	20:19 (3) 21:30	04:54 22:01
22	08:28 16:47	07:32 17:48	06:26 18:42	17:23 (5) 20:39	20:21 (3) 21:31	04:55 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	17:24 (5) 20:41	20:21 (3) 21:33	04:55 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	17:24 (5) 20:42	20:23 (3) 21:34	04:55 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	17:26 (5) 20:44	20:26 (3) 21:36	04:56 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	17:27 (5) 20:46	20:27 (4) 21:37	04:56 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:28 (5) 20:48	20:28 (4) 21:39	04:56 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	17:31 (5) 20:50	20:29 (4) 21:40	04:57 22:01
29	08:18 17:00	07:09 19:54	07:09 19:54	18:34 (5) 20:52	20:30 (4) 21:41	04:58 22:01
30	08:17 17:02	07:06 19:56	07:06 19:56	20:54 20:53	20:44 (4) 21:43	04:58 22:00
31	08:15 17:04	07:04 19:58	07:04 19:58	20:54 20:53	20:43 (4) 21:44	04:58 22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case			620	2	645	1170
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.64	0.63	0.61
Total reduction			0.18	0.23	0.24	0.20
Total, real			113	0	156	228

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** DF - H110

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:45 (4)	05:39	20:25 (3)	06:33	07:26	18:06 (5)	07:24	08:19		
	22:00	39	21:24 (4)	21:25	28	20:53 (3)	20:18		16:10		
2	05:00	20:46 (4)	05:40	20:25 (3)	06:35	07:28	18:07 (5)	07:26	08:21		
	22:00	38	21:24 (4)	21:23	27	20:52 (3)	20:16	19:02	26	18:33 (5)	16:52
3	05:00	20:45 (4)	05:42	20:24 (3)	06:36	07:30	18:08 (5)	07:28	08:22		
	21:59	38	21:23 (4)	21:21	26	20:50 (3)	20:13	19:00	23	18:31 (5)	16:50
4	05:01	20:46 (4)	05:44	20:25 (3)	06:38	07:31	18:10 (5)	07:30	08:24		
	21:59	37	21:23 (4)	21:19	23	20:48 (3)	20:11	18:57	19	18:29 (5)	16:48
5	05:02	20:47 (4)	05:45	20:24 (3)	06:40	07:33	18:12 (5)	07:32	08:25		
	21:58	36	21:23 (4)	21:17	22	20:46 (3)	20:09	18:55	14	18:26 (5)	16:46
6	05:03	20:47 (4)	05:47	20:25 (3)	06:42	07:35	18:14 (5)	07:34	08:26		
	21:57	35	21:22 (4)	21:15	20	20:45 (3)	20:06	18:52	10	18:24 (5)	16:44
7	05:04	20:48 (4)	05:49	20:26 (3)	06:43	07:37		07:36	08:28		
	21:57	34	21:22 (4)	21:13	17	20:43 (3)	20:04	18:50		16:43	16:06
8	05:05	20:49 (4)	05:51	20:25 (3)	06:45	07:39		07:38	08:29		
	21:56	32	21:21 (4)	21:11	16	20:41 (3)	20:01	18:48		16:41	16:06
9	05:06	20:49 (4)	05:52	20:26 (3)	06:47	07:41		07:40	08:30		
	21:55	32	21:21 (4)	21:09	13	20:39 (3)	19:59	18:45		16:39	16:05
10	05:07	20:50 (4)	05:54	20:26 (3)	06:49	07:42		07:42	08:31		
	21:55	30	21:20 (4)	21:07	11	20:37 (3)	19:56	18:43		16:37	16:05
11	05:08	20:51 (4)	05:56	20:28 (3)	06:50	07:44		07:44	08:33		
	21:54	28	21:19 (4)	21:05	7	20:35 (3)	19:54	18:40		16:36	16:05
12	05:09	20:51 (4)	05:58	20:29 (3)	06:52	07:46		07:45	08:34		
	21:53	27	21:18 (4)	21:03	5	20:34 (3)	19:51	18:38		16:34	16:05
13	05:11	20:52 (4)	05:59	20:30 (3)	06:54	07:48		07:47	08:35		
	21:52	25	21:17 (4)	21:01	1	20:31 (3)	19:49	18:36		16:32	16:05
14	05:12	20:53 (4)	06:01	06:56		18:25 (5)	07:50	07:49	08:36		
	21:51	23	21:16 (4)	20:59		19:47	8	18:33 (5)	18:33	16:31	16:05
15	05:13	20:54 (4)	06:03	06:58		18:21 (5)	07:52	07:51	08:37		
	21:50	21	21:15 (4)	20:57		19:44	16	18:37 (5)	18:31	16:29	16:05
16	05:14	20:55 (4)	06:05	06:59		18:18 (5)	07:54	07:53	08:38		
	21:49	20	21:15 (4)	20:55		19:42	21	18:39 (5)	18:29	16:27	16:05
17	05:16	20:56 (4)	06:06	07:01		18:15 (5)	07:55	07:55	08:38		
	21:47	18	21:14 (4)	20:53		19:39	25	18:40 (5)	18:26	16:26	16:05
18	05:17	20:58 (4)	06:08	07:03		18:13 (5)	07:57	07:57	08:39		
	21:46	14	21:12 (4)	20:50		19:37	28	18:41 (5)	18:24	16:25	16:05
19	05:18	20:34 (3)	06:10	07:05		18:12 (5)	07:59	07:59	08:40		
	21:45	21	21:11 (4)	20:48		19:34	30	18:42 (5)	18:22	16:23	16:05
20	05:20	20:33 (3)	06:12	07:06		18:11 (5)	08:01	08:00	08:41		
	21:44	20	21:10 (4)	20:46		19:32	32	18:43 (5)	18:20	16:22	16:06
21	05:21	20:31 (3)	06:13	07:08		18:09 (5)	08:03	08:02	08:41		
	21:42	20	21:09 (4)	20:44		19:29	33	18:42 (5)	18:17	16:20	16:06
22	05:23	20:30 (3)	06:15	07:10		18:08 (5)	08:05	08:04	08:42		
	21:41	17	20:47 (3)	20:42		19:27	35	18:43 (5)	18:15	16:19	16:07
23	05:24	20:29 (3)	06:17	07:12		18:08 (5)	08:07	08:06	08:42		
	21:39	20	20:49 (3)	20:39		19:24	35	18:43 (5)	18:13	16:18	16:07
24	05:26	20:28 (3)	06:19	07:13		18:07 (5)	08:09	08:08	08:43		
	21:38	21	20:49 (3)	20:37		19:22	36	18:43 (5)	18:11	16:17	16:08
25	05:27	20:28 (3)	06:20	07:15		18:06 (5)	07:11	08:09	08:43		
	21:36	23	20:51 (3)	20:35		19:19	36	18:42 (5)	17:09	16:16	16:08
26	05:29	20:27 (3)	06:22	07:17		18:06 (5)	07:13	08:11	08:43		
	21:35	24	20:51 (3)	20:32		19:17	36	18:42 (5)	17:07	16:15	16:09
27	05:30	20:27 (3)	06:24	07:19		18:06 (5)	07:15	08:13	08:44		
	21:33	25	20:52 (3)	20:30		19:14	36	18:42 (5)	17:04	16:13	16:10
28	05:32	20:26 (3)	06:26	07:21		18:06 (5)	07:16	08:14	08:44		
	21:32	26	20:52 (3)	20:28		19:12	35	18:41 (5)	17:02	16:13	16:11
29	05:34	20:26 (3)	06:28	07:22		18:06 (5)	07:18	08:16	08:44		
	21:30	27	20:53 (3)	20:25		19:09	35	18:41 (5)	17:00	16:12	16:11
30	05:35	20:25 (3)	06:29	07:24		18:06 (5)	07:20	08:18	08:44		
	21:28	28	20:53 (3)	20:23		19:07	32	18:38 (5)	16:58	16:11	16:12
31	05:37	20:25 (3)	06:31			07:22			08:44		
	21:26	28	20:53 (3)	20:21		16:56			16:13		
Potential sun hours	512		460		382		328		259		233
Total, worst case	827		216		509		122				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.62		0.64		0.67		0.67				
Total reduction	0.20		0.22		0.22		0.20				
Total, real	166		47		110		24				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DG - H111

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:58 (2) 20:10 (2)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	20:01 (2) 20:06 (2)
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49
5	08:43 16:19	08:07 17:14	07:07 18:09	17:39 (4) 17:42 (4)	06:51 20:07	05:44 21:03
6	08:42 16:21	08:05 17:16	07:04 18:11	17:38 (4) 17:45 (4)	06:49 20:09	05:42 21:04
7	08:42 16:22	08:03 17:18	07:02 18:13	17:36 (4) 17:46 (4)	06:47 20:11	05:40 21:06
8	08:41 16:24	08:01 17:20	07:00 18:15	17:35 (4) 17:48 (4)	06:44 20:13	05:38 21:08
9	08:41 16:25	07:59 17:22	06:57 18:17	17:34 (4) 17:50 (4)	06:42 20:15	05:36 21:10
10	08:40 16:26	07:57 17:24	16:53 (5) 16:54 (5)	06:55 18:19	17:34 (4) 20:17	05:34 21:11
11	08:40 16:28	07:55 17:26	16:52 (5) 16:56 (5)	06:52 18:21	17:34 (4) 20:18	05:33 21:13
12	08:39 16:30	07:53 17:28	16:51 (5) 16:58 (5)	06:50 18:23	17:33 (4) 20:20	05:31 21:15
13	08:38 16:31	07:51 17:30	16:50 (5) 17:00 (5)	06:48 18:25	17:33 (4) 20:22	05:29 21:17
14	08:37 16:33	07:49 17:32	16:50 (5) 17:02 (5)	06:45 18:27	17:33 (4) 20:24	05:27 21:18
15	08:36 16:34	07:47 17:34	16:50 (5) 17:05 (5)	06:43 18:28	17:34 (4) 20:26	05:26 21:20
16	08:35 16:36	07:45 17:36	16:51 (5) 17:07 (5)	06:40 18:30	17:34 (4) 20:28	05:24 21:22
17	08:34 16:38	07:43 17:38	16:51 (5) 17:09 (5)	06:38 18:32	17:35 (4) 20:30	05:22 21:23
18	08:33 16:40	07:41 17:40	16:51 (5) 17:08 (5)	06:35 18:34	17:36 (4) 20:31	05:21 21:25
19	08:32 16:41	07:39 17:42	16:52 (5) 17:07 (5)	06:33 18:36	17:39 (4) 20:33	05:19 21:27
20	08:31 16:43	07:36 17:44	16:54 (5) 17:06 (5)	06:31 18:38	18:01 (3) 20:35	05:18 21:28
21	08:30 16:45	07:34 17:46	16:57 (5) 17:03 (5)	06:28 18:40	18:01 (3) 20:37	05:16 21:30
22	08:28 16:47	07:32 17:48	06:26 18:41	18:13 (3) 20:37	18:01 (3) 20:39	05:15 21:31
23	08:27 16:49	07:30 17:50	06:23 18:43	18:02 (3) 20:41	06:09 20:41	05:13 21:33
24	08:26 16:50	07:28 17:52	06:21 18:45	18:02 (3) 20:42	06:07 20:42	05:12 21:34
25	08:24 16:52	07:25 17:54	06:18 18:47	18:04 (3) 20:44	06:05 20:44	05:11 21:36
26	08:23 16:54	07:23 17:56	06:16 18:49	18:14 (3) 20:46	06:03 20:46	05:09 21:37
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	19:54 (2) 20:15 (2)	05:08 21:39
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	19:55 (2) 20:14 (2)	05:07 21:40
29	08:18 17:00		07:08 19:54	05:56 20:52	19:56 (2) 20:13 (2)	05:06 21:41
30	08:17 17:02		07:06 19:56	05:54 20:53	19:57 (2) 20:12 (2)	05:05 21:43
31	08:15 17:04		07:04 19:58			05:04 21:44
Potential sun hours	250	273	367	420	494	510
Total, worst case		133	345	210	17	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.66	0.68	0.65	0.65	
Total reduction		0.15	0.18	0.23	0.25	
Total, real		21	63	48	4	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DG - H111

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:12 (4) 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:12 (4) 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:11 (4) 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:12 (4) 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:12 (4) 16:46	08:25 16:07
6	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	18:12 (4) 16:44	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	18:12 (4) 16:43	08:28 16:06
8	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	18:13 (4) 16:41	08:29 16:06
9	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	18:15 (4) 16:39	08:30 16:05
10	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	18:16 (4) 16:37	08:31 16:05
11	05:08 21:54	05:56 21:05	20:09 (2) 19:54	06:50 18:40	07:44 16:35	08:33 16:05
12	05:09 21:53	05:57 21:03	20:06 (2) 19:51	06:52 18:38	07:45 16:34	08:34 16:05
13	05:10 21:52	05:59 21:01	20:04 (2) 19:49	06:54 18:36	07:47 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	20:03 (2) 19:46	06:56 18:33	07:49 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	20:02 (2) 19:44	06:57 18:31	07:51 16:29	08:37 16:04
16	05:14 21:49	06:04 20:55	20:01 (2) 19:42	06:59 18:29	07:53 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	20:00 (2) 19:39	07:01 18:26	07:55 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:00 (2) 19:37	07:03 18:24	07:57 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	19:59 (2) 19:34	07:05 18:22	07:59 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	19:59 (2) 19:32	07:06 18:20	08:01 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	19:59 (2) 19:29	07:08 18:17	08:03 17:26 (5)	08:41 16:06
22	05:23 21:41	06:15 20:42	19:59 (2) 19:27	07:10 18:15	08:05 17:37 (5)	08:42 16:06
23	05:24 21:39	06:17 20:39	20:00 (2) 19:24	07:12 18:13	08:07 17:22 (5)	08:42 16:07
24	05:26 21:38	06:19 20:37	20:00 (2) 19:22	07:13 18:11	08:09 17:38 (5)	08:43 16:08
25	05:27 21:36	06:20 20:35	20:01 (2) 19:19	07:15 18:10	08:09 16:21 (5)	08:43 16:08
26	05:29 21:35	06:22 20:32	20:02 (2) 19:17	07:17 18:08	08:11 16:20 (5)	08:43 16:09
27	05:30 21:33	06:24 20:30	20:04 (2) 19:14	07:19 18:07	08:13 16:20 (5)	08:44 16:10
28	05:32 21:32	06:26 20:28	19:12 18:38 (4)	07:21 17:02	16:34 (5) 16:31 (5)	16:13 16:12
29	05:34 21:30	06:27 20:25	07:22 19:09	18:14 (4) 18:39 (4)	07:18 17:00	08:16 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	18:12 (4) 18:38 (4)	07:20 16:58	08:17 16:11
31	05:37 21:26	06:31 20:21		07:22 16:56	16:21 (5) 16:25 (5)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		232	227	256		
Sun reduction		0.34	0.32	0.29		
Oper. time red.		1.00	1.00	1.00		
Wind dir. red.		0.65	0.68	0.67		
Total reduction		0.22	0.22	0.20		
Total, real		51	49	50		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DH - H112

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:33 (5)	08:14	16:13 (4)	07:16		07:01	19:32 (1)	05:52	19:48 (2)	05:03
	16:15	4	15:37 (5)	17:06	22	16:35 (4)	18:02		19:33 (1)	20:55	38
2	08:44	15:34 (5)	08:12	16:12 (4)	07:14		17:35 (3)	19:30 (1)	05:50	19:47 (2)	05:02
	16:16	5	15:39 (5)	17:08	25	16:37 (4)	18:04	1	17:36 (3)	20:02	5
3	08:44	15:33 (5)	08:10	16:12 (4)	07:12		17:34 (3)	19:30 (1)	05:48	19:47 (2)	05:01
	16:17	6	15:39 (5)	17:10	27	16:39 (4)	18:06	4	17:38 (3)	20:04	7
4	08:43	15:34 (5)	08:08	16:11 (4)	07:09		17:33 (3)	19:30 (1)	05:46	19:47 (2)	05:00
	16:18	7	15:41 (5)	17:12	30	16:41 (4)	18:07	8	17:41 (3)	20:06	9
5	08:43	15:33 (5)	08:07	16:11 (4)	07:07		17:31 (3)	19:29 (1)	05:44	19:47 (2)	04:59
	16:19	9	15:42 (5)	17:14	32	16:43 (4)	18:09	11	17:42 (3)	20:07	11
6	08:43	15:34 (5)	08:05	16:10 (4)	07:04		17:31 (3)	19:29 (1)	05:43	19:46 (2)	04:59
	16:21	10	15:44 (5)	17:16	35	16:45 (4)	18:11	14	17:45 (3)	20:09	13
7	08:42	15:34 (5)	08:03	16:10 (4)	07:02		17:29 (3)	19:29 (1)	05:40	19:47 (2)	04:58
	16:22	11	15:45 (5)	17:18	37	16:47 (4)	18:13	17	17:46 (3)	20:11	14
8	08:42	15:34 (5)	08:01	16:10 (4)	07:00		17:29 (3)	19:30 (1)	05:38	19:47 (2)	04:57
	16:24	12	15:46 (5)	17:20	40	16:50 (4)	18:15	19	17:48 (3)	20:13	14
9	08:41	15:35 (5)	07:59	16:09 (4)	06:57		17:28 (3)	19:32 (1)	05:36	19:47 (2)	04:57
	16:25	14	15:49 (5)	17:22	43	16:52 (4)	18:17	22	17:50 (3)	20:15	11
10	08:40	15:35 (5)	07:57	16:09 (4)	06:55		17:29 (3)	19:33 (1)	05:34	19:47 (2)	04:56
	16:26	15	15:50 (5)	17:24	45	16:54 (4)	18:19	23	17:52 (3)	20:17	6
11	08:40	15:35 (5)	07:55	16:09 (4)	06:53		17:29 (3)	19:39 (1)	21:11	38	20:25 (2)
	16:28	17	15:52 (5)	17:26	47	16:56 (4)	18:21		05:33	19:49 (2)	04:56
12	08:39	15:35 (5)	07:53	16:09 (4)	06:50		17:29 (3)	21:13	36	20:25 (2)	21:55
	16:30	19	15:54 (5)	17:28	47	16:56 (4)	18:23		05:31	19:49 (2)	04:55
13	08:38	15:36 (5)	07:51	16:09 (4)	06:48		17:30 (3)	21:15	35	20:24 (2)	21:56
	16:31	19	15:55 (5)	17:30	47	16:56 (4)	18:25		05:29	19:49 (2)	04:55
14	08:37	15:36 (5)	07:49	16:09 (4)	06:45		17:30 (3)	21:17	34	20:23 (2)	21:57
	16:33	21	15:57 (5)	17:32	47	16:56 (4)	18:27		05:27	19:50 (2)	04:55
15	08:36	15:36 (5)	07:47	16:10 (4)	06:43		17:32 (3)	21:18	33	20:23 (2)	21:58
	16:34	23	15:59 (5)	17:34	46	16:56 (4)	18:28		21:18	19:51 (2)	04:55
16	08:35	15:36 (5)	07:45	16:10 (4)	06:40		17:33 (3)	21:20	31	20:22 (2)	21:58
	16:36	24	16:00 (5)	17:36	46	16:56 (4)	18:30		05:24	19:52 (2)	04:54
17	08:34	15:37 (5)	07:43	16:11 (4)	06:38		17:37 (3)	21:22	30	20:22 (2)	21:59
	16:38	26	16:03 (5)	17:38	45	16:56 (4)	18:32		21:22	19:52 (2)	04:54
18	08:33	15:37 (5)	07:41	16:10 (4)	06:35	8	17:45 (3)	21:23	28	20:20 (2)	21:59
	16:40	26	16:03 (5)	17:40	45	16:55 (4)	18:34		05:21	19:54 (2)	04:54
19	08:32	15:38 (5)	07:39	16:11 (4)	06:33		20:31	21:25	26	20:20 (2)	22:00
	16:41	26	16:04 (5)	17:42	43	16:54 (4)	18:36		21:25	19:56 (2)	04:54
20	08:31	15:38 (5)	07:36	16:12 (4)	06:31		20:33	1	20:05 (2)	21:27	23
	16:43	25	16:03 (5)	17:44	42	16:54 (4)	18:38		20:01 (2)	05:18	19:56 (2)
21	08:30	15:39 (5)	07:34	16:13 (4)	06:28		20:35	6	20:07 (2)	21:28	21
	16:45	25	16:04 (5)	17:46	40	16:53 (4)	18:40		20:16	05:16	19:58 (2)
22	08:29	15:39 (5)	07:32	16:14 (4)	06:26		20:37	11	20:08 (2)	21:30	18
	16:47	24	16:03 (5)	17:48	37	16:51 (4)	18:42		20:12	05:15	20:16 (2)
23	08:27	15:41 (5)	07:30	16:15 (4)	06:23		20:39	15	19:55 (2)	05:13	20:01 (2)
	16:49	22	16:03 (5)	17:50	35	16:50 (4)	18:43		20:10 (2)	21:31	13
24	08:26	15:41 (5)	07:28	16:17 (4)	06:21		20:41	18	19:54 (2)	05:13	20:03 (2)
	16:50	21	16:02 (5)	17:52	32	16:49 (4)	18:45		20:12 (2)	21:33	8
25	08:24	15:43 (5)	07:25	16:18 (4)	06:18		20:43	21	19:53 (2)	05:12	20:11 (2)
	16:52	19	16:02 (5)	17:54	28	16:46 (4)	18:47		20:14 (2)	21:34	22:01
26	08:23	15:44 (5)	07:23	16:21 (4)	06:16		20:44	23	19:52 (2)	05:11	20:14 (2)
	16:54	19	16:21 (4)	17:56	23	16:44 (4)	18:49		20:15 (2)	21:36	22:01
27	08:22	15:46 (5)	07:21	16:24 (4)	06:13		20:46	26	19:51 (2)	05:09	20:16 (2)
	16:56	19	16:23 (4)	17:58	17	16:41 (4)	18:51		20:17 (2)	21:37	22:01
28	08:20	15:49 (5)	07:18	16:31 (4)	06:11		20:48	29	19:50 (2)	05:08	20:17 (2)
	16:58	19	16:26 (4)	18:00	3	16:34 (4)	18:53		20:19 (2)	21:39	22:01
29	08:18	16:15 (4)			07:09		20:50	32	19:49 (2)	05:07	20:18 (2)
	17:00	13	16:28 (4)		19:54		20:52	33	20:21 (2)	21:40	22:01
30	08:17	16:14 (4)			07:06		20:54	36	19:48 (2)	05:06	20:18 (2)
	17:02	16	16:30 (4)		19:56				20:22 (2)	21:41	22:01
31	08:15	16:13 (4)			07:04				21:44	05:05	20:18 (2)
	17:04	19	16:32 (4)		19:58				20:24 (2)	21:43	22:00
Potential sun hours	250		273		367		420		494		510
Total, worst case	535		1006		259		342		731		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.66		0.68		0.65		0.65		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	86		154		48		79		180		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DH - H112

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December	
1	04:59		05:39	19:59 (2)	06:33		07:26	18:08 (3)	07:24	15:39 (4)	08:19	15:17 (5)
	22:00		21:25	36 20:35 (2)	20:18		19:05	25 18:33 (3)	16:54	44 16:23 (4)	16:10	17 15:34 (5)
2	04:59		05:40	19:59 (2)	06:35	19:32 (1)	07:28	18:07 (3)	07:26	15:39 (4)	08:21	15:17 (5)
	22:00		21:23	37 20:36 (2)	20:16	6 19:38 (1)	19:02	26 18:33 (3)	16:52	42 16:21 (4)	16:09	16 15:33 (5)
3	05:00		05:42	19:58 (2)	06:36	19:30 (1)	07:30	18:07 (3)	07:28	15:39 (4)	08:22	15:18 (5)
	21:59		21:21	38 20:36 (2)	20:13	11 19:41 (1)	19:00	24 18:31 (3)	16:50	40 16:19 (4)	16:08	14 15:32 (5)
4	05:01		05:44	19:58 (2)	06:38	19:27 (1)	07:31	18:06 (3)	07:30	15:40 (4)	08:24	15:19 (5)
	21:59		21:19	38 20:36 (2)	20:11	14 19:41 (1)	18:57	23 18:29 (3)	16:48	37 16:17 (4)	16:08	13 15:32 (5)
5	05:02		05:45	19:57 (2)	06:40	19:26 (1)	07:33	18:06 (3)	07:32	15:40 (4)	08:25	15:19 (5)
	21:58		21:17	39 20:36 (2)	20:09	15 19:41 (1)	18:55	20 18:26 (3)	16:46	35 16:15 (4)	16:07	11 15:30 (5)
6	05:03		05:47	19:57 (2)	06:42	19:25 (1)	07:35	18:06 (3)	07:34	15:40 (4)	08:26	15:20 (5)
	21:58		21:15	40 20:37 (2)	20:06	14 19:39 (1)	18:52	18 18:24 (3)	16:44	32 16:12 (4)	16:07	10 15:30 (5)
7	05:04		05:49	19:57 (2)	06:43	19:24 (1)	07:37	18:05 (3)	07:36	15:41 (4)	08:28	15:21 (5)
	21:57		21:13	40 20:37 (2)	20:04	11 19:35 (1)	18:50	16 18:21 (3)	16:43	29 16:10 (4)	16:06	8 15:29 (5)
8	05:05		05:51	19:56 (2)	06:45	19:24 (1)	07:39	18:06 (3)	07:38	15:41 (4)	08:29	15:21 (5)
	21:56		21:12	40 20:36 (2)	20:01	9 19:33 (1)	18:48	12 18:18 (3)	16:41	27 16:08 (4)	16:06	7 15:28 (5)
9	05:06		05:52	19:56 (2)	06:47	19:24 (1)	07:41	18:06 (3)	07:40	15:42 (4)	08:30	15:22 (5)
	21:55		21:10	41 20:37 (2)	19:59	7 19:31 (1)	18:45	10 18:16 (3)	16:39	24 16:06 (4)	16:05	7 15:29 (5)
10	05:07		05:54	19:56 (2)	06:49	19:23 (1)	07:42	18:07 (3)	07:42	15:44 (4)	08:31	15:23 (5)
	21:55		21:08	40 20:36 (2)	19:56	5 19:28 (1)	18:43	7 18:14 (3)	16:37	21 16:05 (4)	16:05	5 15:28 (5)
11	05:08		05:56	19:56 (2)	06:50	19:24 (1)	07:44	18:08 (3)	07:44	15:45 (4)	08:33	15:23 (5)
	21:54		21:05	39 20:35 (2)	19:54	2 19:26 (1)	18:40	3 18:11 (3)	16:35	18 16:03 (4)	16:05	4 15:27 (5)
12	05:09		05:57	19:56 (2)	06:52		07:46		07:45	15:46 (4)	08:34	15:24 (5)
	21:53		21:03	38 20:34 (2)	19:51		18:38		16:34	15 16:01 (4)	16:05	3 15:27 (5)
13	05:10		05:59	19:56 (2)	06:54		07:48		07:47	15:47 (4)	08:35	15:24 (5)
	21:52		21:01	35 20:31 (2)	19:49		18:36		16:32	12 15:59 (4)	16:05	3 15:27 (5)
14	05:12		06:01	19:56 (2)	06:56		07:50	17:00 (4)	07:49	15:21 (5)	08:36	15:25 (5)
	21:51		20:59	33 20:29 (2)	19:47		18:33	11 17:11 (4)	16:31	19 15:58 (4)	16:05	1 15:26 (5)
15	05:13		06:03	19:57 (2)	06:58		07:52	16:55 (4)	07:51	15:19 (5)	08:37	
	21:50		20:57	31 20:28 (2)	19:44		18:31	20 17:15 (4)	16:29	19 15:56 (4)	16:05	
16	05:14		06:04	19:57 (2)	06:59		07:54	16:52 (4)	07:53	15:17 (5)	08:38	
	21:49		20:55	28 20:25 (2)	19:42		18:29	25 17:17 (4)	16:27	19 15:54 (4)	16:05	
17	05:16		06:06	19:57 (2)	07:01		07:55	16:50 (4)	07:55	15:16 (5)	08:38	
	21:47		20:53	26 20:23 (2)	19:39		18:26	29 17:19 (4)	16:26	19 15:35 (5)	16:05	
18	05:17		06:08	19:58 (2)	07:03		07:57	16:48 (4)	07:57	15:15 (5)	08:39	
	21:46		20:51	24 20:22 (2)	19:37		18:24	33 17:21 (4)	16:24	21 15:36 (5)	16:05	
19	05:18		06:10	19:59 (2)	07:05		07:59	16:46 (4)	07:59	15:15 (5)	08:40	
	21:45		20:48	20 20:19 (2)	19:34		18:22	36 17:22 (4)	16:23	22 15:37 (5)	16:05	
20	05:20		06:12	20:00 (2)	07:06		08:01	16:45 (4)	08:00	15:14 (5)	08:41	
	21:44		20:46	17 20:17 (2)	19:32		18:20	38 17:23 (4)	16:22	24 15:38 (5)	16:06	
21	05:21	20:12 (2)	06:13	20:01 (2)	07:08		08:03	16:43 (4)	08:02	15:14 (5)	08:41	
	21:42	11 20:23 (2)	20:44	14 20:15 (2)	19:29		18:17	40 17:23 (4)	16:20	25 15:39 (5)	16:06	
22	05:23	20:09 (2)	06:15	20:02 (2)	07:10		08:05	16:42 (4)	08:04	15:14 (5)	08:42	
	21:41	16 20:25 (2)	20:42	10 20:12 (2)	19:27		18:15	42 17:24 (4)	16:19	25 15:39 (5)	16:06	
23	05:24	20:08 (2)	06:17	20:05 (2)	07:12		08:07	16:42 (4)	08:06	15:14 (5)	08:42	
	21:39	19 20:27 (2)	20:39	5 20:10 (2)	19:24		18:13	43 17:25 (4)	16:18	26 15:40 (5)	16:07	
24	05:26	20:06 (2)	06:19		07:13		08:09	16:41 (4)	08:08	15:14 (5)	08:43	
	21:38	22 20:28 (2)	20:37		19:22		18:11	44 17:25 (4)	16:17	26 15:40 (5)	16:08	
25	05:27	20:05 (2)	06:20		07:15		07:11	15:40 (4)	08:09	15:15 (5)	08:43	
	21:36	25 20:30 (2)	20:35		19:19		17:09	45 16:25 (4)	16:16	26 15:41 (5)	16:08	
26	05:29	20:04 (2)	06:22		07:17	18:20 (3)	07:13	15:39 (4)	08:11	15:15 (5)	08:43	
	21:35	27 20:31 (2)	20:32		19:17	5 18:25 (3)	17:06	47 16:26 (4)	16:14	25 15:40 (5)	16:09	
27	05:30	20:03 (2)	06:24		07:19	18:16 (3)	07:15	15:39 (4)	08:13	15:15 (5)	08:44	
	21:33	29 20:32 (2)	20:30		19:14	13 18:29 (3)	17:04	47 16:26 (4)	16:13	23 15:38 (5)	16:10	
28	05:32	20:02 (2)	06:26		07:21	18:13 (3)	07:16	15:39 (4)	08:14	15:16 (5)	08:44	
	21:32	30 20:32 (2)	20:28		19:12	18 18:31 (3)	17:02	47 16:26 (4)	16:12	22 15:38 (5)	16:11	
29	05:34	20:01 (2)	06:28		07:22	18:12 (3)	07:18	15:38 (4)	08:16	15:16 (5)	08:44	15:33 (5)
	21:30	32 20:33 (2)	20:25		19:09	21 18:33 (3)	17:00	48 16:26 (4)	16:12	20 15:36 (5)	16:11	1 15:34 (5)
30	05:35	20:00 (2)	06:29		07:24	18:09 (3)	07:20	15:38 (4)	08:18	15:16 (5)	08:44	15:32 (5)
	21:28	34 20:34 (2)	20:23		19:07	24 18:33 (3)	16:58	48 16:26 (4)	16:11	19 15:35 (5)	16:12	2 15:34 (5)
31	05:37	20:00 (2)	06:31				07:22	15:38 (4)			08:44	15:33 (5)
	21:27	35 20:35 (2)	20:21				16:56	47 16:25 (4)			16:13	2 15:35 (5)
Potential sun hours	512		460		382		328		259		233	
Total, worst case	280		709		175		874		756		124	
Sun reduction	0.32		0.34		0.32		0.29		0.27		0.21	
Oper. time red.	1.00		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.	0.65		0.65		0.67		0.66		0.66		0.66	
Total reduction	0.21		0.22		0.22		0.19		0.17		0.14	
Total, real	59		157		38		169		132		17	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DI - H113

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44		08:14	16:00 (5)	07:16		16:35 (4)	07:01	05:52	19:49 (2)	05:03
	16:15		17:06	10 16:10 (5)	18:02	27	17:02 (4)	20:00	20:55	36 20:25 (2)	21:45
2	08:44		08:12		07:14		16:36 (4)	06:59	05:50		05:02
	16:16		17:08		18:04	23	16:59 (4)	20:02	20:57	37 20:25 (2)	21:46
3	08:44		08:10		07:12		16:39 (4)	06:56	05:48		05:01
	16:17		17:10		18:06	17	16:56 (4)	20:04	20:59	37 20:25 (2)	21:48
4	08:43		08:08	16:37 (4)	07:09		16:46 (4)	06:54	05:46		05:00
	16:18		17:12	4 16:41 (4)	18:07	4	16:50 (4)	20:06	21:01	37 20:25 (2)	21:49
5	08:43		08:07	16:35 (4)	07:07		17:40 (3)	06:51	05:44		04:59
	16:19		17:14	8 16:43 (4)	18:09	2	17:42 (3)	20:07	21:03	36 20:24 (2)	21:50
6	08:43		08:05	16:34 (4)	07:04		17:39 (3)	06:49	05:42		04:59
	16:21		17:16	11 16:45 (4)	18:11	6	17:45 (3)	20:09	21:04	35 20:23 (2)	21:51
7	08:42		08:03	16:33 (4)	07:02		17:37 (3)	06:47	05:40		04:58
	16:22		17:18	14 16:47 (4)	18:13	9	17:46 (3)	20:11	21:06	35 20:24 (2)	21:52
8	08:42		08:01	16:32 (4)	07:00		17:37 (3)	06:44	05:38		04:57
	16:24		17:20	18 16:50 (4)	18:15	11	17:48 (3)	20:13	21:08	33 20:23 (2)	21:53
9	08:41		07:59	16:31 (4)	06:57		17:35 (3)	06:42	05:36		04:57
	16:25		17:22	21 16:52 (4)	18:17	15	17:50 (3)	20:15	21:10	32 20:22 (2)	21:54
10	08:40		07:57	16:30 (4)	06:55		17:35 (3)	06:39	05:34		04:56
	16:26		17:24	24 16:54 (4)	18:19	17	17:52 (3)	20:17	21:11	31 20:21 (2)	21:55
11	08:40	15:49 (5)	07:55	16:30 (4)	06:52		17:35 (3)	06:37	05:33		04:56
	16:28	3 15:52 (5)	17:26	26 16:56 (4)	18:21	20	17:55 (3)	20:19	21:13	29 20:21 (2)	21:55
12	08:39	15:49 (5)	07:53	16:28 (4)	06:50		17:35 (3)	06:35	05:31		04:55
	16:30	5 15:54 (5)	17:28	30 16:58 (4)	18:23	21	17:56 (3)	20:20	21:15	28 20:20 (2)	21:56
13	08:38	15:49 (5)	07:51	16:28 (4)	06:48		17:35 (3)	06:32	05:29		04:55
	16:31	6 15:55 (5)	17:30	32 17:00 (4)	18:25	23	17:58 (3)	20:22	21:17	25 20:18 (2)	21:57
14	08:37	15:49 (5)	07:49	16:28 (4)	06:45		17:35 (3)	06:30	05:27		04:55
	16:33	8 15:57 (5)	17:32	34 17:02 (4)	18:27	24	17:59 (3)	20:24	21:18	23 20:18 (2)	21:58
15	08:36	15:49 (5)	07:47	16:27 (4)	06:43		17:36 (3)	06:28	05:26		04:55
	16:34	10 15:59 (5)	17:34	38 17:05 (4)	18:28	22	17:58 (3)	20:26	21:20	20 20:16 (2)	21:58
16	08:35	15:48 (5)	07:45	16:27 (4)	06:40		17:36 (3)	06:25	05:24		04:54
	16:36	12 16:00 (5)	17:36	40 17:07 (4)	18:30	20	17:56 (3)	20:28	21:22	17 20:15 (2)	21:59
17	08:34	15:49 (5)	07:43	16:28 (4)	06:38		17:38 (3)	06:23	05:22		04:54
	16:38	14 16:03 (5)	17:38	41 17:09 (4)	18:32	17	17:55 (3)	20:30	21:23	13 20:12 (2)	21:59
18	08:33	15:49 (5)	07:41	16:27 (4)	06:35		17:40 (3)	06:21	05:21		04:54
	16:40	16 16:05 (5)	17:40	43 17:10 (4)	18:34	12	17:52 (3)	20:31	21:25	7 20:10 (2)	22:00
19	08:32	15:49 (5)	07:39	16:27 (4)	06:33		17:45 (3)	06:18	05:19		04:54
	16:41	18 16:07 (5)	17:42	43 17:10 (4)	18:36	2	17:47 (3)	20:33	3 20:05 (2)		22:00
20	08:31	15:49 (5)	07:36	16:27 (4)	06:31			06:16	19:59 (2)		04:54
	16:43	19 16:08 (5)	17:44	43 17:10 (4)	18:38			20:35	8 20:07 (2)		22:00
21	08:30	15:50 (5)	07:34	16:28 (4)	06:28			06:14	19:56 (2)		04:54
	16:45	21 16:11 (5)	17:46	42 17:10 (4)	18:40			20:37	12 20:08 (2)		22:01
22	08:29	15:50 (5)	07:32	16:28 (4)	06:26			06:12	19:55 (2)		04:55
	16:47	23 16:12 (5)	17:48	41 17:09 (4)	18:42			20:39	15 20:10 (2)		22:01
23	08:27	15:50 (5)	07:30	16:28 (4)	06:23			06:09	19:54 (2)		04:55
	16:49	25 16:15 (5)	17:50	41 17:09 (4)	18:43			20:41	18 20:12 (2)		22:01
24	08:26	15:50 (5)	07:28	16:29 (4)	06:21			06:07	19:52 (2)		04:55
	16:50	25 16:15 (5)	17:52	39 17:08 (4)	18:45			20:43	22 20:14 (2)		22:01
25	08:24	15:52 (5)	07:25	16:29 (4)	06:18			06:05	19:52 (2)		04:55
	16:52	24 16:16 (5)	17:54	38 17:07 (4)	18:47			20:44	23 20:15 (2)		22:01
26	08:23	15:52 (5)	07:23	16:30 (4)	06:16			06:03	19:51 (2)		04:56
	16:54	23 16:15 (5)	17:56	36 17:06 (4)	18:49			20:46	26 20:17 (2)		22:01
27	08:22	15:52 (5)	07:21	16:32 (4)	06:13			06:01	19:50 (2)		04:56
	16:56	23 16:15 (5)	17:58	33 17:05 (4)	18:51			20:48	29 20:19 (2)		22:01
28	08:20	15:54 (5)	07:18	16:33 (4)	06:11			05:58	19:50 (2)		04:57
	16:58	21 16:15 (5)	18:00	30 17:03 (4)	18:53			20:50	31 20:21 (2)		22:01
29	08:18	15:55 (5)			07:08			05:56	19:49 (2)		04:57
	17:00	19 16:14 (5)			19:54			20:52	33 20:22 (2)		22:01
30	08:17	15:56 (5)			07:06			05:54	19:49 (2)		04:58
	17:02	17 16:13 (5)			19:56			20:54	35 20:24 (2)		22:00
31	08:15	15:57 (5)			07:04				05:04		
	17:04	14 16:11 (5)			19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case		346		780		292		255		511	
Sun reduction		0.24		0.23		0.27		0.35		0.38	
Oper. time red.		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.		0.66		0.66		0.67		0.65		0.65	
Total reduction		0.16		0.15		0.18		0.23		0.25	
Total, real		56		120		53		58		126	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DI - H113

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December	
1	04:59		05:39	20:02 (2)	06:33		07:26	18:14 (3)	07:24	16:00 (4)	08:19	15:31 (5)
	22:00		21:25	20:30 (2)	20:18		19:05	22	18:36 (3)	16:54	23	16:23 (4)
2	04:59		05:40	20:02 (2)	06:35		07:28		18:13 (3)	07:26		16:01 (4)
	22:00		21:23	20:32 (2)	20:16		19:02	20	18:33 (3)	16:52	20	16:21 (4)
3	05:00		05:42	20:00 (2)	06:36		07:30		18:13 (3)	07:28		16:01 (4)
	21:59		21:21	20:32 (2)	20:13		19:00	18	18:31 (3)	16:50	18	16:19 (4)
4	05:01		05:44	20:00 (2)	06:38		07:31		18:13 (3)	07:30		16:02 (4)
	21:59		21:19	20:33 (2)	20:11		18:57	16	18:29 (3)	16:48	15	16:17 (4)
5	05:02		05:45	19:59 (2)	06:40		07:33		18:13 (3)	07:32		16:04 (4)
	21:58		21:17	20:33 (2)	20:09		18:55	13	18:26 (3)	16:46	11	16:15 (4)
6	05:03		05:47	19:59 (2)	06:42		07:35		18:14 (3)	07:34		16:05 (4)
	21:58		21:15	20:33 (2)	20:06		18:52	10	18:24 (3)	16:44	7	16:12 (4)
7	05:04		05:49	19:59 (2)	06:43		07:37		18:13 (3)	07:36		16:07 (4)
	21:57		21:13	20:34 (2)	20:04		18:50	8	18:21 (3)	16:43	3	16:10 (4)
8	05:05		05:51	19:58 (2)	06:45		07:39		18:14 (3)	07:38		08:29
	21:56		21:12	20:34 (2)	20:01		18:48	4	18:18 (3)	16:41		16:06
9	05:06		05:52	19:58 (2)	06:47		07:41		07:40			08:30
	21:55		21:10	20:34 (2)	19:59		18:45		16:39			16:05
10	05:07		05:54	19:57 (2)	06:49		07:42		17:16 (4)	07:42		15:31 (5)
	21:55		21:07	20:33 (2)	19:56		18:43	12	17:28 (4)	16:37	10	15:41 (5)
11	05:08		05:56	19:57 (2)	06:50		07:44		17:12 (4)	07:44		15:29 (5)
	21:54		21:05	20:34 (2)	19:54		18:40	19	17:31 (4)	16:35	14	15:43 (5)
12	05:09		05:57	19:57 (2)	06:52		07:46		17:09 (4)	07:45		15:27 (5)
	21:53		21:03	20:34 (2)	19:51		18:38	25	17:34 (4)	16:34	18	15:45 (5)
13	05:10		05:59	19:56 (2)	06:54		07:48		17:07 (4)	07:47		15:26 (5)
	21:52		21:01	20:31 (2)	19:49		18:36	28	17:35 (4)	16:32	20	15:46 (5)
14	05:12		06:01	19:57 (2)	06:56		07:50		17:05 (4)	07:49		15:26 (5)
	21:51		20:59	20:29 (2)	19:47		18:33	32	17:37 (4)	16:31	21	15:47 (5)
15	05:13		06:03	19:57 (2)	06:58		07:52		17:04 (4)	07:51		15:25 (5)
	21:50		20:57	20:28 (2)	19:44		18:31	34	17:38 (4)	16:29	22	15:47 (5)
16	05:14		06:04	19:57 (2)	06:59		07:54		17:02 (4)	07:53		15:25 (5)
	21:49		20:55	20:25 (2)	19:42		18:29	37	17:39 (4)	16:27	23	15:48 (5)
17	05:16		06:06	19:58 (2)	07:01		07:55		17:01 (4)	07:55		15:24 (5)
	21:47		20:53	20:23 (2)	19:39		18:26	38	17:39 (4)	16:26	25	15:49 (5)
18	05:17		06:08	19:58 (2)	07:03		07:57		17:00 (4)	07:57		15:24 (5)
	21:46		20:51	20:22 (2)	19:37		18:24	40	17:40 (4)	16:24	25	15:49 (5)
19	05:18		06:10	19:58 (2)	07:05		07:59		16:59 (4)	07:59		15:24 (5)
	21:45		20:48	20:19 (2)	19:34		18:22	41	17:40 (4)	16:23	25	15:49 (5)
20	05:20		06:12	19:59 (2)	07:06		08:01		16:59 (4)	08:00		15:24 (5)
	21:44		20:46	20:17 (2)	19:32		18:20	42	17:41 (4)	16:22	23	15:47 (5)
21	05:21		06:13	20:01 (2)	07:08		08:03		16:58 (4)	08:02		15:25 (5)
	21:42		20:44	20:15 (2)	19:29		18:17	43	17:41 (4)	16:20	21	15:46 (5)
22	05:23		06:15	20:01 (2)	07:10		08:05		16:58 (4)	08:04		15:25 (5)
	21:41		20:42	20:12 (2)	19:27		18:15	43	17:41 (4)	16:19	19	15:44 (5)
23	05:24		06:17	20:03 (2)	07:12		08:07		16:57 (4)	08:06		15:25 (5)
	21:39		20:39	20:10 (2)	19:24		18:13	44	17:41 (4)	16:18	18	15:43 (5)
24	05:26		06:19	20:06 (2)	07:13		08:09		16:57 (4)	08:08		15:26 (5)
	21:38		20:37	20:09 (2)	19:22		18:11	44	17:41 (4)	16:17	16	15:42 (5)
25	05:27		06:20		07:15	18:23 (3)	07:11		15:57 (4)	08:09		15:27 (5)
	21:36		20:35		19:19	18:34 (3)	17:09	41	16:38 (4)	16:16	14	15:41 (5)
26	05:29	10	20:12 (2)	06:22	07:17	18:20 (3)	07:13		15:57 (4)	08:11		15:27 (5)
	21:35		20:22 (2)	20:32	19:17	18:36 (3)	17:06	39	16:36 (4)	16:14	13	15:40 (5)
27	05:30		20:09 (2)	06:24	07:19	18:19 (3)	07:15		15:57 (4)	08:13		15:28 (5)
	21:33	15	20:24 (2)	20:30	19:14	18:38 (3)	17:04	37	16:34 (4)	16:13	10	15:38 (5)
28	05:32		20:07 (2)	06:26	07:21	18:17 (3)	07:16		15:57 (4)	08:14		15:29 (5)
	21:32	19	20:26 (2)	20:28	19:12	18:39 (3)	17:02	34	16:31 (4)	16:12	9	15:38 (5)
29	05:34		20:05 (2)	06:27	07:22	18:16 (3)	07:18		15:57 (4)	08:16		15:29 (5)
	21:30	22	20:27 (2)	20:25	19:09	18:39 (3)	17:00	32	16:29 (4)	16:12	7	15:36 (5)
30	05:35		20:04 (2)	06:29	07:24	18:14 (3)	07:20		15:58 (4)	08:18		15:30 (5)
	21:28	25	20:29 (2)	20:23	19:07	18:38 (3)	16:58	29	16:27 (4)	16:11	5	15:35 (5)
31	05:37		20:04 (2)	06:31			07:22		15:58 (4)			08:44
	21:26	26	20:30 (2)	20:21			16:56	27	16:25 (4)			16:13
Potential sun hours	512		460		382		328		259		233	
Total, worst case	117		657		115		872		455		4	
Sun reduction	0.32		0.34		0.32		0.29		0.27		0.21	
Oper. time red.	1.00		1.00		1.00		1.00		1.00		1.00	
Wind dir. red.	0.65		0.65		0.68		0.66		0.66		0.66	
Total reduction	0.21		0.22		0.22		0.19		0.18		0.14	
Total, real	25		145		25		169		80		1	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DJ - H114

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44		08:14	16:03 (5)	07:16		16:40 (4)	07:01	05:52	19:50 (2)	05:03
	16:15		17:06	18:02	34	17:14 (4)	20:00	20:55	35	20:25 (2)	21:45
2	08:44		08:12	16:04 (5)	07:14		16:41 (4)	06:59	05:50	19:50 (2)	05:02
	16:16		17:08	18:04	31	17:12 (4)	20:02	20:57	35	20:25 (2)	21:46
3	08:44		08:10	16:06 (5)	07:12		16:43 (4)	06:56	05:48	19:50 (2)	05:01
	16:17		17:10	18:06	27	17:10 (4)	20:04	20:59	34	20:24 (2)	21:48
4	08:43		08:08	16:09 (5)	07:09		16:45 (4)	06:54	05:46	19:50 (2)	05:00
	16:18		17:12	18:07	24	17:09 (4)	20:06	21:01	34	20:24 (2)	21:49
5	08:43		08:07	16:15 (5)	07:07		16:47 (4)	06:51	05:44	19:50 (2)	04:59
	16:19		17:14	18:09	18	17:05 (4)	20:07	21:03	33	20:23 (2)	21:50
6	08:43		08:05	16:18 (4)	07:04		16:51 (4)	06:49	05:42	19:50 (2)	04:59
	16:21		17:16	18:11	11	17:02 (4)	20:09	21:04	33	20:23 (2)	21:51
7	08:42		08:03	16:19 (4)	07:02		17:42 (3)	06:47	05:40	19:51 (2)	04:58
	16:22		17:18	18:13	4	17:46 (3)	20:11	21:06	32	20:23 (2)	21:52
8	08:42		08:01	16:47 (4)	07:00		17:42 (3)	06:44	05:38	19:52 (2)	04:57
	16:24		17:20	18:15	6	17:48 (3)	20:13	21:08	30	20:22 (2)	21:53
9	08:41		07:59	16:46 (4)	06:57		17:40 (3)	06:42	05:36	19:52 (2)	04:57
	16:25		17:22	18:17	10	17:50 (3)	20:15	21:10	29	20:21 (2)	21:54
10	08:40		07:57	16:44 (4)	06:55		17:40 (3)	06:39	05:34	19:53 (2)	04:56
	16:26		17:24	18:19	12	17:52 (3)	20:17	21:11	27	20:20 (2)	21:55
11	08:40		07:55	16:43 (4)	06:52		17:39 (3)	06:37	05:33	19:54 (2)	04:56
	16:28		17:26	18:21	16	17:55 (3)	20:19	21:13	25	20:19 (2)	21:55
12	08:39		07:53	16:41 (4)	06:50		17:39 (3)	06:35	05:31	19:55 (2)	04:55
	16:30		17:28	18:23	17	17:56 (3)	20:20	21:15	23	20:18 (2)	21:56
13	08:38		07:51	16:40 (4)	06:48		17:39 (3)	06:32	05:29	19:56 (2)	04:55
	16:31		17:30	18:25	19	17:58 (3)	20:22	21:17	20	20:16 (2)	21:57
14	08:37		07:49	16:40 (4)	06:45		17:38 (3)	06:30	05:27	19:58 (2)	04:55
	16:33		17:32	18:27	22	18:00 (3)	20:24	21:18	17	20:15 (2)	21:58
15	08:36		07:47	16:39 (4)	06:43		17:39 (3)	06:28	05:26	20:00 (2)	04:55
	16:34	1	15:59 (5)	17:34	26	17:05 (4)	20:26	21:20	13	20:13 (2)	21:58
16	08:35		07:45	16:39 (4)	06:40		17:39 (3)	06:25	05:24	20:04 (2)	04:54
	16:36	3	16:00 (5)	17:36	28	17:07 (4)	20:28	21:22	6	20:10 (2)	21:59
17	08:34		07:43	16:38 (4)	06:38		17:40 (3)	06:23	05:22		04:54
	16:38	6	16:03 (5)	17:38	31	17:09 (4)	20:30	21:23			21:59
18	08:33		07:41	16:37 (4)	06:35		17:41 (3)	06:21	05:21		04:54
	16:40	8	16:05 (5)	17:40	34	17:11 (4)	20:31	21:25			22:00
19	08:32		07:39	16:37 (4)	06:33		17:43 (3)	06:18	20:02 (2)	05:19	04:54
	16:41	10	16:07 (5)	17:42	36	17:13 (4)	20:33	3	20:05 (2)	21:27	22:00
20	08:31		07:36	16:37 (4)	06:31		17:47 (3)	06:16	20:00 (2)	05:18	04:54
	16:43	11	16:08 (5)	17:44	39	17:16 (4)	20:35	7	20:07 (2)	21:28	22:00
21	08:30		07:34	16:37 (4)	06:28		06:14	19:57 (2)	05:16		04:54
	16:45	14	16:11 (5)	17:46	41	17:18 (4)	20:37	11	20:08 (2)	21:30	22:01
22	08:29		07:32	16:37 (4)	06:26		06:12	19:55 (2)	05:15		04:55
	16:47	16	16:12 (5)	17:48	41	17:18 (4)	20:39	15	20:10 (2)	21:31	22:01
23	08:27		07:30	16:37 (4)	06:23		06:09	19:54 (2)	05:13		04:55
	16:49	18	16:15 (5)	17:50	41	17:18 (4)	20:41	18	20:12 (2)	21:33	22:01
24	08:26		07:28	16:38 (4)	06:21		06:07	19:53 (2)	05:12		04:55
	16:50	20	16:17 (5)	17:52	40	17:18 (4)	20:43	21	20:14 (2)	21:34	22:01
25	08:24		07:25	16:37 (4)	06:18		06:05	19:52 (2)	05:11		04:55
	16:52	21	16:19 (5)	17:54	40	17:17 (4)	20:44	23	20:15 (2)	21:36	22:01
26	08:23		07:23	16:38 (4)	06:16		06:03	19:52 (2)	05:09		04:56
	16:54	23	16:21 (5)	17:56	39	17:17 (4)	20:46	25	20:17 (2)	21:37	22:01
27	08:22		07:21	16:39 (4)	06:13		06:01	19:51 (2)	05:08		04:56
	16:56	24	16:22 (5)	17:58	37	17:16 (4)	20:48	28	20:19 (2)	21:39	22:01
28	08:20		07:18	16:39 (4)	06:11		05:58	19:51 (2)	05:07		04:57
	16:58	24	16:23 (5)	18:00	35	17:14 (4)	20:50	30	20:21 (2)	21:40	22:01
29	08:18				07:08		05:56	19:50 (2)	05:06		04:57
	17:00	23	16:22 (5)		19:54		20:52	32	20:22 (2)	21:41	22:01
30	08:17		16:00 (5)		07:06		05:54	19:50 (2)	05:05		04:58
	17:02	21	16:21 (5)		19:56		20:54	34	20:24 (2)	21:43	22:00
31	08:15		16:01 (5)		07:04				05:04		
	17:04	20	16:21 (5)		19:58				21:44		
Potential sun hours	250		273		367		420		494		510
Total, worst case		263		651		349			426		
Sun reduction		0.24		0.23		0.27		0.35	0.38		
Oper. time red.		1.00		1.00		1.00			1.00		
Wind dir. red.		0.66		0.67		0.67		0.65	0.65		
Total reduction		0.16		0.15		0.18		0.23	0.25		
Total, real		42		101		64		56	105		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DJ - H114

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July		August		September		October		November		December				
1	04:59		05:39		20:05 (2)	06:33		07:26	18:17 (3)	07:24	16:14 (4)	08:19			
	22:00		21:25	24	20:29 (2)	20:18		19:05	19	18:36 (3)	16:54	9	16:23 (4)	16:10	
2	04:59		05:40		20:04 (2)	06:35		07:28		18:17 (3)	07:26		16:16 (4)	08:21	
	22:00		21:23	26	20:30 (2)	20:16		19:02	16	18:33 (3)	16:52	5	16:21 (4)	16:09	
3	05:00		05:42		20:03 (2)	06:36		07:30		18:17 (3)	07:28		16:17 (4)	08:22	
	21:59		21:21	27	20:30 (2)	20:13		19:00	14	18:31 (3)	16:50	2	16:19 (4)	16:08	
4	05:01		05:44		20:02 (2)	06:38		07:31		18:18 (3)	07:30			08:24	
	21:59		21:19	29	20:31 (2)	20:11		18:57	11	18:29 (3)	16:48			16:08	
5	05:02		05:45		20:01 (2)	06:40		07:33		18:18 (3)	07:32			08:25	
	21:58		21:17	30	20:31 (2)	20:09		18:55	8	18:26 (3)	16:46			16:07	
6	05:03		05:47		20:01 (2)	06:42		07:35		18:19 (3)	07:34			08:26	
	21:58		21:15	31	20:32 (2)	20:06		18:52	5	18:24 (3)	16:44			16:07	
7	05:04		05:49		20:00 (2)	06:43		07:37		18:19 (3)	07:36		15:39 (5)	08:28	
	21:57		21:13	33	20:33 (2)	20:04		18:50	2	18:21 (3)	16:43	6	15:45 (5)	16:06	
8	05:05		05:51		19:59 (2)	06:45		07:39		17:24 (4)	07:38		15:36 (5)	08:29	
	21:56		21:12	34	20:33 (2)	20:01		18:48	15	17:39 (4)	16:41	12	15:48 (5)	16:06	
9	05:06		05:52		19:59 (2)	06:47		07:41		17:20 (4)	07:40		15:34 (5)	08:30	
	21:55		21:10	34	20:33 (2)	19:59		18:45	22	17:42 (4)	16:39	15	15:49 (5)	16:05	
10	05:07		05:54		19:58 (2)	06:49		07:42		17:18 (4)	07:42		15:33 (5)	08:31	
	21:55		21:07	35	20:33 (2)	19:56		18:43	26	17:44 (4)	16:37	19	15:52 (5)	16:05	
11	05:08		05:56		19:58 (2)	06:50		07:44		17:16 (4)	07:44		15:32 (5)	08:33	
	21:54		21:05	35	20:33 (2)	19:54		18:40	29	17:45 (4)	16:35	21	15:53 (5)	16:05	
12	05:09		05:57		19:58 (2)	06:52		07:46		17:14 (4)	07:45		15:32 (5)	08:34	
	21:53		21:03	35	20:33 (2)	19:51		18:38	32	17:46 (4)	16:34	21	15:53 (5)	16:05	
13	05:10		05:59		19:58 (2)	06:54		07:48		17:13 (4)	07:47		15:31 (5)	08:35	
	21:52		21:01	33	20:31 (2)	19:49		18:36	34	17:47 (4)	16:32	23	15:54 (5)	16:05	
14	05:12		06:01		19:58 (2)	06:56		07:50		17:12 (4)	07:49		15:31 (5)	08:36	
	21:51		20:59	31	20:29 (2)	19:47		18:33	36	17:48 (4)	16:31	23	15:54 (5)	16:04	
15	05:13		06:03		19:58 (2)	06:58		07:52		17:11 (4)	07:51		15:31 (5)	08:37	
	21:50		20:57	30	20:28 (2)	19:44		18:31	37	17:48 (4)	16:29	24	15:55 (5)	16:05	
16	05:14		06:04		19:58 (2)	06:59		07:54		17:10 (4)	07:53		15:31 (5)	08:38	
	21:49		20:55	27	20:25 (2)	19:42		18:29	39	17:49 (4)	16:27	23	15:54 (5)	16:05	
17	05:16		06:06		19:58 (2)	07:01		07:55		17:09 (4)	07:55		15:31 (5)	08:38	
	21:47		20:53	25	20:23 (2)	19:39		18:26	40	17:49 (4)	16:26	21	15:52 (5)	16:05	
18	05:17		06:08		19:59 (2)	07:03		07:57		17:09 (4)	07:57		15:31 (5)	08:39	
	21:46		20:51	23	20:22 (2)	19:37		18:24	40	17:49 (4)	16:24	20	15:51 (5)	16:05	
19	05:18		06:10		19:59 (2)	07:05		07:59		17:08 (4)	07:59		15:31 (5)	08:40	
	21:45		20:48	20	20:19 (2)	19:34		18:22	41	17:49 (4)	16:23	18	15:49 (5)	16:05	
20	05:20		06:12		20:00 (2)	07:06		08:01		17:08 (4)	08:00		15:31 (5)	08:41	
	21:44		20:46	17	20:17 (2)	19:32		18:20	41	17:49 (4)	16:22	16	15:47 (5)	16:06	
21	05:21		06:13		20:01 (2)	07:08		08:03		17:08 (4)	08:02		15:32 (5)	08:41	
	21:42		20:44	14	20:15 (2)	19:29		18:17	40	17:48 (4)	16:20	14	15:46 (5)	16:06	
22	05:23		06:15		20:02 (2)	07:10		08:05		17:08 (4)	08:04		15:33 (5)	08:42	
	21:41		20:42	10	20:12 (2)	19:27		18:15	37	17:45 (4)	16:19	11	15:44 (5)	16:06	
23	05:24		06:17		20:04 (2)	07:12		08:07		17:08 (4)	08:06		15:33 (5)	08:42	
	21:39		20:39	6	20:10 (2)	19:24		18:13	35	17:43 (4)	16:18	10	15:43 (5)	16:07	
24	05:26		06:19		20:06 (2)	07:13	18:28 (3)	08:09		17:08 (4)	08:08		15:34 (5)	08:43	
	21:38		20:37	3	20:09 (2)	19:22	10	18:38 (3)	18:11	33	17:41 (4)	16:17	8	15:42 (5)	16:08
25	05:27		06:20			07:15		18:24 (3)	07:11		16:08 (4)	08:09		15:35 (5)	08:43
	21:36		20:35			19:19	16	18:40 (3)	17:09	30	16:38 (4)	16:16	6	15:41 (5)	16:08
26	05:29		06:22			07:17		18:22 (3)	07:13		16:08 (4)	08:11		15:36 (5)	08:43
	21:35		20:32			19:17	19	18:41 (3)	17:06	28	16:36 (4)	16:14	4	15:40 (5)	16:09
27	05:30		06:24			07:19		18:21 (3)	07:15		16:09 (4)	08:13		15:37 (5)	08:44
	21:33		20:30			19:14	21	18:42 (3)	17:04	25	16:34 (4)	16:13	1	15:38 (5)	16:10
28	05:32		20:12 (2)	06:26		07:21		18:20 (3)	07:16		16:09 (4)	08:14			08:44
	21:32	10	20:22 (2)	20:28		19:12	23	18:43 (3)	17:02	22	16:31 (4)	16:12			16:11
29	05:34		20:09 (2)	06:27		07:22		18:19 (3)	07:18		16:10 (4)	08:16			08:44
	21:30	15	20:24 (2)	20:25		19:09	22	18:41 (3)	17:00	19	16:29 (4)	16:12			16:11
30	05:35		20:08 (2)	06:29		07:24		18:18 (3)	07:20		16:11 (4)	08:18			08:44
	21:28	18	20:26 (2)	20:23		19:07	20	18:38 (3)	16:58	16	16:27 (4)	16:11			16:12
31	05:37		20:07 (2)	06:31				07:22			16:12 (4)				08:44
	21:26	21	20:28 (2)	20:21				16:56	13	16:25 (4)					16:13
Potential sun hours	512		460			382		328		259					233
Total, worst case		64		612		131		805		332					
Sun reduction		0.32		0.34		0.32		0.29		0.27					
Oper. time red.		1.00		1.00		1.00		1.00		1.00					
Wind dir. red.		0.65		0.65		0.67		0.67		0.66					
Total reduction		0.21		0.22		0.22		0.20		0.18					
Total, real		13		135		28		157		58					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DK - H115

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:23 (5)	08:14	15:56 (4)	07:16	17:32 (3)	07:01	19:32 (1)	05:52	19:51 (2)	05:03
2	08:44	15:23 (5)	08:12	15:56 (4)	07:14	17:29 (3)	06:59	19:30 (1)	05:50	19:50 (2)	05:02
3	08:44	15:23 (5)	08:10	15:55 (4)	07:12	17:28 (3)	06:56	19:30 (1)	05:48	19:49 (2)	05:01
4	08:43	15:24 (5)	08:08	15:55 (4)	07:09	17:28 (3)	06:54	19:30 (1)	05:46	19:49 (2)	05:00
5	08:43	15:23 (5)	08:07	15:55 (4)	07:07	17:26 (3)	06:51	19:29 (1)	05:44	19:48 (2)	04:59
6	08:43	15:24 (5)	08:05	15:55 (4)	07:04	17:26 (3)	06:49	19:29 (1)	05:42	19:48 (2)	04:59
7	08:42	15:24 (5)	08:03	15:55 (4)	07:02	17:25 (3)	06:47	19:28 (1)	05:40	19:49 (2)	04:58
8	08:42	15:24 (5)	08:01	15:55 (4)	07:00	17:25 (3)	06:44	19:29 (1)	05:38	19:48 (2)	04:57
9	08:41	15:26 (5)	07:59	15:55 (4)	06:57	17:24 (3)	06:42	19:31 (1)	05:36	19:48 (2)	04:57
10	08:40	15:26 (5)	07:57	15:55 (4)	06:55	17:25 (3)	06:39	19:31 (1)	05:34	19:48 (2)	04:56
11	08:40	15:26 (5)	07:55	15:55 (4)	06:53	17:26 (3)	06:37	19:36 (1)	05:33	19:49 (2)	04:56
12	08:39	15:26 (5)	07:53	15:56 (4)	06:50	17:26 (3)	06:35	19:37 (1)	05:31	19:48 (2)	04:55
13	08:38	15:27 (5)	07:51	15:55 (4)	06:48	17:27 (3)	06:32	19:37 (1)	05:29	19:48 (2)	04:55
14	08:37	15:27 (5)	07:49	15:56 (4)	06:45	17:27 (3)	06:30	19:37 (1)	05:27	19:49 (2)	04:55
15	08:36	15:28 (5)	07:47	15:57 (4)	06:43	17:29 (3)	06:28	19:37 (1)	05:26	19:49 (2)	04:55
16	08:35	15:28 (5)	07:45	15:57 (4)	06:40	17:30 (3)	06:25	19:37 (1)	05:24	19:50 (2)	04:54
17	08:34	15:29 (5)	07:43	15:58 (4)	06:38	17:35 (3)	06:23	19:37 (1)	05:22	19:50 (2)	04:54
18	08:33	15:30 (5)	07:41	15:59 (4)	06:35	17:40 (3)	06:21	19:37 (1)	05:21	19:51 (2)	04:54
19	08:32	15:31 (5)	07:39	16:00 (4)	06:33	17:41 (3)	06:18	19:37 (1)	05:19	19:52 (2)	04:54
20	08:31	15:31 (5)	07:36	16:01 (4)	06:31	17:42 (3)	06:16	19:37 (1)	05:18	19:52 (2)	04:54
21	08:30	15:33 (5)	07:34	16:03 (4)	06:28	17:43 (3)	06:14	19:37 (1)	05:16	19:53 (2)	04:54
22	08:29	15:33 (5)	07:32	16:04 (4)	06:26	17:44 (3)	06:12	19:37 (1)	05:15	19:54 (2)	04:55
23	08:27	15:35 (5)	07:30	16:06 (4)	06:23	17:45 (3)	06:09	19:37 (1)	05:13	19:54 (2)	04:55
24	08:26	15:36 (5)	07:28	16:09 (4)	06:21	17:46 (3)	06:07	19:37 (1)	05:12	19:55 (2)	04:55
25	08:24	15:39 (5)	07:25	16:11 (4)	06:18	17:47 (3)	06:05	19:37 (1)	05:11	19:56 (2)	04:55
26	08:23	15:43 (5)	07:23	16:18 (4)	06:16	17:48 (3)	06:03	19:37 (1)	05:09	19:57 (2)	04:56
27	08:22	15:57 (4)	07:21	16:23 (4)	06:13	17:49 (3)	06:01	19:37 (1)	05:08	19:59 (2)	04:56
28	08:20	16:23 (4)	07:18	16:11 (4)	06:11	17:50 (3)	05:58	19:37 (1)	05:07	20:00 (2)	04:57
29	08:18	16:26 (4)	18:00	16:11 (4)	06:11	17:51 (3)	05:56	19:37 (1)	05:06	20:01 (2)	04:57
30	08:17	16:28 (4)		16:11 (4)	06:11	17:52 (3)	05:54	19:37 (1)	05:05	20:02 (2)	04:58
31	08:15	16:32 (4)		16:11 (4)	06:11	17:53 (3)	05:52	19:37 (1)	05:04	20:03 (2)	04:58
Potential sun hours	250		273	367		420		494		510	
Total, worst case	798		1080	301		291		1098		13	
Sun reduction	0.24		0.23	0.27		0.35		0.38		0.32	
Oper. time red.	1.00		1.00	1.00		1.00		1.00		1.00	
Wind dir. red.	0.66		0.66	0.68		0.65		0.65		0.65	
Total reduction	0.16		0.15	0.18		0.23		0.25		0.21	
Total, real	128		166	55		67		270		3	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DK - H115

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59		05:39	19:59 (2)	06:33	19:34 (1)	07:26	18:05 (3)	07:24	15:25 (4)	08:19
	22:00		21:25	20:42 (2)	20:18	19:37 (1)	19:05	18:30 (3)	16:54	16:16 (4)	16:10
2	04:59		05:40	19:59 (2)	06:35	19:30 (1)	07:28	18:04 (3)	07:26	15:25 (4)	08:21
	22:00		21:23	20:42 (2)	20:16	19:41 (1)	19:02	18:31 (3)	16:52	16:16 (4)	16:09
3	05:00		05:42	19:58 (2)	06:36	19:29 (1)	07:30	18:03 (3)	07:28	15:24 (4)	08:22
	21:59		21:21	20:42 (2)	20:13	19:42 (1)	19:00	18:31 (3)	16:50	16:16 (4)	16:08
4	05:01		05:44	19:58 (2)	06:38	19:26 (1)	07:31	18:03 (3)	07:30	15:24 (4)	08:24
	21:59		21:19	20:42 (2)	20:11	19:42 (1)	18:57	18:29 (3)	16:48	16:16 (4)	16:08
5	05:02		05:45	19:58 (2)	06:40	19:26 (1)	07:33	18:02 (3)	07:32	15:24 (4)	08:25
	21:58		21:17	20:41 (2)	20:09	19:41 (1)	18:55	18:26 (3)	16:46	16:15 (4)	16:07
6	05:03		05:47	19:58 (2)	06:42	19:25 (1)	07:35	18:02 (3)	07:34	15:25 (4)	08:26
	21:58		21:15	20:42 (2)	20:06	19:39 (1)	18:52	18:24 (3)	16:44	16:12 (4)	16:07
7	05:04		05:49	19:58 (2)	06:43	19:24 (1)	07:37	18:01 (3)	07:36	15:25 (4)	08:28
	21:57		21:13	20:42 (2)	20:04	19:35 (1)	18:50	18:21 (3)	16:43	16:10 (4)	16:06
8	05:05		05:51	19:58 (2)	06:45	19:24 (1)	07:39	18:01 (3)	07:38	15:25 (4)	08:29
	21:56		21:12	20:41 (2)	20:01	19:33 (1)	18:48	18:18 (3)	16:41	16:08 (4)	16:06
9	05:06		05:52	19:58 (2)	06:47	19:24 (1)	07:41	18:02 (3)	07:40	15:25 (4)	08:30
	21:55		21:10	20:39 (2)	19:59	19:31 (1)	18:45	18:16 (3)	16:39	16:06 (4)	16:05
10	05:07		05:54	19:58 (2)	06:49	19:24 (1)	07:42	18:02 (3)	07:42	15:27 (4)	08:31
	21:55		21:08	20:37 (2)	19:56	19:28 (1)	18:43	18:14 (3)	16:37	16:05 (4)	16:05
11	05:08		05:56	19:59 (2)	06:50	19:24 (1)	07:44	18:03 (3)	07:44	15:27 (4)	08:33
	21:54	8	20:24 (2)	21:05	20:35 (2)	19:26 (1)	18:40	18:11 (3)	16:35	16:03 (4)	16:05
12	05:09		05:57	19:59 (2)	06:52		07:46	18:04 (3)	07:45	15:28 (4)	08:34
	21:53	13	20:26 (2)	21:03	20:34 (2)		18:38	18:09 (3)	16:34	16:01 (4)	16:05
13	05:10		05:59	19:59 (2)	06:54		07:48	18:05 (3)	07:47	15:29 (4)	08:35
	21:52	16	20:28 (2)	21:01	20:31 (2)		18:36	18:07 (3)	16:32	15:59 (4)	16:05
14	05:12		06:01	20:00 (2)	06:56		07:50		07:49	15:29 (4)	08:36
	21:51	19	20:29 (2)	20:59	20:29 (2)		18:33		16:31	15:58 (4)	16:05
15	05:13		06:03	20:01 (2)	06:58		07:52		07:51	15:30 (4)	08:37
	21:50	21	20:30 (2)	20:57	20:28 (2)		18:31		16:29	15:56 (4)	16:05
16	05:14		06:05	20:01 (2)	06:59		07:54	16:47 (4)	07:53	15:15 (5)	08:38
	21:49	23	20:31 (2)	20:55	20:25 (2)		18:29	12	16:59 (4)	16:27	15:54 (4)
17	05:16		06:06	20:02 (2)	07:01		07:55		07:55	15:12 (5)	08:38
	21:47	25	20:33 (2)	20:53	20:23 (2)		18:26	21	17:03 (4)	16:26	15:52 (4)
18	05:17		06:08	20:04 (2)	07:03		07:57		07:57	15:10 (5)	08:39
	21:46	28	20:34 (2)	20:51	20:22 (2)		18:24	26	17:05 (4)	16:24	15:51 (4)
19	05:18		06:10	20:05 (2)	07:05		07:59		07:59	15:09 (5)	08:40
	21:45	29	20:34 (2)	20:48	20:19 (2)		18:22	31	17:07 (4)	16:23	15:49 (4)
20	05:20		06:12	20:07 (2)	07:06		08:01		08:00	15:08 (5)	08:41
	21:44	31	20:36 (2)	20:46	20:17 (2)		18:20	35	17:09 (4)	16:22	15:47 (4)
21	05:21		06:13	20:10 (2)	07:08		08:03		08:02	15:08 (5)	08:41
	21:42	32	20:36 (2)	20:44	20:15 (2)		18:17	37	17:10 (4)	16:20	15:46 (4)
22	05:23		06:15		07:10		08:05		08:04	15:07 (5)	08:42
	21:41	34	20:37 (2)	20:42			18:15	40	17:11 (4)	16:19	15:44 (4)
23	05:24		06:17		07:12		08:07		08:06	15:07 (5)	08:42
	21:39	35	20:38 (2)	20:39			18:13	42	17:12 (4)	16:18	15:43 (4)
24	05:26		06:19		07:13		08:09		08:08	15:07 (5)	08:43
	21:38	36	20:38 (2)	20:37			18:11	44	17:13 (4)	16:17	15:42 (5)
25	05:27		06:20		07:15		07:11		08:09	15:07 (5)	08:43
	21:36	38	20:40 (2)	20:35			17:09	45	16:13 (4)	16:16	15:40 (5)
26	05:29		06:22		07:17		07:13		08:11	15:07 (5)	08:43
	21:35	39	20:40 (2)	20:32			17:06	47	16:14 (4)	16:14	15:33 (5)
27	05:30		06:24		07:19		07:15		08:13	15:07 (5)	08:44
	21:33	40	20:41 (2)	20:30			18:25 (3)	48	16:14 (4)	16:13	15:34 (5)
28	05:32		06:26		07:21		07:16		08:14	15:08 (5)	08:44
	21:32	41	20:41 (2)	20:28			18:28 (3)	49	16:14 (4)	16:12	15:34 (5)
29	05:34		06:28		07:22		07:18		08:16	15:07 (5)	08:44
	21:30	41	20:40 (2)	20:25			18:29 (3)	50	16:15 (4)	16:12	15:34 (5)
30	05:35		06:29		07:24		07:20		08:18	15:08 (5)	08:44
	21:28	42	20:41 (2)	20:23			18:06 (3)	51	16:15 (4)	16:11	15:35 (5)
31	05:37		06:31				07:22		08:19	15:09 (5)	08:45
	21:27	43	20:42 (2)	20:21			16:56	51	16:15 (4)	16:11	15:35 (5)
Potential sun hours	512		460		382		328		259		233
Total, worst case	634		679		179		859		1047		442
Sun reduction	0.32		0.34		0.32		0.29		0.27		0.21
Oper. time red.	1.00		1.00		1.00		1.00		1.00		1.00
Wind dir. red.	0.65		0.65		0.67		0.66		0.66		0.66
Total reduction	0.21		0.22		0.22		0.19		0.17		0.14
Total, real	132		150		39		167		183		60

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DL - H116

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:02 (4)	08:14		07:16	17:18 (2)	07:01	05:52	05:03		
	16:15	29	15:31 (4)	17:06		18:02	16	17:34 (2)	20:00	20:55	21:45
2	08:44		15:03 (4)	08:12	16:33 (3)	07:14		17:16 (2)	06:59	05:50	05:02
	16:16	29	15:32 (4)	17:08	4	16:37 (3)	18:04	20	17:36 (2)	20:02	20:57
3	08:44		15:03 (4)	08:10		16:33 (3)	07:12		17:15 (2)	06:56	05:48
	16:17	28	15:31 (4)	17:10	6	16:39 (3)	18:06	23	17:38 (2)	20:04	20:59
4	08:43		15:04 (4)	08:08		16:32 (3)	07:09		17:15 (2)	06:54	05:46
	16:18	28	15:32 (4)	17:12	9	16:41 (3)	18:07	26	17:41 (2)	20:06	21:01
5	08:43		15:04 (4)	08:07		16:32 (3)	07:07		17:13 (2)	06:51	05:44
	16:19	28	15:32 (4)	17:14	11	16:43 (3)	18:09	29	17:42 (2)	20:07	21:03
6	08:43		15:05 (4)	08:05		16:32 (3)	07:04		17:13 (2)	06:49	05:42
	16:21	28	15:33 (4)	17:16	13	16:45 (3)	18:11	32	17:45 (2)	20:09	21:04
7	08:42		15:06 (4)	08:03		16:32 (3)	07:02		17:12 (2)	06:47	05:40
	16:22	27	15:33 (4)	17:18	15	16:47 (3)	18:13	33	17:45 (2)	20:11	21:06
8	08:42		15:06 (4)	08:01		16:32 (3)	07:00		17:12 (2)	06:44	05:38
	16:24	26	15:32 (4)	17:20	18	16:50 (3)	18:15	34	17:46 (2)	20:13	21:08
9	08:41		15:08 (4)	07:59		16:33 (3)	06:57		17:11 (2)	06:42	05:36
	16:25	25	15:33 (4)	17:22	19	16:52 (3)	18:17	34	17:45 (2)	20:15	21:10
10	08:40		15:08 (4)	07:57		16:33 (3)	06:55		17:12 (2)	06:39	05:34
	16:26	25	15:33 (4)	17:24	21	16:54 (3)	18:19	33	17:45 (2)	20:17	21:11
11	08:40		15:09 (4)	07:55		16:34 (3)	06:52		17:12 (2)	06:37	05:33
	16:28	24	15:33 (4)	17:26	19	16:53 (3)	18:21	33	17:45 (2)	20:19	21:13
12	08:39		15:10 (4)	07:53		16:35 (3)	06:50		17:12 (2)	06:35	05:31
	16:30	23	15:33 (4)	17:28	17	16:52 (3)	18:23	31	17:43 (2)	20:20	21:15
13	08:38		15:11 (4)	07:51		16:36 (3)	06:48		17:13 (2)	06:32	05:29
	16:31	22	15:33 (4)	17:30	14	16:50 (3)	18:25	30	17:43 (2)	20:22	21:17
14	08:37		15:12 (4)	07:49		16:38 (3)	06:45		17:13 (2)	06:30	05:27
	16:33	20	15:32 (4)	17:32	10	16:48 (3)	18:27	28	17:41 (2)	20:24	21:18
15	08:36		15:14 (4)	07:47		06:43			17:15 (2)	06:28	05:26
	16:34	18	15:32 (4)	17:34		18:28	25	17:40 (2)	20:26	21:20	21:58
16	08:35		15:14 (4)	07:45		06:40			17:16 (2)	06:25	05:24
	16:36	16	15:30 (4)	17:36		18:30	22	17:38 (2)	20:28	21:22	21:59
17	08:34		15:17 (4)	07:43		06:38			17:18 (2)	06:23	05:22
	16:38	12	15:29 (4)	17:38		18:32	18	17:36 (2)	20:30	21:23	21:59
18	08:33		15:20 (4)	07:41		06:35			17:20 (2)	06:21	05:21
	16:40	8	15:28 (4)	17:40		18:34	12	17:32 (2)	20:31	21:25	22:00
19	08:32			07:39		06:33			06:18	05:19	04:54
	16:41			17:42		18:36			20:33	21:27	22:00
20	08:31			07:36		06:31			06:16	05:18	04:54
	16:43			17:44		18:38			20:35	21:28	22:00
21	08:30			07:34		06:28			06:14	05:16	04:54
	16:45			17:46		18:40			20:37	21:30	22:01
22	08:29			07:32		06:26			06:12	05:15	04:55
	16:47			17:48		18:42			20:39	21:31	22:01
23	08:27			07:30		06:23			06:09	05:13	04:55
	16:49			17:50		18:43			20:41	21:33	22:01
24	08:26			07:28		06:21			06:07	05:12	04:55
	16:50			17:52		18:45			20:43	21:34	22:01
25	08:24			07:25		06:18			06:05	05:11	04:55
	16:52			17:54		18:47			20:44	21:36	22:01
26	08:23			07:23		17:25 (2)	06:16		06:03	05:09	04:56
	16:54			17:56	3	17:28 (2)	18:49		20:46	21:37	22:01
27	08:22			07:21		17:22 (2)	06:13		06:00	05:08	04:56
	16:56			17:58	9	17:31 (2)	18:51		20:48	21:39	22:01
28	08:20			07:18		17:19 (2)	06:11		05:58	05:07	04:57
	16:58			18:00	13	17:32 (2)	18:53		20:50	21:40	22:01
29	08:19					07:08			05:56	05:06	04:57
	17:00					19:54			20:52	21:41	22:01
30	08:17					07:06			05:54	05:05	04:58
	17:02					19:56			20:54	21:43	22:00
31	08:15					07:04				05:04	
	17:04					19:58				21:44	
Potential sun hours	250			273		367			420	494	510
Total, worst case		416		201		479					
Sun reduction		0.24		0.23		0.27					
Oper. time red.		1.00		1.00		1.00					
Wind dir. red.		0.65		0.66		0.68					
Total reduction		0.16		0.15		0.18					
Total, real		66		31		88					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DL - H116

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:51 (2) 18:22 (2)	07:24 16:54	16:03 (3) 16:23 (3)	08:19 16:10	14:51 (4) 15:15 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:51 (2) 18:22 (2)	07:26 16:52	16:02 (3) 16:21 (3)	08:21 16:09	14:50 (4) 15:15 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:50 (2) 18:23 (2)	07:28 16:50	16:02 (3) 16:19 (3)	08:22 16:08	14:51 (4) 15:16 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:50 (2) 18:23 (2)	07:30 16:48	16:02 (3) 16:17 (3)	08:24 16:08	14:51 (4) 15:18 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:49 (2) 18:23 (2)	07:32 16:46	16:02 (3) 16:15 (3)	08:25 16:07	14:51 (4) 15:18 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:49 (2) 18:23 (2)	07:34 16:44	16:02 (3) 16:12 (3)	08:26 16:07	14:51 (4) 15:19 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:48 (2) 18:21 (2)	07:36 16:43	16:02 (3) 16:10 (3)	08:28 16:06	14:51 (4) 15:19 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:48 (2) 18:18 (2)	07:38 16:41	16:03 (3) 16:08 (3)	08:29 16:06	14:51 (4) 15:19 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:48 (2) 18:16 (2)	07:40 16:39	16:04 (3) 16:07 (3)	08:30 16:05	14:52 (4) 15:21 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:49 (2) 18:14 (2)	07:42 16:37	08:31 16:05	14:52 (4) 15:21 (4)	15:21 (4) 15:21 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:50 (2) 18:11 (2)	07:44 16:35	08:33 16:05	14:52 (4) 15:21 (4)	15:21 (4) 15:21 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:50 (2) 18:09 (2)	07:45 16:34	08:34 16:05	14:52 (4) 15:22 (4)	15:22 (4) 15:22 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:52 (2) 18:07 (2)	07:47 16:32	08:35 16:05	14:53 (4) 15:22 (4)	15:22 (4) 15:22 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:53 (2) 18:04 (2)	07:49 16:31	08:36 16:04	14:53 (4) 15:22 (4)	15:23 (4) 15:22 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:55 (2) 18:02 (2)	07:51 16:29	08:37 16:04	14:53 (4) 15:23 (4)	15:23 (4) 15:23 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:50 (2) 16:27	07:53 16:27	08:38 16:05	14:54 (4) 15:24 (4)	15:24 (4) 15:24 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:55 (2) 16:26	07:55 16:26	08:38 16:05	14:54 (4) 15:24 (4)	15:24 (4) 15:24 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:57 (2) 16:24	07:57 16:24	08:39 16:05	14:55 (4) 15:25 (4)	15:25 (4) 15:25 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:59 (2) 16:23	07:59 16:23	08:40 16:05	14:56 (4) 15:26 (4)	15:26 (4) 15:26 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	18:00 (2) 16:22	08:00 16:22	08:41 16:06	14:56 (4) 15:26 (4)	15:26 (4) 15:26 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	18:02 (2) 16:20	08:02 16:20	08:41 16:06	14:57 (4) 15:27 (4)	15:27 (4) 15:27 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	18:03 (2) 16:19	08:04 16:19	08:42 16:06	14:57 (4) 15:27 (4)	15:27 (4) 15:27 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	18:04 (2) 16:18	08:06 16:18	08:42 16:07	14:58 (4) 15:28 (4)	15:28 (4) 15:28 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	18:05 (2) 16:17	08:08 16:17	14:57 (4) 15:05 (4)	08:43 16:08	14:58 (4) 15:28 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	18:05 (2) 18:13 (2)	07:11 17:09	08:09 16:16	14:55 (4) 15:07 (4)	08:43 16:08	14:58 (4) 15:28 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	18:01 (2) 18:17 (2)	07:13 17:06	08:11 16:14	14:54 (4) 15:09 (4)	08:43 16:09	14:58 (4) 15:28 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	17:58 (2) 18:19 (2)	07:15 17:04	08:13 16:13	14:53 (4) 15:11 (4)	08:44 16:10	15:00 (4) 15:29 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	17:56 (2) 18:20 (2)	07:16 17:02	08:14 16:12	14:52 (4) 15:12 (4)	08:44 16:10	15:00 (4) 15:30 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	17:55 (2) 18:21 (2)	07:18 17:00	08:16 16:12	14:51 (4) 15:13 (4)	08:44 16:11	15:01 (4) 15:30 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	17:52 (2) 18:21 (2)	07:20 16:58	08:18 16:11	14:51 (4) 15:14 (4)	08:44 16:12	15:00 (4) 15:30 (4)
31	05:37 21:27	06:31 20:21		07:22 16:56	16:03 (3) 16:22 (3)		08:44 16:13	15:01 (4) 15:30 (4)	15:01 (4) 15:30 (4)
Potential sun hours	512	460	382	328	259	233			
Total, worst case			124	451	228	894			
Sun reduction			0.32	0.29	0.27	0.21			
Oper. time red.			1.00	1.00	1.00	1.00			
Wind dir. red.			0.68	0.67	0.65	0.65			
Total reduction			0.22	0.20	0.17	0.13			
Total, real			27	89	39	120			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DM - H117

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		16:26 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24					15:46 (2)	08:19		15:31 (3)	
	16:15		17:06	8	16:34 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	34	16:20 (2)	16:10	3	15:34 (3)				
2	08:44		08:12		16:24 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28		07:26					15:46 (2)	08:21		15:31 (3)	
	16:16		17:08	13	16:37 (2)	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02		16:52	34	16:20 (2)	16:09	1	15:32 (3)				
3	08:44		08:10		16:22 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28					15:47 (2)	08:22			
	16:17		17:10	17	16:39 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00		16:50	32	16:19 (2)	16:08						
4	08:43		08:08		16:21 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31		07:30					15:48 (2)	08:24			
	16:18		17:12	20	16:41 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	29	16:17 (2)	16:08						
5	08:43		08:07		16:19 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33		07:32					15:48 (2)	08:25			
	16:19		17:14	24	16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55		16:46	26	16:14 (2)	16:07						
6	08:43		08:05		16:19 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35		07:34					15:49 (2)	08:26			
	16:21		17:16	26	16:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52		16:44	23	16:12 (2)	16:07						
7	08:42		08:03		16:18 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37		07:36					15:50 (2)	08:28			
	16:22		17:18	29	16:47 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	20	16:10 (2)	16:06						
8	08:42		08:01		16:17 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39		07:38					15:52 (2)	08:29			
	16:24		17:20	32	16:49 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	16	16:08 (2)	16:06						
9	08:41		07:59		16:17 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40					15:55 (2)	08:30			
	16:25		17:22	33	16:50 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45		16:39	12	16:07 (2)	16:05						
10	08:40		15:49 (3)	07:57	16:16 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42		07:42					15:57 (2)	08:31			
	16:26	1	15:50 (3)	17:24	35	16:51 (2)	18:19	20:17	21:11	21:55	21:08	19:56	18:43		16:37	8	16:05 (2)	16:05						
11	08:40		15:49 (3)	07:55	16:16 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44		07:44									
	16:28	3	15:52 (3)	17:26	35	16:51 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54		16:35									
12	08:39		15:49 (3)	07:53	16:16 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46		07:45					15:32 (3)	08:34			
	16:30	5	15:54 (3)	17:28	36	16:52 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51		16:34	6	15:38 (3)	16:05						
13	08:38		15:53 (3)	07:51	16:15 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:47		07:47					15:29 (3)	08:35			
	16:31	6	15:55 (3)	17:30	36	16:51 (2)	18:30	20:27	21:21	21:57	21:01	19:49	18:36		16:32	12	15:41 (3)	16:05						
14	08:37		15:49 (3)	07:49	16:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49					15:28 (3)	08:36			
	16:33	8	15:57 (3)	17:32	36	16:51 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47		16:31	14	15:42 (3)	16:04						
15	08:36		15:49 (3)	07:47	16:15 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52		07:51					15:27 (3)	08:37			
	16:34	10	15:59 (3)	17:34	36	16:51 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44		16:29	17	15:44 (3)	16:04						
16	08:35		15:48 (3)	07:45	16:16 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54		17:00 (2)	07:53				15:26 (3)	08:38			
	16:36	12	16:00 (3)	17:36	35	16:51 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42		17:11 (2)	16:27	19	15:45 (3)	16:05					
17	08:34		16:02 (3)	07:43	16:16 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55		16:56 (2)	07:55				15:25 (3)	08:38			
	16:38	14	16:08 (3)	17:38	35	16:51 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39		18	17:14 (2)	16:26	20	15:45 (3)	16:05				
18	08:33		15:49 (3)	07:41	16:16 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57		16:54 (2)	07:57				15:25 (3)	08:39			
	16:40	16	16:05 (3)	17:40	34	16:50 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37		22	17:16 (2)	16:24	21	15:46 (3)	16:05				
19	08:32		15:50 (3)	07:39	16:17 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		16:52 (2)	07:59				15:25 (3)	08:40			
	16:41	17	16:07 (3)	17:42	33	16:50 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34		18:22	25	17:17 (2)	16:23	21	15:46 (3)	16:05			
20	08:31		15:49 (3)	07:36	16:18 (2)	06:31	06:16	05:18	04:51	05:24	06:12	07:06	08:01		16:50 (2)	07:00				15:25 (3)	08:41			
	16:43	19	16:08 (3)	17:44	31	16:49 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32		18:20	28	17:18 (2)	16:22	22	15:47 (3)	16:06			
21	08:30		15:50 (3)	07:34	16:19 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		16:49 (2)	08:02				15:25 (3)	08:41			
	16:45	21	16:11 (3)	17:46	29	16:48 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29		18:17	30	17:19 (2)	16:20	21	15:46 (3)	16:06			
22	08:29		15:50 (3)	07:32	16:19 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		16:48 (2)	08:04				15:25 (3)	08:42			
	16:47	22	16:12 (3)	17:48	28	16:47 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27		18:15	32	17:20 (2)	16:19	19	15:44 (3)	16:06			
23	08:27		15:51 (3)	07:30	16:21 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		16:47 (2)	08:06				15:26 (3)	08:42			
	16:49	21	16:12 (3)	17:50	24	16:45 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24		18:13	33	17:20 (2)	16:18	17	15:43 (3)	16:07			
24	08:26		15:51 (3)	07:28	16:23 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09		16:46 (2)	08:08				15:26 (3)	08:43			
	16:50	21	16:12 (3)	17:52	21	16:44 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22		18:11	35	17:21 (2)	16:17	16	15:42 (3)	16:08			
25	08:25		15:52 (3)	07:25	16:25 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11		15:46 (2)	08:09				15:27 (3)	08:43			
	16:52	20	16:12 (3)	17:54	16	16:41 (2)	18:47	20:44	21:36	22:01	21:36	20:35	19:19		17:09	35	16:21 (2)	16:16	14	15:41 (3)	16:08			
26	08:23		15:53 (3)	07:23	16:30 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13		15:45 (2)	08:11				15:27 (3)	08:43			
	16:54	19	16:12 (3)	17:56	6	16:36 (2)	18:49	20:46	21:37	22:01	21:35	20:32	19:17		17:06	36	16:21 (2)	16:14	12	15:39 (3)	16:09			
27	08:22		15:54 (3)	07:21	16:31 (2)	06:13	06:00	05:06	04:56	05:30	06:24	07:19	07:15		15:45 (2)	08:13				15:28 (3)	08:44			
	16:56	17	16:11 (3)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04		16:21 (2)	16:13				15:38 (3)	16:10			
28	08:20		15:56 (3)	07:18		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16		15:45 (2)	08:14				15:29 (3)	08:44			
	16:58	14	16:10 (3)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02		36	16:21 (2)	16:12	8	15:37 (3)	16:10				
29	08:19		15:57 (3)			07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18		15:45 (2)	08:16				15:29 (3)	08:44			
	17:00	12	16:09 (3)			19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00		36	16:21 (2)	16:12	7	15:36 (3)	16:11				
30	08:17		16:00 (3)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20		15:45 (2)	08:18				15:30 (3)	08:44			
	17:02	6	16:06 (3)			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58		35	16:20 (2)	16:11	5	15:35 (3)	16:12				
31	08:15		16:30 (20																					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DN - H118

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	17:06	08:49 (2)	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54
3	08:44	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26
4	16:16	17:08	08:50 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
5	08:44	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
6	16:17	17:10	08:50 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50
7	08:43	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30
8	16:18	17:12	08:51 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48
9	08:43	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32
10	16:20	17:14	08:51 (2)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46
11	08:43	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34
12	16:21	17:16	08:51 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44
13	08:42	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36
14	16:22	17:18	08:51 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43
15	08:42	08:01	08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38
16	16:24	17:20	08:51 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41
17	08:41	07:59	08:28 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40
18	16:25	17:22	08:50 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39
19	08:41	07:57	08:29 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42
20	16:27	17:24	08:50 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37
21	08:40	07:55	08:30 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44
22	16:28	17:26	08:49 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36
23	08:39	07:53	08:31 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46
24	16:30	17:28	08:48 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34
25	08:38	07:51	08:33 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48
26	16:31	17:30	08:46 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32
27	08:37	07:49	08:35 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49
28	16:33	17:32	08:42 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31
29	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	16:05
30	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05
31	08:36	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	16:05
32	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16:05
33	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	16:05
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38	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05
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40	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:06
41	08:30	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	16:06
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:20	16:06
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45	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	16:07
46	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	16:07
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52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	16:09
53	08:22	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13	16:09
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	16:14	16:10
55	08:20	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:03 (2)	16:10
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	10 08:13 (2)	16:11
57	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:01 (2)	16:11
58	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	08:15 (2)	16:12
59	08:17	08:45 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:00 (2)	16:12
60	17:02	2 08:47 (2)	19:56	20:54	21:43	22:01	21:28	20:23	19:07	16:58	18 08:18 (2)	16:12
61	08:15	08:44 (2)	07:04		05:04		05:37	06:31		07:22	07:59 (2)	16:12
62	17:04	5 08:49 (2)	19:58		21:44		21:27	20:21		16:56	20 08:19 (2)	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	7	223								62		
Sun reduction	0.24	0.23								0.29		
Oper. time red.	1.00	1.00								1.00		
Wind dir. red.	0.62	0.62								0.62		
Total reduction	0.15	0.14								0.18		
Total, real	1	32								11		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DO - H119

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:09 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:05	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:36 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:37	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:44 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DP - H120

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	06:18 (1) 06:22 (1)	05:03 21:45	04:59 22:00	05:39 21:25	06:11 (1) 06:34 (1)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	4 06:23 (1)	05:02 21:47	05:00 22:00	05:40 21:23	06:11 (1) 06:35 (1)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	06:14 (1) 06:12 (1)	05:01 21:48	05:01 21:59	05:42 21:21	06:12 (1) 06:34 (1)	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	12 06:24 (1)	05:00 21:49	05:01 21:59	05:44 21:19	06:14 (1) 06:35 (1)	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	14 06:10 (1)	04:59 21:50	05:02 21:58	05:46 21:18	06:16 (1) 06:35 (1)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	16 06:09 (1)	04:59 21:51	05:03 21:58	05:47 21:16	06:17 (1) 06:34 (1)	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	18 06:07 (1)	04:58 21:52	05:04 21:57	05:49 21:14	06:19 (1) 06:34 (1)	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20 06:05 (1)	04:57 21:53	05:05 21:56	05:51 21:12	06:20 (1) 06:33 (1)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	21 06:03 (1)	04:57 21:54	05:06 21:56	05:52 21:10	06:22 (1) 06:33 (1)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	23 06:02 (1)	04:56 21:55	05:07 21:55	05:54 21:08	06:24 (1) 06:33 (1)	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	23 06:01 (1)	04:56 21:56	05:08 21:54	05:56 21:06	06:25 (1) 06:31 (1)	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	22 06:01 (1)	04:56 21:56	05:10 21:53	05:58 21:04	06:27 (1) 06:30 (1)	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	21 06:02 (1)	04:55 21:57	05:11 21:52	05:59 21:01	06:34 (1) 06:23 (1)	06:48 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	20 06:02 (1)	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	07:49 16:05	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	18 06:04 (1)	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	07:51 16:05	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	17 06:04 (1)	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	07:53 16:05	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	14 06:06 (1)	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	07:55 16:05	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	11 06:07 (1)	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	07:57 16:05	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	7 06:09 (1)	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	07:59 16:05	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28		04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:01 16:06	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30		04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:02 16:06	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31		04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:04 16:07	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33		04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:06 16:07	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35		04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:08 16:08	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36		04:56 22:01	05:28 21:37	06:18 (1) 06:28 (1)	06:21 19:20	07:11 17:09	08:09 16:16	08:09 16:08	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37		04:56 22:01	05:29 21:35	06:16 (1) 06:29 (1)	06:22 19:17	07:13 17:07	08:11 16:15	08:11 16:09	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39		04:57 22:01	05:31 21:33	06:15 (1) 06:31 (1)	06:24 19:20	07:19 17:05	08:13 16:14	08:13 16:10	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40		04:57 22:01	05:32 21:32	06:14 (1) 06:31 (1)	06:26 19:28	07:17 17:02	08:15 16:13	08:15 16:11	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42		04:58 22:01	05:34 21:30	06:14 (1) 06:33 (1)	06:28 19:26	07:19 17:00	08:16 16:12	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	06:20 (1) 06:21 (1)	04:58 22:00	05:36 21:28	06:12 (1) 06:33 (1)	06:29 19:23	07:24 16:58	08:18 16:11	08:18 16:13	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:12 (1) 06:34 (1)	06:31 20:21		07:22 16:56	08:44 16:14		
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233
Total, worst case				1	298			121	183					
Sun reduction				0.35	0.38			0.32	0.34					
Oper. time red.				1.00	1.00			1.00	1.00					
Wind dir. red.				0.67	0.67			0.67	0.67					
Total reduction				0.24	0.26			0.22	0.23					
Total, real				0	76			26	42					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DQ - H121

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	05:03	05:34 (1)	04:59	05:32 (1)	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:56	21:45	05:45 (1)	22:00	05:50 (1)	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	05:02	05:33 (1)	05:00	05:33 (1)	05:41	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	21:47	05:45 (1)	22:00	05:50 (1)	21:23	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48	05:01	05:32 (1)	05:01	05:34 (1)	05:42	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	21:48	05:44 (1)	21:59	05:51 (1)	21:21	20:14	19:00	16:50	16:09	
4	08:43	08:09	07:09	06:54	05:46	05:00	05:31 (1)	05:01	05:34 (1)	05:44	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01	21:49	05:44 (1)	21:59	05:50 (1)	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44	04:59	05:31 (1)	05:02	05:35 (1)	05:46	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03	21:50	05:45 (1)	21:58	05:51 (1)	21:18	20:09	18:55	16:47	16:07	
6	08:43	08:05	07:05	06:49	05:42	04:59	05:30 (1)	05:03	05:36 (1)	05:47	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:09	21:05	21:51	05:45 (1)	21:58	05:51 (1)	21:16	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40	04:58	05:30 (1)	05:04	05:37 (1)	05:49	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	21:52	05:45 (1)	21:57	05:51 (1)	21:14	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38	04:57	05:29 (1)	05:05	05:38 (1)	05:51	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	21:53	05:45 (1)	21:56	05:52 (1)	21:12	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	05:36	04:57	05:29 (1)	05:06	05:39 (1)	05:52	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	21:54	05:46 (1)	21:56	05:52 (1)	21:10	19:59	18:45	16:39	16:06	
10	08:41	07:57	06:55	06:40	05:35	04:56	05:28 (1)	05:07	05:40 (1)	05:54	06:49	07:43	07:42	08:32	
	16:27	17:24	18:19	20:17	21:12	21:55	05:45 (1)	21:55	05:52 (1)	21:08	19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33	04:56	05:28 (1)	05:08	05:41 (1)	05:56	06:51	07:44	07:44	08:33	
	16:28	17:26	18:21	20:19	21:13	21:56	05:45 (1)	21:54	05:52 (1)	21:06	19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31	04:56	05:28 (1)	05:10	05:42 (1)	05:58	06:52	07:46	07:46	08:34	
	16:30	17:28	18:23	20:21	21:15	21:56	05:46 (1)	21:53	05:52 (1)	21:04	19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:33	05:29	04:55	05:27 (1)	05:11	05:43 (1)	05:59	06:54	07:48	07:48	08:35	
	16:31	17:30	18:25	20:22	21:17	21:57	05:45 (1)	21:52	9	05:52 (1)	21:01	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27	04:55	05:27 (1)	05:12	05:44 (1)	06:01	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:19	21:58	05:46 (1)	21:51	8	05:52 (1)	20:59	19:47	18:34	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26	04:55	05:27 (1)	05:13	05:45 (1)	06:03	06:58	07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	21:20	21:58	05:46 (1)	21:50	7	05:52 (1)	20:57	19:44	18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24	04:55	05:27 (1)	05:15	05:47 (1)	06:05	07:00	07:54	07:53	08:38	
	16:36	17:36	18:31	20:28	21:22	21:59	05:46 (1)	21:49	5	05:52 (1)	20:55	19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22	04:54	05:27 (1)	05:16	05:48 (1)	06:06	07:01	07:56	07:55	08:39	
	16:38	17:38	18:32	20:30	21:24	21:59	05:46 (1)	21:48	4	05:52 (1)	20:53	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21	04:54	05:27 (1)	05:17	05:49 (1)	06:08	07:03	07:58	07:57	08:39	
	16:40	17:40	18:34	20:32	21:25	22:00	05:46 (1)	21:46	2	05:51 (1)	20:51	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19	04:54	05:27 (1)	05:19	05:49 (1)	06:10	07:05	07:59	07:59	08:40	
	16:42	17:42	18:36	20:33	21:27	22:00	05:46 (1)	21:45	05:52 (1)	20:48	19:34	18:22	16:23	16:05	
20	08:31	07:37	06:31	06:16	05:18	04:55	05:27 (1)	05:20	05:47 (1)	06:12	07:07	08:01	08:01	08:41	
	16:43	17:44	18:38	20:35	21:28	22:00	05:46 (1)	21:44	05:53 (1)	20:46	19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16	04:55	05:28 (1)	05:22	05:48 (1)	06:14	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30	22:01	05:47 (1)	21:42	05:53 (1)	20:44	19:29	18:18	16:21	16:06	
22	08:29	07:32	06:26	06:12	05:15	04:55	05:28 (1)	05:23	05:49 (1)	06:15	07:10	08:05	08:04	08:42	
	16:47	17:48	18:42	20:39	21:31	22:01	05:47 (1)	21:41	05:54 (1)	20:42	19:27	18:15	16:19	16:07	
23	08:27	07:30	06:23	06:10	05:13	04:55	05:28 (1)	05:24	05:50 (1)	06:17	07:12	08:07	08:06	08:42	
	16:49	17:50	18:44	20:41	21:33	22:01	05:47 (1)	21:40	05:55 (1)	20:39	19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12	04:55	05:28 (1)	05:26	05:51 (1)	06:19	07:14	08:09	08:08	08:43	
	16:51	17:52	18:45	20:43	21:34	22:01	05:47 (1)	21:38	05:56 (1)	20:37	19:22	18:11	16:17	16:08	
25	08:25	07:26	06:19	06:05	05:11	04:56	05:29 (1)	05:28	05:52 (1)	06:21	07:15	08:11	08:09	08:43	
	16:53	17:54	18:47	20:45	21:36	1	05:41 (1)	22:01	05:53 (1)	20:35	19:20	18:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:10	04:56	05:29 (1)	05:29	05:53 (1)	06:22	07:17	08:13	08:11	08:44	
	16:55	17:56	18:49	20:46	21:37	3	05:42 (1)	22:01	05:54 (1)	20:33	19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08	04:57	05:30 (1)	05:31	05:54 (1)	06:24	07:19	08:15	08:13	08:44	
	16:56	17:58	18:51	20:48	21:39	4	05:42 (1)	22:01	05:55 (1)	20:30	19:15	17:05	16:14	16:10	
28	08:20	07:19	06:11	05:59	05:07	04:57	05:30 (1)	05:32	05:56 (1)	06:26	07:21	08:17	08:14	08:44	
	16:58	18:00	18:53	20:50	21:40	6	05:43 (1)	22:01	05:57 (1)	20:28	19:12	17:02	16:13	16:11	
29	08:19		07:09	05:56	05:06	04:58	05:31 (1)	05:34	05:58 (1)	06:28	07:23	08:19	08:16	08:44	
	17:00		19:55	20:52	21:42	7	05:43 (1)	22:01	05:59 (1)	20:26	19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05	04:58	05:31 (1)	05:36	05:60 (1)	06:29	07:24	08:21	08:18	08:44	
	17:02		19:57	20:54	21:43	8	05:43 (1)	22:00	05:61 (1)	20:23	19:07	18:05	16:11	16:13	
31	08:15		07:04	05:54	05:04	04:59	05:32 (1)	05:37	05:62 (1)	06:31	07:22	08:22	08:19	08:44	
	17:04		19:58	21:44	21:44	10	05:44 (1)	21:27	05:63 (1)	20:21	19:06	18:06	16:11	16:14	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233			
Total, worst case					39	516									
Sun reduction					0.38	0.32									
Oper. time red.					1.00	1.00									
Wind dir. red.					0.66	0.66									
Total reduction					0.25	0.21									
Total, real					10	109									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DR - H122

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:41	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:31	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DS - H123

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	07:25 (5) 20:55	05:03 05:34 (3)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 05:33 (3)
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 05:32 (3)
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 05:31 (3)
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 21:03	04:59 05:31 (3)
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 21:04	04:59 05:30 (3)
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:11 (5) 21:06	04:58 05:30 (3)
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:08 (5) 21:08	04:57 05:29 (3)
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:06 (5) 21:10	04:57 05:29 (3)
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:04 (5) 21:12	04:56 05:28 (3)
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:05 (5) 21:13	04:56 05:28 (3)
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	07:02 (5) 21:15	04:56 05:28 (3)
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	07:00 (5) 21:17	04:55 05:27 (3)
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	06:58 (5) 21:18	04:55 05:27 (3)
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	06:56 (5) 21:20	04:55 05:27 (3)
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	06:54 (5) 21:22	04:55 05:27 (3)
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	06:52 (5) 21:23	04:54 05:27 (3)
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	06:50 (5) 21:25	04:54 05:27 (3)
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	06:48 (5) 21:27	04:54 05:27 (3)
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	06:46 (5) 21:28	04:54 05:27 (3)
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	06:44 (5) 21:30	04:55 05:28 (3)
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	06:42 (5) 21:31	04:55 05:28 (3)
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	06:40 (5) 21:33	04:55 05:28 (3)
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	06:38 (5) 21:34	04:55 05:28 (3)
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	06:36 (5) 21:36	04:56 05:29 (3)
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	06:34 (5) 21:37	04:56 05:29 (3)
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	06:32 (5) 21:39	04:57 05:30 (3)
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	06:30 (5) 21:40	04:57 05:30 (3)
29	08:19 17:00		07:09 19:55	05:56 20:52	06:28 (5) 21:41	04:58 05:31 (3)
30	08:17 17:02		07:06 19:56	05:54 20:54	06:26 (5) 21:43	04:58 05:31 (3)
31	08:15 17:04		07:04 19:58		06:24 (5) 21:44	04:59 05:32 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case				154	30	460
Sun reduction				0.35	0.38	0.32
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.66	0.66
Total reduction				0.24	0.25	0.21
Total, real				37	8	97

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DS - H123

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 16	05:32 (3) 05:48 (3) 21:25	05:39 20:18 16	07:04 (5) 07:20 (5) 19:05	07:24 16:54 16:10	08:19 16:10 16:10
2	05:00 22:00 15	05:33 (3) 05:48 (3) 21:23	05:40 20:16 19	07:03 (5) 07:22 (5) 19:02	07:28 16:52 16:09	08:21 16:09 16:09
3	05:00 21:59 15	05:33 (3) 05:48 (3) 21:21	05:42 20:14 19	07:04 (5) 07:23 (5) 19:00	07:30 16:50 16:09	08:22 16:09 16:09
4	05:01 21:59 14	05:34 (3) 05:48 (3) 21:19	05:44 20:11 17	07:05 (5) 07:22 (5) 18:57	07:30 16:48 16:08	08:24 16:08 16:08
5	05:02 21:58 14	05:35 (3) 05:49 (3) 21:17	05:46 20:09 16	07:07 (5) 07:23 (5) 18:55	07:32 16:46 16:07	08:25 16:07 16:07
6	05:03 21:58 13	05:36 (3) 05:49 (3) 21:16	05:47 20:06 14	07:09 (5) 07:23 (5) 18:53	07:34 16:45 16:07	08:26 16:07 16:07
7	05:04 21:57 13	05:37 (3) 05:50 (3) 21:14	05:49 20:04 12	07:10 (5) 07:22 (5) 18:50	07:36 16:43 16:06	08:28 16:06 16:06
8	05:05 21:56 12	05:38 (3) 05:50 (3) 21:12	05:51 20:01 10	07:12 (5) 07:22 (5) 18:48	07:38 16:41 16:06	08:29 16:06 16:06
9	05:06 21:55 11	05:39 (3) 05:50 (3) 21:10	05:52 19:59 7	07:14 (5) 07:21 (5) 18:45	07:40 16:39 16:06	08:30 16:06 16:06
10	05:07 21:55 10	05:40 (3) 05:50 (3) 21:08	05:54 19:57 5	07:16 (5) 07:21 (5) 18:43	07:42 16:37 16:05	08:32 16:05 16:05
11	05:08 21:54 9	05:41 (3) 05:50 (3) 21:06	05:56 19:54 2	07:17 (5) 07:19 (5) 18:41	07:44 16:36 16:05	08:33 16:05 16:05
12	05:10 21:53 8	05:42 (3) 05:50 (3) 21:04	05:58 19:52 1	07:19 (5) 07:21 (5) 18:39	07:46 16:34 16:05	08:34 16:05 16:05
13	05:11 21:52 7	05:43 (3) 05:50 (3) 21:01	05:59 19:49 1	07:22 (5) 07:23 (5) 18:36	07:47 16:32 16:05	08:35 16:05 16:05
14	05:12 21:51 6	05:44 (3) 05:50 (3) 20:59	06:01 19:47 1	07:25 (5) 07:26 (5) 18:34	07:49 16:31 16:05	08:36 16:05 16:05
15	05:13 21:50 5	05:45 (3) 05:50 (3) 20:57	06:03 19:44 1	07:28 (5) 07:29 (5) 18:31	07:51 16:29 16:05	08:37 16:05 16:05
16	05:15 21:49 4	05:47 (3) 05:51 (3) 20:55	06:05 19:42 1	07:31 (5) 07:32 (5) 18:29	07:53 16:28 16:05	08:38 16:05 16:05
17	05:16 21:47 2	05:48 (3) 05:50 (3) 20:53	06:06 19:39 1	07:34 (5) 07:35 (5) 18:27	07:55 16:26 16:05	08:39 16:05 16:05
18	05:17 21:46 1	05:49 (3) 05:50 (3) 20:51	06:08 19:37 1	07:37 (5) 07:38 (5) 18:24	07:57 16:25 16:05	08:39 16:05 16:05
19	05:19 21:45 1	06:10 20:48 1	07:05 19:34 1	07:40 (5) 07:41 (5) 18:22	07:59 16:23 16:05	08:40 16:05 16:05
20	05:20 21:44 1	06:12 20:46 1	07:07 19:32 1	07:43 (5) 07:44 (5) 18:20	08:01 16:22 16:06	08:41 16:06 16:06
21	05:21 21:42 1	06:14 20:44 1	07:08 19:29 1	07:46 (5) 07:47 (5) 18:18	08:02 16:21 16:06	08:41 16:06 16:06
22	05:23 21:41 1	06:15 20:42 1	07:10 19:27 1	07:49 (5) 07:50 (5) 18:15	08:04 16:19 16:07	08:42 16:07 16:07
23	05:24 21:39 1	06:17 20:39 1	07:12 19:24 1	07:52 (5) 07:53 (5) 18:13	08:06 16:18 16:07	08:42 16:07 16:07
24	05:26 21:38 1	06:19 20:37 1	07:14 19:22 1	07:55 (5) 07:56 (5) 18:11	08:08 16:17 16:08	08:43 16:08 16:08
25	05:28 21:36 1	06:21 20:35 1	07:15 19:19 1	07:58 (5) 07:59 (5) 18:09	08:09 16:16 16:08	08:43 16:08 16:08
26	05:29 21:35 1	06:22 20:33 1	07:17 19:17 1	08:01 (5) 08:02 (5) 18:07	08:11 16:15 16:09	08:43 16:09 16:09
27	05:31 21:33 1	06:24 20:30 1	07:19 19:15 1	08:04 (5) 08:05 (5) 18:05	08:13 16:14 16:10	08:44 16:10 16:10
28	05:32 21:32 1	06:26 20:28 1	07:21 19:12 1	08:07 (5) 08:08 (5) 18:03	08:14 16:13 16:11	08:44 16:11 16:11
29	05:34 21:30 1	06:28 20:25 1	07:23 19:10 1	08:10 (5) 08:11 (5) 18:01	08:16 16:12 16:12	08:44 16:12 16:12
30	05:35 21:28 1	06:29 20:23 1	07:24 19:07 1	08:13 (5) 08:14 (5) 18:00	08:18 16:11 16:13	08:44 16:13 16:13
31	05:37 21:27 1	06:31 20:21 13	07:26 (5) 07:27 (5) 13	08:16 (5) 08:17 (5) 18:00	08:20 16:11 16:14	08:44 16:14 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	175	19	137			
Sun reduction	0.32	0.34	0.32			
Oper. time red.	1.00	1.00	1.00			
Wind dir. red.	0.66	0.67	0.67			
Total reduction	0.21	0.23	0.22			
Total, real	37	4	30			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DT - H124

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44			05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DU - H125

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:05
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:40 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:42 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:06 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:34	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:12
31	08:16 17:04		07:04 19:58	05:04 21:44			05:37 21:27	06:31 20:21		07:23 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DV - H126

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	09:05 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
2	16:15	17:06	09:08 (2)	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:10
3	08:44	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
4	16:16	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
5	08:44	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
6	16:17	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:08
7	08:43	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
8	16:18	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
9	08:43	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25
10	16:20	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
11	08:43	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
12	16:21	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:07
13	08:42	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
14	16:22	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
15	08:42	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
16	16:24	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
17	08:41	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
18	16:25	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:05
19	08:41	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32
20	16:27	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
21	08:40	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
22	16:28	17:26		18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
23	08:39	07:53		06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34
24	16:30	17:28		18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
25	08:38	07:51		06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
26	16:31	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:05
27	08:37	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
28	16:33	09:09 (2)		18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33	16:05
29	08:37	07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
30	16:34	09:12 (2)		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
31	08:36	07:45		06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38
32	16:36	09:13 (2)		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
33	08:35	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
34	16:38	09:13 (2)		18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
35	08:33	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39
36	16:40	09:13 (2)		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
37	08:32	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:40
38	16:41	09:14 (2)		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:05
39	08:31	07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:41
40	16:43	09:14 (2)		18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:06
41	08:30	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:41
42	16:45	09:15 (2)		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06
43	08:29	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
44	16:47	09:16 (2)		18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:07
45	08:27	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
46	16:49	09:16 (2)		18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:07
47	08:26	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
48	16:51	09:15 (2)		18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:07
49	08:25	07:25		06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:43
50	16:52	09:16 (2)		18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:09	16:08
51	08:23	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:44
52	16:54	09:15 (2)		18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:09
53	08:22	07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:44
54	16:56	09:16 (2)		18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:04	16:10
55	08:20	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:44
56	16:58	09:15 (2)		18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:11
57	08:19	07:18		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:44
58	17:00	09:14 (2)		19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:11
59	08:17	07:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:44
60	17:02	09:13 (2)		19:56	20:54	21:43	22:01	21:28	20:23	19:07	18:58	16:12
61	08:15	07:12		07:04	05:50	05:04	04:57	05:37	06:31	07:22	08:18	08:44
62	17:04	09:12 (2)		19:58	21:44	21:44	21:27	20:21	19:16	18:56	18:41	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	245	3									252	
Sun reduction	0.24	0.23									0.27	
Oper. time red.	1.00	1.00									1.00	
Wind dir. red.	0.61	0.61									0.61	
Total reduction	0.15	0.14									0.16	
Total, real	36	0									41	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DW - H127

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:23 (5)	08:14	15:49 (4)	07:16	17:09 (3)	07:01	19:16 (2)	05:52	05:03	
	16:15	14	15:37 (5)	17:06	38	16:27 (4)	18:02	23	17:32 (3)	20:00	17
2	08:44	15:23 (5)	08:12	15:50 (4)	07:14	17:09 (3)	06:59	19:13 (2)	05:50	05:02	
	16:16	16	15:39 (5)	17:08	37	16:27 (4)	18:04	22	17:31 (3)	20:02	22
3	08:44	15:23 (5)	08:10	15:50 (4)	07:12	17:10 (3)	06:56	19:12 (2)	05:48	05:01	
	16:17	16	15:39 (5)	17:10	37	16:27 (4)	18:06	20	17:30 (3)	20:04	25
4	08:43	15:24 (5)	08:08	15:50 (4)	07:09	17:12 (3)	06:54	19:11 (2)	05:46	05:00	
	16:18	17	15:41 (5)	17:12	36	16:26 (4)	18:07	17	17:29 (3)	20:06	28
5	08:43	15:24 (5)	08:07	15:51 (4)	07:07	17:13 (3)	06:51	19:10 (2)	05:44	04:59	
	16:19	18	15:42 (5)	17:14	35	16:26 (4)	18:09	13	17:26 (3)	20:07	30
6	08:43	15:25 (5)	08:05	15:52 (4)	07:04	17:17 (3)	06:49	19:09 (2)	05:42	04:59	
	16:21	19	15:44 (5)	17:16	34	16:26 (4)	18:11	6	17:23 (3)	20:09	33
7	08:42	15:25 (5)	08:03	15:52 (4)	07:02		06:47		19:08 (2)	05:40	
	16:22	20	15:45 (5)	17:18	33	16:25 (4)	18:13		20:11	19:43 (2)	35
8	08:42	15:25 (5)	08:01	15:53 (4)	07:00		06:44		19:07 (2)	05:38	
	16:24	21	15:46 (5)	17:20	31	16:24 (4)	18:15		20:13	19:44 (2)	37
9	08:41	15:26 (5)	07:59	15:55 (4)	06:57		06:42		19:07 (2)	05:36	
	16:25	23	15:49 (5)	17:22	28	16:23 (4)	18:17		20:15	19:44 (2)	37
10	08:40	15:26 (5)	07:57	15:56 (4)	06:55		06:39		19:06 (2)	05:34	
	16:26	23	15:49 (5)	17:24	26	16:22 (4)	18:19		20:17	19:43 (2)	37
11	08:40	15:27 (5)	07:55	15:58 (4)	06:52		06:37		19:07 (2)	05:33	
	16:28	22	15:49 (5)	17:26	23	16:21 (4)	18:21		20:19	19:43 (2)	36
12	08:39	15:27 (5)	07:53	15:59 (4)	06:50		06:35		19:07 (2)	05:31	
	16:30	23	15:50 (5)	17:28	19	16:18 (4)	18:23		20:20	19:43 (2)	36
13	08:38	15:28 (5)	07:51	16:02 (4)	06:48		06:32		19:06 (2)	05:29	
	16:31	24	15:55 (4)	17:30	13	16:15 (4)	18:25		20:22	19:42 (2)	36
14	08:37	15:29 (5)	07:49	16:05 (4)	06:45		06:30		19:07 (2)	05:27	
	16:33	26	15:57 (4)	17:32		18:27		20:24	19:41 (2)	21:18	
15	08:36	15:29 (5)	07:47	16:06 (4)	06:43		06:28		19:07 (2)	05:26	
	16:34	28	15:59 (4)	17:34		18:28		20:26	19:41 (2)	21:20	
16	08:35	15:29 (5)	07:45	16:07 (4)	06:40		06:25		19:08 (2)	05:24	
	16:36	30	16:00 (4)	17:36		18:30		20:28	19:40 (2)	21:22	
17	08:34	15:31 (5)	07:43	16:08 (4)	06:38		06:23		19:08 (2)	05:22	
	16:38	30	16:02 (4)	17:38		18:32		20:30	19:38 (2)	21:23	
18	08:33	15:32 (5)	07:41	16:09 (4)	06:35		06:21		19:09 (2)	05:21	
	16:40	32	16:05 (4)	17:40		18:34		20:31	19:37 (2)	21:25	
19	08:32	15:33 (5)	07:39	16:10 (4)	06:33		06:18		19:10 (2)	05:19	
	16:41	33	16:07 (4)	17:42		18:36		20:33	19:36 (2)	21:27	
20	08:31	15:34 (5)	07:36	17:14 (3)	06:31		06:16		19:12 (2)	05:18	
	16:43	32	16:08 (4)	17:44	2	17:16 (3)	18:38		20:35	19:34 (2)	22
21	08:30	15:37 (5)	07:34	17:12 (3)	06:28		06:14		19:13 (2)	05:16	
	16:45	32	16:11 (4)	17:46	6	17:18 (3)	18:40		20:37	19:31 (2)	18
22	08:29	15:40 (5)	07:32	17:11 (3)	06:26		06:12		19:16 (2)	05:15	
	16:47	27	16:12 (4)	17:48	8	17:19 (3)	18:42		20:39	19:28 (2)	12
23	08:27	15:49 (4)	07:30	17:10 (3)	06:23		06:09			05:13	
	16:49	26	16:15 (4)	17:50	12	17:22 (3)	18:43		20:41	21:33	
24	08:26	15:48 (4)	07:28	17:10 (3)	06:21		06:07			05:12	
	16:50	29	16:17 (4)	17:52	14	17:24 (3)	18:45		20:43	21:34	
25	08:24	15:49 (4)	07:25	17:09 (3)	06:18		06:05			05:11	
	16:52	30	16:19 (4)	17:54	17	17:26 (3)	18:47		20:44	21:36	
26	08:23	15:48 (4)	07:23	17:09 (3)	06:16		06:03			05:09	
	16:54	33	16:21 (4)	17:56	19	17:28 (3)	18:49		20:46	21:37	
27	08:22	15:48 (4)	07:21	17:09 (3)	06:13		06:01			05:08	
	16:56	35	16:23 (4)	17:58	22	17:31 (3)	18:51		20:48	21:39	
28	08:20	15:49 (4)	07:18	17:08 (3)	06:11		05:58			05:07	
	16:58	37	16:26 (4)	18:00	24	17:32 (3)	18:53		20:50	21:40	
29	08:18	15:48 (4)			07:08		05:56			05:06	
	17:00	38	16:26 (4)		19:54		20:52			21:41	
30	08:17	15:48 (4)			07:06		19:22 (2)		05:54	05:05	
	17:02	38	16:26 (4)		19:56		19:30 (2)		20:54	21:43	
31	08:15	15:48 (4)			07:04		19:18 (2)			05:04	
	17:04	38	16:26 (4)		19:58		19:31 (2)			21:44	
Potential sun hours	250		273		367		420		494	510	
Total, worst case	830		514		122		645				
Sun reduction	0.24		0.23		0.27		0.35				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.66		0.67		0.67		0.67				
Total reduction	0.16		0.15		0.18		0.24				
Total, real	133		80		22		152				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DW - H127

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December		
1	04:59 22:00	05:39 21:25	06:33 20:18	19:05 (2) 19:42 (2)	07:26 16:54	15:25 (4) 15:52 (4)	08:19 16:10	15:09 (5) 15:31 (5)
2	04:59 22:00	05:40 21:23	06:35 20:16	19:05 (2) 19:42 (2)	07:28 16:52	15:24 (4) 15:53 (4)	08:21 16:09	15:08 (5) 15:31 (5)
3	05:00 21:59	05:42 21:21	06:36 20:13	19:04 (2) 19:41 (2)	07:30 16:50	15:23 (4) 15:54 (4)	08:22 16:08	15:09 (5) 15:32 (5)
4	05:01 21:59	05:44 21:19	06:38 20:11	19:05 (2) 19:41 (2)	07:31 16:48	15:22 (4) 15:55 (4)	08:24 16:08	15:10 (5) 15:32 (5)
5	05:02 21:58	05:45 21:17	06:40 20:09	19:05 (2) 19:40 (2)	07:33 16:46	15:21 (4) 15:55 (4)	08:25 16:07	15:10 (5) 15:30 (5)
6	05:03 21:58	05:47 21:15	06:42 20:06	19:05 (2) 19:39 (2)	07:35 16:44	15:21 (4) 15:56 (4)	08:26 16:07	15:11 (5) 15:30 (5)
7	05:04 21:57	05:49 21:13	06:43 20:04	19:05 (2) 19:35 (2)	07:37 16:43	15:20 (4) 15:56 (4)	08:28 16:06	15:11 (5) 15:29 (5)
8	05:05 21:56	05:50 21:12	06:45 20:01	19:05 (2) 19:33 (2)	07:39 16:41	15:20 (4) 15:57 (4)	08:29 16:06	15:11 (5) 15:28 (5)
9	05:06 21:55	05:52 21:10	06:47 19:59	19:06 (2) 19:31 (2)	07:40 16:39	15:19 (4) 15:57 (4)	08:30 16:05	15:12 (5) 15:28 (5)
10	05:07 21:55	05:54 21:08	06:49 19:56	19:07 (2) 19:28 (2)	07:42 16:37	15:20 (4) 15:58 (4)	08:31 16:05	15:12 (5) 15:28 (5)
11	05:08 21:54	05:56 21:05	06:50 19:54	19:08 (2) 19:26 (2)	07:44 16:35	15:20 (4) 15:58 (4)	08:33 16:05	15:13 (5) 15:27 (5)
12	05:09 21:53	05:57 21:03	06:52 19:51	19:10 (2) 19:24 (2)	07:46 16:34	15:20 (4) 15:58 (4)	08:34 16:05	15:13 (5) 15:27 (5)
13	05:10 21:52	05:59 21:01	06:54 19:49	19:12 (2) 19:22 (2)	07:48 16:32	15:20 (4) 15:58 (4)	08:35 16:05	15:13 (5) 15:27 (5)
14	05:12 21:51	06:01 20:59	06:56 19:47	19:16 (2) 19:18 (2)	07:50 16:31	15:20 (4) 15:57 (4)	08:36 16:04	15:14 (5) 15:26 (5)
15	05:13 21:50	06:03 20:57	06:58 19:44	19:18 (2) 19:20 (2)	07:52 16:29	15:21 (4) 15:56 (4)	08:37 16:05	15:15 (5) 15:26 (5)
16	05:14 21:49	06:04 20:55	06:59 19:42	19:21 (2) 19:22 (2)	07:54 16:27	15:21 (4) 15:54 (4)	08:38 16:05	15:15 (5) 15:26 (5)
17	05:16 21:47	06:06 20:53	07:01 19:39	19:24 (2) 19:26 (2)	07:55 16:26	15:22 (4) 15:52 (4)	08:38 16:05	15:16 (5) 15:27 (5)
18	05:17 21:46	06:08 20:51	07:03 19:37	19:27 (2) 19:28 (2)	07:57 16:24	15:22 (4) 15:51 (4)	08:39 16:05	15:17 (5) 15:27 (5)
19	05:18 21:45	06:10 20:48	07:05 19:34	19:30 (2) 19:31 (2)	07:59 16:23	15:23 (4) 15:49 (4)	08:40 16:05	15:18 (5) 15:28 (5)
20	05:20 21:44	06:12 20:46	07:06 19:32	19:34 (2) 19:35 (2)	08:00 16:20	15:15 (5) 15:46 (4)	08:41 16:06	15:17 (5) 15:28 (5)
21	05:21 21:42	06:13 20:44	07:08 19:29	19:37 (2) 19:38 (2)	08:03 16:19	15:12 (5) 15:44 (4)	08:41 16:06	15:18 (5) 15:28 (5)
22	05:23 21:41	06:15 20:42	07:10 19:27	19:40 (2) 19:36 (2)	08:05 16:18	15:10 (5) 15:42 (4)	08:42 16:06	15:18 (5) 15:28 (5)
23	05:24 21:39	06:17 20:39	07:12 19:24	19:15 (2) 19:38 (2)	08:07 16:13	15:10 (5) 15:43 (4)	08:42 16:07	15:19 (5) 15:29 (5)
24	05:26 21:38	06:19 20:37	07:13 19:22	19:14 (2) 19:40 (2)	08:09 16:11	15:09 (5) 15:42 (4)	08:43 16:08	15:19 (5) 15:30 (5)
25	05:27 21:36	06:20 20:35	07:15 19:19	19:12 (2) 19:41 (2)	08:09 16:14	15:09 (5) 15:39 (4)	08:43 16:09	15:20 (5) 15:30 (5)
26	05:29 21:35	06:22 20:32	07:17 19:17	19:10 (2) 19:42 (2)	08:11 16:13	15:09 (5) 15:38 (4)	08:43 16:10	15:20 (5) 15:32 (5)
27	05:30 21:33	06:24 20:30	07:19 19:14	19:10 (2) 19:42 (2)	08:13 17:04	15:09 (5) 15:38 (4)	08:44 16:10	15:21 (5) 15:32 (5)
28	05:32 21:32	06:26 20:28	07:21 19:12	19:08 (2) 19:42 (2)	08:14 17:02	15:09 (5) 15:41 (4)	08:44 16:11	15:21 (5) 15:33 (5)
29	05:34 21:30	06:27 20:25	07:22 19:09	19:07 (2) 19:42 (2)	08:16 17:00	15:08 (5) 15:46 (4)	08:44 16:11	15:22 (5) 15:34 (5)
30	05:35 21:28	06:29 20:23	07:24 19:07	19:07 (2) 19:43 (2)	08:18 16:58	15:08 (5) 15:48 (4)	08:44 16:12	15:21 (5) 15:34 (5)
31	05:37 21:27	06:31 20:21	07:26 19:42 (2)	19:06 (2) 19:42 (2)	07:22 16:56	15:26 (4) 15:50 (4)	08:44 16:13	15:22 (5) 15:35 (5)
Potential sun hours	512	460	382	328	259	233		
Total, worst case		313	364	288	958	435		
Sun reduction		0.34	0.32	0.29	0.27	0.21		
Oper. time red.		1.00	1.00	1.00	1.00	1.00		
Wind dir. red.		0.67	0.67	0.67	0.66	0.66		
Total reduction		0.23	0.21	0.20	0.18	0.14		
Total, real		72	78	57	168	59		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: DX - H128

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:02 (2)	08:14		07:16		07:01		05:52		05:03		04:59		05:39		06:33		07:26		07:24	
	16:15	23	15:25 (2)	17:06		18:02		20:00		20:55		21:45		22:00		21:25		20:18		19:05		16:54	
2	08:44		15:02 (2)	08:12		07:14		06:59		05:50		05:02		04:59		05:40		06:35		07:28		07:26	
	16:16	24	15:26 (2)	17:08		18:04		20:02		20:57		21:47		22:00		21:23		20:16		19:02		16:52	
3	08:44		15:02 (2)	08:10		07:12		06:56		05:48		05:01		05:00		05:42		06:36		07:30		07:28	
	16:17	24	15:26 (2)	17:10		18:06		20:04		20:59		21:48		21:59		21:21		20:13		19:00		16:50	
4	08:43		15:03 (2)	08:08		07:09		06:54		05:46		05:00		05:01		05:44		06:38		07:31		07:30	
	16:18	24	15:27 (2)	17:12		18:07		20:06		21:01		21:49		21:59		21:19		20:11		18:57		16:48	
5	08:43		15:03 (2)	08:07		07:07		06:51		05:44		04:59		05:02		05:45		06:40		07:33		07:32	
	16:19	23	15:26 (2)	17:14		18:09		20:07		21:03		21:50		21:58		21:17		20:09		18:55		16:46	
6	08:43		15:05 (2)	08:05		07:04		06:49		05:42		04:58		05:03		05:47		06:42		07:35		07:34	
	16:21	22	15:27 (2)	17:16		18:11		20:09		21:04		21:51		21:58		21:15		20:06		18:52		16:44	
7	08:42		15:05 (2)	08:03		07:02		06:47		05:40		04:58		05:04		05:49		06:43		07:37		07:36	
	16:22	22	15:27 (2)	17:18		18:13		20:11		21:06		21:52		21:57		21:14		20:04		18:50		16:43	
8	08:42		15:05 (2)	08:01		07:00		06:44		05:38		04:57		05:05		05:50		06:45		07:39		07:38	
	16:23	22	15:27 (2)	17:20		18:15		20:13		21:08		21:53		21:56		21:12		20:01		18:48		16:41	
9	08:41		15:07 (2)	07:59		06:57		06:42		05:36		04:57		05:06		05:52		06:47		07:41		07:40	
	16:25	21	15:28 (2)	17:22		18:17		20:15		21:10		21:54		21:55		21:10		19:59		18:45		16:39	
10	08:40		15:08 (2)	07:57		06:55		06:39		05:34		04:56		05:07		05:54		06:49		07:42		07:42	
	16:26	20	15:28 (2)	17:24		18:19		20:17		21:12		21:55		21:55		21:08		19:56		18:43		16:37	
11	08:40		15:08 (2)	07:55		06:53		06:37		05:32		04:56		05:08		05:56		06:50		07:44		07:44	
	16:28	20	15:28 (2)	17:26		18:21		20:19		21:13		21:55		21:54		21:05		19:54		18:40		16:35	
12	08:39		15:09 (2)	07:53		06:50		06:35		05:31		04:55		05:09		05:57		06:52		07:46		07:46	
	16:29	18	15:27 (2)	17:28		18:23		20:20		21:15		21:56		21:53		21:03		19:51		18:38		16:34	
13	08:38		15:10 (2)	07:51		06:48		06:32		05:29		04:55		05:10		05:59		06:54		07:48		07:47	
	16:31	17	15:27 (2)	17:30		18:25		20:22		21:17		21:57		21:52		21:01		19:49		18:36		16:32	
14	08:37		15:12 (2)	07:49		06:45		06:30		05:27		04:55		05:12		06:01		06:56		07:50		07:49	
	16:33	15	15:27 (2)	17:32		18:27		20:24		21:18		21:58		21:51		20:59		19:47		18:33		16:30	
15	08:36		15:13 (2)	07:47		06:43		06:28		05:25		04:54		05:13		06:03		06:58		07:52		07:51	
	16:34	13	15:26 (2)	17:34		18:28		20:26		21:20		21:58		21:50		20:57		19:44		18:31		16:29	
16	08:35		15:14 (2)	07:45		06:40		06:25		05:24		04:54		05:14		06:04		06:59		07:54		07:53	
	16:36	10	15:24 (2)	17:36		18:30		20:28		21:22		21:59		21:49		20:55		19:42		18:29		16:27	
17	08:34		15:18 (2)	07:43		06:38		06:23		05:22		04:54		05:16		06:06		07:01		07:55		07:55	
	16:38	4	15:22 (2)	17:38		18:32		20:30		21:23		21:59		21:47		20:53		19:39		18:26		16:26	
18	08:33		15:19 (2)	07:41		06:35		06:21		05:21		04:54		05:17		06:08		07:03		07:57		07:57	
	16:39		15:20 (2)	17:40		18:34		20:31		21:25		22:00		21:46		20:51		19:37		18:24		16:24	
19	08:32		15:19 (2)	07:39		06:33		06:18		05:19		04:54		05:18		06:10		07:05		07:59		07:59	
	16:41		15:21 (2)	17:42		18:36		20:33		21:27		22:00		21:45		20:48		19:34		18:22		16:23	
20	08:31		15:18 (2)	07:36		06:31		06:16		05:17		04:54		05:20		06:12		07:06		08:01		08:00	
	16:43		15:22 (2)	17:44		18:38		20:35		21:28		22:00		21:44		20:46		19:32		18:20		16:22	
21	08:30		15:17 (2)	07:34		06:28		06:14		05:16		04:54		05:21		06:13		07:08		08:03		08:02	
	16:45		15:23 (2)	17:46		18:40		20:37		21:30		22:01		21:42		20:44		19:29		18:17		16:20	
22	08:29		15:16 (2)	07:32		06:26		06:11		05:15		04:54		05:23		06:15		07:10		08:05		08:04	
	16:47		15:24 (2)	17:48		18:42		20:39		21:31		22:01		21:41		20:42		19:27		18:15		16:19	
23	08:27		15:15 (2)	07:30		06:23		06:09		05:13		04:55		05:24		06:17		07:12		08:07		08:06	
	16:49		15:25 (2)	17:50		18:43		20:41		21:33		22:01		21:39		20:39		19:24		18:13		16:18	
24	08:26		15:14 (2)	07:28		06:21		06:07		05:12		04:55		05:26		06:19		07:13		08:09		08:08	
	16:50		15:26 (2)	17:52		18:45		20:43		21:34		22:01		21:38		20:37		19:22		18:11		16:17	
25	08:25		15:13 (2)	07:25		06:18		06:05		05:10		04:55		05:27		06:20		07:15		08:11		08:09	
	16:52		15:27 (2)	17:54		18:47		20:44		21:36		22:01		21:36		20:35		19:19		18:09		16:15	
26	08:23		15:12 (2)	07:23		06:16		06:03		05:09		04:56		05:29		06:22		07:17		08:13		08:11	
	16:54		15:29 (2)	17:56		18:49		20:46		21:37		22:01		21:35		20:32		19:17		18:06		16:14	
27	08:22		15:11 (2)	07:21		06:13		06:00		05:08		04:56		05:30		06:24		07:19		08:15		08:13	
	16:56		15:30 (2)	17:58		18:51		20:48		21:39		22:01		21:33		20:30		19:14		18:04		16:13	
28	08:20		15:10 (2)	07:18		06:11		05:58		05:07		04:57		05:32		06:26		07:21		08:16		08:14	
	16:58		15:32 (2)	18:00		18:53		20:50		21:40		22:01		21:32		20:28		19:12		18:02		16:12	
29	08:19		15:09 (2)	07:16		06:08		05:56		05:06		04:57		05:34		06:27		07:22		08:18		08:16	
	17:00		15:11 (2)	18:01		18:54		20:52		21:41		22:01		21:30		20:25		19:09		18:00		16:11	
30	08:17		15:08 (2)	07:14		06:05		05:54		05:05		04:58		05:35		06:29		07:24		08:20		08:18	
	17:02		15:13 (2)	18:04		18:56		20:54		21:43		22:00		21:28		20:23		19:07		18:00		16:11	
31	08:15		15:07 (2)	07:12		06:04		05:54		05:04		04:58		05:37		06:31		07:22		08:22		08:20	

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DY - H129

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: DZ - H130

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EA - H131

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EB - H132

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EC - H133

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: ED - H134

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EE - H135

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EF - H136

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EG - H137

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EH - H138

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	06:20 (5) 06:51 (5)	05:03 21:45	05:39 (4) 05:46 (4)	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10		
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	06:20 (5) 06:50 (5)	05:02 21:47	05:33 (4) 05:46 (4)	05:00 22:00	05:41 (4) 05:46 (4)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	06:21 (5) 06:49 (5)	05:01 21:48	05:32 (4) 05:45 (4)	05:00 21:59	05:39 (4) 05:46 (4)	05:42 21:21	06:42 (5) 06:46 (5)	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	06:22 (5) 06:48 (5)	05:00 21:49	05:31 (4) 05:44 (4)	05:01 21:59	05:39 (4) 05:47 (4)	05:44 21:19	06:38 (5) 06:51 (5)	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	06:22 (5) 06:47 (5)	04:59 21:50	05:31 (4) 05:45 (4)	05:02 21:58	05:38 (4) 05:49 (4)	05:46 21:17	06:36 (5) 06:53 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	06:24 (5) 06:46 (5)	04:59 21:51	05:31 (4) 05:44 (4)	05:03 21:58	05:38 (4) 05:50 (4)	05:47 21:16	06:34 (5) 06:54 (5)	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	06:25 (5) 06:44 (5)	04:58 21:52	05:33 (4) 05:44 (4)	05:04 21:57	05:37 (4) 05:51 (4)	05:49 21:14	06:33 (5) 06:56 (5)	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	06:27 (5) 06:42 (5)	04:57 21:53	05:33 (4) 05:43 (4)	05:05 21:56	05:38 (4) 05:51 (4)	05:51 21:12	06:31 (5) 06:57 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	06:29 (5) 06:39 (5)	04:57 21:54	05:34 (4) 05:42 (4)	05:06 21:55	05:39 (4) 05:52 (4)	05:52 21:10	06:31 (5) 06:58 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	06:45 21:55	04:56 21:55	05:35 (4) 05:41 (4)	05:07 21:55	05:40 (4) 05:53 (4)	05:54 21:08	06:30 (5) 06:59 (5)	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	06:45 21:55	04:56 21:55	05:37 (4) 05:40 (4)	05:08 21:54	05:41 (4) 05:53 (4)	05:56 21:06	06:29 (5) 06:59 (5)	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	06:47 (5) 21:56	04:56 21:56	05:40 (4) 21:53	05:09 21:53	05:42 (4) 05:54 (4)	05:58 21:03	06:28 (5) 06:59 (5)	06:52 19:52	07:46 18:34	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	06:45 21:57	04:55 21:57	05:11 21:52	05:09 21:52	05:43 (4) 05:54 (4)	05:59 21:16	06:29 (5) 07:00 (5)	06:52 19:40	07:48 18:32	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	06:45 21:58	04:55 21:58	05:12 21:51	05:07 21:58	05:44 (4) 05:55 (4)	06:01 20:59	06:30 (5) 07:00 (5)	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	06:45 21:58	04:55 21:58	05:13 21:50	05:03 21:57	05:45 (4) 05:55 (4)	06:03 20:57	06:32 (5) 07:00 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	06:45 21:59	04:55 21:59	05:15 21:49	05:07 21:56	05:47 (4) 05:56 (4)	06:05 20:55	06:33 (5) 06:59 (5)	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	06:47 (5) 21:59	04:54 21:59	05:16 21:47	05:06 21:59	05:48 (4) 05:56 (4)	06:06 20:53	06:35 (5) 06:59 (5)	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	06:45 (5) 22:00	04:54 22:00	05:17 21:46	05:08 21:46	05:49 (4) 05:56 (4)	06:08 20:51	06:37 (5) 06:59 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	06:43 (5) 22:00	04:54 22:00	05:19 21:45	05:19 21:45	05:50 (4) 05:56 (4)	06:10 20:48	06:38 (5) 06:58 (5)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	06:41 (5) 22:00	04:53 22:00	05:18 21:44	05:18 21:44	05:52 (4) 05:57 (4)	06:12 20:46	06:40 (5) 06:58 (5)	07:01 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	06:39 (5) 21:30	04:55 22:01	05:21 21:42	05:21 21:42	05:53 (4) 05:57 (4)	06:13 20:44	06:42 (5) 06:58 (5)	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	06:36 (5) 21:31	04:55 22:01	05:23 21:41	05:23 21:41	05:55 (4) 05:57 (4)	06:15 20:42	06:43 (5) 06:56 (5)	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	06:34 (5) 21:33	04:55 22:01	05:24 21:39	05:24 21:39	05:56 (4) 05:57 (4)	06:17 20:39	06:45 (5) 06:56 (5)	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	06:32 (5) 21:34	04:55 22:01	05:26 21:38	05:26 21:38	05:41 (4) 05:47 (4)	06:17 20:37	06:47 (5) 06:55 (5)	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	06:30 (5) 21:36	04:56 22:01	05:27 21:36	05:27 21:36	05:40 (4) 05:46 (4)	06:16 20:35	06:55 (5) 06:52 (5)	19:22 19:19	18:11 17:09	16:17 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:17 18:49	06:03 20:46	05:09 21:37	06:28 (5) 21:37	04:56 22:01	05:29 21:35	05:29 21:35	05:39 (4) 05:46 (4)	06:16 20:32	06:52 (5) 06:51 (5)	19:17 19:17	17:13 17:07	16:18 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	06:26 (5) 21:39	04:57 22:01	05:27 21:33	05:27 21:33	05:38 (4) 05:44 (4)	06:15 20:30	06:51 (5) 06:47 (5)	19:15 19:15	17:17 17:05	16:19 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	06:24 (5) 21:40	04:57 22:01	05:32 21:32	05:32 21:32	05:37 (4) 05:47 (4)	06:14 20:26	06:49 (5) 06:46 (5)	19:12 19:12	17:17 17:02	16:14 16:13	08:44 16:11
29	08:19 17:00	07:17 17:55	06:09 18:52	05:56 20:52	05:06 21:41	06:22 (5) 21:41	04:58 22:01	05:34 21:30	05:34 21:30	05:46 (4) 05:56 (4)	06:28 20:25	06:51 (5) 06:48 (5)	19:10 19:07	17:23 17:20	16:16 16:12	08:44 16:11
30	08:17 17:02	07:15 17:56	06:06 18:54	05:54 20:54	05:05 21:43	06:20 (5) 06:51 (5)	04:58 22:00	05:35 (4) 05:46 (4)	05:35 21:28	05:47 (4) 05:57 (4)	06:29 20:23	06:52 (5) 06:49 (5)	19:07 19:07	17:24 17:24	16:18 16:11	08:44 16:13
31	08:15 17:04	07:14 17:58	06:04 18:58	05:54 20:58	05:04 21:44	06:18 (5) 21:44	04:57 22:00	05:37 (4) 05:46 (4)	05:37 21:27	05:49 (4) 05:58 (4)	06:31 20:21	06:53 (5) 06:50 (5)	19:07 19:07	17:22 17:22	16:19 16:16	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233				
Total, worst case																
Sun reduction				0.35	0.38	0.32	0.32	0.32	0.34							
Oper. time red.				1.00	1.00	1.00	1.00	1.00	1.00							
Wind dir. red.				0.68	0.67	0.66	0.66	0.66	0.68							
Total reduction				0.24	0.26	0.21	0.21	0.21	0.23							
Total, real				62	74	24	41	109								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EI - H139

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EJ - H140

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EK - H141

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EL - H142

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:25 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					43							
Sun reduction					0.38							
Oper. time red.					1.00							
Wind dir. red.					0.66							
Total reduction					0.25							
Total, real					11							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EM - H143

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June	
1	08:44	08:14	07:16				07:01	07:25 (5)	05:52	06:18 (4)	05:03	05:34 (3)
	16:15	17:06	18:02				20:00	21 07:46 (5)	20:55	8 06:26 (4)	21:45	4 05:38 (3)
2	08:44	08:12	07:14				06:59	07:23 (5)	05:50	06:16 (4)	05:02	05:33 (3)
	16:16	17:08	18:04				20:02	23 07:46 (5)	20:57	10 06:26 (4)	21:47	5 05:38 (3)
3	08:44	08:10	07:12				06:56	07:20 (5)	05:48	06:14 (4)	05:01	05:32 (3)
	16:17	17:10	18:06				20:04	25 07:45 (5)	20:59	11 06:25 (4)	21:48	6 05:38 (3)
4	08:43	08:09	07:09				06:54	07:19 (5)	05:46	06:12 (4)	05:00	05:31 (3)
	16:18	17:12	18:08				20:06	25 07:44 (5)	21:01	11 06:23 (4)	21:49	7 05:38 (3)
5	08:43	08:07	07:07				06:52	07:19 (5)	05:44	06:10 (4)	04:59	05:31 (3)
	16:20	17:14	18:10				20:08	23 07:42 (5)	21:03	12 06:22 (4)	21:50	8 05:39 (3)
6	08:43	08:05	07:05				06:49	07:20 (5)	05:42	06:12 (4)	04:59	05:30 (3)
	16:21	17:16	18:11				20:09	21 07:41 (5)	21:04	8 06:20 (4)	21:51	9 05:39 (3)
7	08:42	08:03	07:02				06:47	07:21 (5)	05:40		04:58	05:30 (3)
	16:22	17:18	18:13				20:11	19 07:40 (5)	21:06		21:52	10 05:40 (3)
8	08:42	08:01	07:00				06:44	07:22 (5)	05:38		04:57	05:29 (3)
	16:24	17:20	18:15				20:13	15 07:37 (5)	21:08		21:53	11 05:40 (3)
9	08:41	07:59	06:57				06:42	07:26 (5)	05:36		04:57	05:29 (3)
	16:25	17:22	18:17				20:15	7 07:33 (5)	21:10		21:54	12 05:41 (3)
10	08:40	07:57	06:55				06:40		05:35		04:56	05:28 (3)
	16:27	17:24	18:19				20:17		21:12		21:55	12 05:40 (3)
11	08:40	07:55	06:53				06:37		05:33		04:56	05:28 (3)
	16:28	17:26	18:21				20:19		21:13		21:55	13 05:41 (3)
12	08:39	07:53	06:50				06:35		05:31		04:56	05:28 (3)
	16:30	17:28	18:23				20:20		21:15		21:56	13 05:41 (3)
13	08:38	07:51	06:48				06:32		05:29		04:55	05:27 (3)
	16:31	17:30	18:25				20:22		21:17		21:57	14 05:41 (3)
14	08:37	07:49	06:45				06:30		05:27		04:55	05:27 (3)
	16:33	17:32	18:27				20:24		21:18		21:58	14 05:41 (3)
15	08:36	07:47	06:43				06:28		05:26		04:55	05:27 (3)
	16:35	17:34	18:29				20:26		21:20		21:58	15 05:42 (3)
16	08:35	07:45	06:41				06:25		05:24		04:55	05:27 (3)
	16:36	17:36	18:30				20:28		21:22		21:59	15 05:42 (3)
17	08:34	07:43	06:38				06:23		05:22		04:54	05:27 (3)
	16:38	17:38	18:32				20:30		21:23		21:59	15 05:42 (3)
18	08:33	07:41	06:36				06:21		05:21		04:54	05:27 (3)
	16:40	17:40	18:34				20:32		21:25		22:00	15 05:42 (3)
19	08:32	07:39	06:33				06:18		05:19		04:54	05:27 (3)
	16:42	17:42	18:36				20:33		21:27		22:00	16 05:43 (3)
20	08:31	07:37	06:31				06:16		05:18		04:54	05:27 (3)
	16:43	17:44	18:38				20:35		21:28		22:00	16 05:43 (3)
21	08:30	07:34	06:28				06:14		05:16		04:55	05:27 (3)
	16:45	17:46	18:40				20:37		21:30		22:01	16 05:43 (3)
22	08:29	07:32	06:26				06:12		05:15		04:55	05:28 (3)
	16:47	17:48	18:42				20:39		21:31		22:01	16 05:44 (3)
23	08:27	07:30	06:23				06:09		05:13		04:55	05:28 (3)
	16:49	17:50	18:44				20:41		21:33		22:01	16 05:44 (3)
24	08:26	07:28	06:21				06:07		05:12		04:55	05:28 (3)
	16:51	17:52	18:45				20:43		21:34		22:01	15 05:43 (3)
25	08:25	07:25	06:18		06:42 (5)		06:05		05:11		04:56	05:29 (3)
	16:53	17:54	18:47	3	06:45 (5)		20:44		21:36		22:01	15 05:44 (3)
26	08:23	07:23	06:16		06:40 (5)		06:03		05:09		04:56	05:29 (3)
	16:54	17:56	18:49	6	06:46 (5)		20:46		21:37		22:01	15 05:44 (3)
27	08:22	07:21	06:14		06:37 (5)		06:01	06:26 (4)	05:08		04:57	05:30 (3)
	16:56	17:58	18:51	9	06:46 (5)		20:48	1 06:27 (4)	21:39		22:01	15 05:45 (3)
28	08:20	07:19	06:11		06:35 (5)		05:59	06:24 (4)	05:07		04:57	05:30 (3)
	16:58	18:00	18:53	12	06:47 (5)		20:50	3 06:27 (4)	21:40		22:01	14 05:44 (3)
29	08:19		07:09		07:32 (5)		05:56	06:22 (4)	05:06		04:58	05:31 (3)
	17:00		19:55	15	07:47 (5)		20:52	5 06:27 (4)	21:41		22:01	14 05:45 (3)
30	08:17		07:06		07:30 (5)		05:54	06:20 (4)	05:05	05:35 (3)	04:58	05:31 (3)
	17:02		19:56	17	07:47 (5)		20:54	7 06:27 (4)	21:43	1 05:36 (3)	22:00	14 05:45 (3)
31	08:15		07:04		07:27 (5)				05:04		05:34 (3)	
	17:04		19:58	19	07:46 (5)				21:44	3 05:37 (3)		
Potential sun hours	250	273	367				420		494		510	
Total, worst case			81				195		64		380	
Sun reduction			0.27				0.35		0.38		0.32	
Oper. time red.			1.00				1.00		1.00		1.00	
Wind dir. red.			0.68				0.68		0.67		0.66	
Total reduction			0.18				0.24		0.26		0.21	
Total, real			15				46		16		80	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EM - H143

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33		07:26		07:24		08:19	
	22:00	13 05:45 (3)	21:25	20:18		19:05		16:54		16:10	
2	05:00	05:33 (3)	05:40	06:35		07:28		07:26		08:21	
	22:00	13 05:46 (3)	21:23	20:16		19:02		16:52		16:09	
3	05:00	05:33 (3)	05:42	06:37		07:24 (5)		07:30		08:22	
	21:59	12 05:45 (3)	21:21	20:14	7	07:31 (5)		19:00		16:09	
4	05:01	05:34 (3)	05:44	06:38		07:20 (5)		07:32		08:24	
	21:59	11 05:45 (3)	21:19	20:11	14	07:34 (5)		18:57		16:08	
5	05:02	05:35 (3)	05:46	06:40		07:17 (5)		07:33		08:25	
	21:58	11 05:46 (3)	21:17	20:09	19	07:36 (5)		18:55		16:07	
6	05:03	05:36 (3)	05:47	06:42		07:16 (5)		07:35		08:26	
	21:58	10 05:46 (3)	21:16	2 06:26 (4)	21	07:37 (5)		18:53		16:07	
7	05:04	05:37 (3)	05:49	06:21 (4)	06:44	07:14 (5)		07:37		08:28	
	21:57	9 05:46 (3)	21:14	10 06:31 (4)	20:04	24 07:38 (5)		18:50		16:06	
8	05:05	05:38 (3)	05:51	06:20 (4)	06:45	07:13 (5)		07:39		08:29	
	21:56	8 05:46 (3)	21:12	12 06:32 (4)	20:01	25 07:38 (5)		18:48		16:06	
9	05:06	05:39 (3)	05:52	06:22 (4)	06:47	07:14 (5)		07:41		08:30	
	21:55	7 05:46 (3)	21:10	11 06:33 (4)	19:59	25 07:39 (5)		18:45		16:06	
10	05:07	05:40 (3)	05:54	06:24 (4)	06:49	07:16 (5)		07:43		08:32	
	21:55	6 05:46 (3)	21:08	10 06:34 (4)	19:57	23 07:39 (5)		18:43		16:05	
11	05:08	05:41 (3)	05:56	06:25 (4)	06:51	07:17 (5)		07:44		08:33	
	21:54	5 05:46 (3)	21:06	9 06:34 (4)	19:54	22 07:39 (5)		18:41		16:05	
12	05:09	05:42 (3)	05:58	06:27 (4)	06:52	07:19 (5)		07:46		08:34	
	21:53	3 05:45 (3)	21:03	8 06:35 (4)	19:52	20 07:39 (5)		18:38		16:05	
13	05:11	05:43 (3)	05:59	06:29 (4)	06:54	07:21 (5)		07:48		08:35	
	21:52	2 05:45 (3)	21:01	6 06:35 (4)	19:49	17 07:38 (5)		18:36		16:05	
14	05:12	05:44 (3)	06:01	06:30 (4)	06:56	07:22 (5)		07:50		08:36	
	21:51	1 05:45 (3)	20:59	5 06:35 (4)	19:47	15 07:37 (5)		18:34		16:05	
15	05:13		06:03	06:32 (4)	06:58	07:24 (5)		07:52		08:37	
	21:50		20:57	3 06:35 (4)	19:44	13 07:37 (5)		18:31		16:05	
16	05:14		06:05	06:33 (4)	06:59	07:26 (5)		07:54		08:38	
	21:49		20:55	1 06:34 (4)	19:42	10 07:36 (5)		18:29		16:05	
17	05:16		06:06		07:01	07:28 (5)		07:56		08:39	
	21:47		20:53		19:39	7 07:35 (5)		18:27		16:05	
18	05:17		06:08		07:03	07:29 (5)		07:57		08:39	
	21:46		20:51		19:37	4 07:33 (5)		18:24		16:05	
19	05:19		06:10		07:05			07:59		08:40	
	21:45		20:48		19:34			18:22		16:05	
20	05:20		06:12		07:07			08:01		08:41	
	21:44		20:46		19:32			18:20		16:06	
21	05:21		06:13		07:08			08:03		08:41	
	21:42		20:44		19:29			18:18		16:06	
22	05:23		06:15		07:10			08:05		08:42	
	21:41		20:42		19:27			18:15		16:07	
23	05:24		06:17		07:12			08:07		08:42	
	21:39		20:39		19:24			18:13		16:07	
24	05:26		06:19		07:14			08:09		08:43	
	21:38		20:37		19:22			18:11		16:08	
25	05:27		06:21		07:15			07:11		08:43	
	21:36		20:35		19:19			17:09		16:08	
26	05:29		06:22		07:17			07:13		08:43	
	21:35		20:32		19:17			17:07		16:09	
27	05:31		06:24		07:19			07:15		08:44	
	21:33		20:30		19:15			17:05		16:10	
28	05:32		06:26		07:21			07:17		08:44	
	21:32		20:28		19:12			17:02		16:11	
29	05:34		06:28		07:23			07:19		08:44	
	21:30		20:25		19:10			17:00		16:12	
30	05:35		06:29		07:24			07:20		08:44	
	21:28		20:23		19:07			16:58		16:13	
31	05:37		06:31					07:22		08:44	
	21:27		20:21					16:56		16:14	
Potential sun hours	512		460		382			328		259	
Total, worst case		111	77		266						
Sun reduction		0.32	0.34		0.32						
Oper. time red.		1.00	1.00		1.00						
Wind dir. red.		0.66	0.67		0.68						
Total reduction		0.21	0.23		0.22						
Total, real		24	18		58						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EN - H144

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:06 (5)	08:14	15:25 (4)	07:16	17:05 (3)	07:01	19:16 (1)	05:52	19:18 (2)	05:03
2	08:44	15:07 (5)	08:12	15:26 (4)	07:14	17:04 (3)	06:59	19:16 (1)	05:50	19:18 (2)	05:02
3	08:44	15:07 (5)	08:10	15:27 (4)	07:12	17:06 (3)	06:56	19:18 (1)	05:48	19:19 (2)	05:01
4	08:43	15:08 (5)	08:08	15:28 (4)	07:09	17:07 (3)	06:54	19:21 (1)	05:46	19:21 (2)	05:00
5	08:43	15:08 (5)	08:07	15:29 (4)	07:07	17:08 (3)	06:51	19:26 (1)	05:44	19:22 (2)	04:59
6	08:43	15:09 (5)	08:05	15:30 (4)	07:04	17:10 (3)	06:49	19:33 (2)	05:42	19:24 (2)	04:59
7	08:42	15:10 (5)	08:03	15:32 (4)	07:02	17:12 (3)	06:47	19:39 (2)	05:40	19:27 (2)	04:58
8	08:42	15:11 (5)	08:01	15:34 (4)	07:00	17:14 (3)	06:44	19:43 (2)	05:38	19:29 (2)	04:57
9	08:41	15:12 (5)	07:59	15:37 (4)	06:57	17:16 (3)	06:42	19:46 (2)	05:36	19:30 (2)	04:57
10	08:40	15:13 (5)	07:57	15:40 (4)	06:55	17:18 (3)	06:39	19:49 (2)	05:34	19:32 (2)	04:56
11	08:40	15:14 (5)	07:55	15:43 (4)	06:53	17:20 (3)	06:37	19:51 (2)	05:32	19:34 (2)	04:55
12	08:39	15:15 (5)	07:53	15:46 (4)	06:50	17:22 (3)	06:35	19:53 (2)	05:30	19:36 (2)	04:55
13	08:38	15:16 (5)	07:51	15:49 (4)	06:48	17:24 (3)	06:32	19:55 (2)	05:28	19:38 (2)	04:55
14	08:37	15:17 (5)	07:49	15:52 (4)	06:45	17:26 (3)	06:30	19:57 (2)	05:26	19:40 (2)	04:55
15	08:36	15:18 (5)	07:47	15:55 (4)	06:43	17:28 (3)	06:28	19:59 (2)	05:24	19:42 (2)	04:55
16	08:35	15:19 (5)	07:45	15:58 (4)	06:40	17:30 (3)	06:26	20:01 (2)	05:22	19:44 (2)	04:54
17	08:34	15:20 (5)	07:43	16:01 (4)	06:38	17:32 (3)	06:24	20:03 (2)	05:20	19:46 (2)	04:54
18	08:33	15:21 (5)	07:41	16:04 (4)	06:35	17:34 (3)	06:21	20:05 (2)	05:18	19:48 (2)	04:54
19	08:32	15:22 (5)	07:39	16:07 (4)	06:33	17:36 (3)	06:18	20:07 (2)	05:16	19:50 (2)	04:54
20	08:31	15:23 (5)	07:37	16:10 (4)	06:30	17:38 (3)	06:16	20:09 (2)	05:14	19:52 (2)	04:54
21	08:30	15:24 (5)	07:35	16:13 (4)	06:28	17:40 (3)	06:14	20:11 (2)	05:12	19:54 (2)	04:54
22	08:29	15:25 (5)	07:33	16:16 (4)	06:26	17:42 (3)	06:12	20:13 (2)	05:10	19:56 (2)	04:55
23	08:27	15:26 (5)	07:31	16:19 (4)	06:23	17:44 (3)	06:09	20:15 (2)	05:08	19:58 (2)	04:55
24	08:26	15:27 (5)	07:29	16:22 (4)	06:21	17:46 (3)	06:07	20:17 (2)	05:06	20:00 (2)	04:55
25	08:24	15:28 (5)	07:27	16:25 (4)	06:18	17:48 (3)	06:05	20:19 (2)	05:04	20:02 (2)	04:55
26	08:23	15:29 (5)	07:25	16:28 (4)	06:16	17:50 (3)	06:03	20:21 (2)	05:02	20:04 (2)	04:56
27	08:22	15:30 (5)	07:23	16:31 (4)	06:13	17:52 (3)	06:01	20:23 (2)	05:00	20:06 (2)	04:56
28	08:20	15:31 (5)	07:21	16:34 (4)	06:11	17:54 (3)	05:58	20:25 (2)	04:58	20:08 (2)	04:57
29	08:19	15:32 (5)	07:19	16:37 (4)	06:09	17:56 (3)	05:56	20:27 (2)	04:56	20:10 (2)	04:57
30	08:17	15:33 (5)	07:17	16:40 (4)	06:06	17:58 (3)	05:54	20:29 (2)	04:54	20:12 (2)	04:58
31	08:15	15:34 (5)	07:15	16:43 (4)	06:04	18:00 (3)	05:52	20:31 (2)	04:52	20:14 (2)	04:58
Potential sun hours	250		273		367		420		494		510
Total, worst case	1266		490		200		962		202		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.66		0.67		0.66		0.66		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	202		76		37		224		51		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EN - H144

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December				
1	04:59 22:00	05:39 21:25	06:33 20:18	30 19:20 (2) 07:26 19:50 (2) 19:05	07:24 16:54	15:09 (4) 08:19 15:25 (4) 16:10	39 14:55 (5) 15:34 (4)			
2	04:59 22:00	05:40 21:23	06:35 20:16	26 19:22 (2) 07:28 19:48 (2) 19:02	07:26 16:52	22 15:06 (4) 08:21 15:28 (4) 16:09	38 14:55 (5) 15:33 (4)			
3	05:00 21:59	05:42 21:21	06:36 20:13	23 19:23 (2) 07:30 19:46 (2) 19:00	07:28 16:50	27 15:03 (4) 08:22 15:30 (4) 16:08	37 14:55 (5) 15:32 (4)			
4	05:01 21:59	05:44 21:19	06:38 20:11	19 19:24 (2) 07:31 19:43 (2) 18:57	07:30 16:48	29 15:02 (4) 08:24 15:31 (4) 16:08	37 14:55 (5) 15:32 (4)			
5	05:02 21:58	05:45 21:17	13 19:38 (2) 06:40 19:51 (2) 20:09	15 19:26 (2) 07:33 19:41 (2) 18:55	07:32 16:46	33 15:00 (4) 08:25 15:33 (4) 16:07	35 14:55 (5) 15:30 (4)			
6	05:03 21:58	05:47 21:15	19 19:35 (2) 06:42 19:54 (2) 20:06	10 19:29 (2) 07:35 19:39 (2) 18:52	07:34 16:44	35 14:59 (4) 08:26 15:34 (4) 16:07	35 14:55 (5) 15:30 (4)			
7	05:04 21:57	05:49 21:14	22 19:34 (2) 06:43 19:56 (2) 20:04	07:37 18:50	11 17:47 (3) 07:36 17:58 (3) 16:43	37 14:58 (4) 08:28 15:35 (4) 16:06	34 14:55 (5) 15:29 (4)			
8	05:05 21:56	05:51 21:12	26 19:31 (2) 06:45 19:57 (2) 20:01	3 19:16 (1) 07:39 19:19 (1) 18:48	16 17:44 (3) 07:38 18:00 (3) 16:41	38 14:57 (4) 08:29 15:35 (4) 16:06	33 14:55 (5) 15:28 (4)			
9	05:06 21:55	05:52 21:10	29 19:30 (2) 06:47 19:59 (2) 19:59	11 19:12 (1) 07:41 19:23 (1) 18:45	20 17:42 (3) 07:40 18:02 (3) 16:39	40 14:56 (4) 08:30 15:36 (4) 16:05	32 14:56 (5) 15:28 (4)			
10	05:07 21:55	05:54 21:08	32 19:28 (2) 06:49 20:00 (2) 19:56	15 19:09 (1) 07:42 19:24 (1) 18:43	23 17:40 (3) 07:42 18:03 (3) 16:37	42 14:56 (4) 08:31 15:38 (4) 16:05	32 14:56 (5) 15:28 (4)			
11	05:08 21:54	05:56 21:05	34 19:27 (2) 06:50 20:01 (2) 19:54	17 19:08 (1) 07:44 19:25 (1) 18:40	25 17:39 (3) 07:44 18:04 (3) 16:35	42 14:56 (4) 08:33 15:38 (4) 16:05	31 14:56 (5) 15:27 (4)			
12	05:09 21:53	05:57 21:03	36 19:26 (2) 06:52 20:02 (2) 19:51	17 19:07 (1) 07:46 19:24 (1) 18:38	26 17:38 (3) 07:45 18:04 (3) 16:34	44 14:55 (4) 08:34 15:39 (4) 16:05	31 14:56 (5) 15:27 (4)			
13	05:10 21:52	05:59 21:01	38 19:24 (2) 06:54 20:02 (2) 19:49	15 19:07 (1) 07:48 19:22 (1) 18:36	28 17:37 (3) 07:47 18:05 (3) 16:32	44 14:55 (4) 08:35 15:39 (4) 16:05	31 14:56 (5) 15:27 (4)			
14	05:12 21:51	06:01 20:59	40 19:23 (2) 06:56 20:03 (2) 19:47	12 19:06 (1) 07:50 19:18 (1) 18:33	27 17:37 (3) 07:49 18:04 (3) 16:31	46 14:54 (4) 08:36 15:40 (4) 16:04	29 14:57 (5) 15:26 (4)			
15	05:13 21:50	06:03 20:57	41 19:23 (2) 06:58 20:04 (2) 19:44	10 19:06 (1) 07:52 19:16 (1) 18:31	26 17:36 (3) 07:51 18:02 (3) 16:29	46 14:54 (4) 08:37 15:40 (4) 16:05	29 14:58 (5) 15:26 (4)			
16	05:14 21:49	06:04 20:55	43 19:21 (2) 06:59 20:04 (2) 19:42	8 19:06 (1) 07:54 19:14 (1) 18:29	23 17:36 (3) 07:53 17:59 (3) 16:27	46 14:54 (4) 08:38 15:40 (4) 16:05	28 14:58 (5) 15:26 (4)			
17	05:16 21:47	06:06 20:53	43 19:21 (2) 07:01 20:04 (2) 19:39	6 19:05 (1) 07:55 19:11 (1) 18:26	21 17:36 (3) 07:55 17:57 (3) 16:26	47 14:54 (4) 08:38 15:41 (4) 16:05	29 14:58 (5) 15:27 (4)			
18	05:17 21:46	06:08 20:51	44 19:21 (2) 07:03 20:05 (2) 19:37	2 19:06 (1) 07:57 19:08 (1) 18:24	19 17:36 (3) 07:57 17:55 (3) 16:24	47 14:54 (4) 08:39 15:41 (4) 16:05	28 14:59 (5) 15:27 (4)			
19	05:18 21:45	06:10 20:48	44 19:20 (2) 07:05 20:04 (2) 19:34	15 19:07 (1) 07:59 18:22	15 17:37 (3) 07:59 17:52 (3) 16:23	47 14:54 (4) 08:40 15:41 (4) 16:05	28 15:00 (5) 15:28 (4)			
20	05:20 21:44	06:12 20:46	45 19:19 (2) 07:06 20:04 (2) 19:32	13 18:01 18:20	13 17:37 (3) 08:00 17:50 (3) 16:22	46 14:55 (4) 08:41 15:41 (4) 16:06	27 15:00 (5) 15:27 (4)			
21	05:21 21:42	06:13 20:44	46 19:19 (2) 07:08 20:05 (2) 19:29	10 08:03 18:17	10 17:38 (3) 08:02 17:48 (3) 16:20	47 14:55 (4) 08:41 15:42 (4) 16:06	27 15:01 (5) 15:28 (4)			
22	05:23 21:41	06:15 20:42	46 19:18 (2) 07:10 20:04 (2) 19:27	6 08:05 18:15	6 17:39 (3) 08:04 17:45 (3) 16:19	47 14:55 (4) 08:42 15:42 (4) 16:06	27 15:01 (5) 15:28 (4)			
23	05:24 21:39	06:17 20:39	46 19:18 (2) 07:12 20:04 (2) 19:24	3 08:07 18:13	3 17:40 (3) 08:06 17:43 (3) 16:18	46 14:56 (4) 08:42 15:42 (4) 16:07	27 15:02 (5) 15:29 (4)			
24	05:26 21:38	06:19 20:37	45 19:19 (2) 07:13 20:04 (2) 19:22	08:09 18:11	16:18 16:17	46 08:08 15:42 (4) 08:43 16:08	28 14:56 (4) 08:43 15:42 (4) 16:08	28 15:02 (5) 15:30 (4)		
25	05:27 21:36	06:20 20:35	45 19:18 (2) 07:15 20:03 (2) 19:19	07:11 17:09	08:09 16:16	44 08:09 15:41 (4) 08:43 16:08	28 14:57 (4) 08:43 15:41 (4) 16:08	28 15:02 (5) 15:30 (4)		
26	05:29 21:35	06:22 20:32	44 19:18 (2) 07:17 20:02 (2) 19:17	07:13 17:06	08:11 16:14	42 08:11 15:39 (4) 08:43 16:09	28 14:57 (4) 08:43 15:36 (4) 16:09	28 15:02 (5) 15:30 (4)		
27	05:30 21:33	06:24 20:30	44 19:18 (2) 07:19 20:02 (2) 19:14	07:15 17:04	08:13 16:13	40 08:13 15:38 (4) 08:44 16:10	28 14:58 (5) 08:44 15:38 (4) 16:10	28 15:04 (5) 15:32 (4)		
28	05:32 21:32	06:26 20:28	41 19:18 (2) 07:21 19:59 (2) 19:12	07:16 17:02	08:14 16:12	40 08:14 15:37 (4) 08:44 16:11	29 14:57 (5) 08:44 15:37 (4) 16:11	29 15:04 (5) 15:33 (4)		
29	05:34 21:30	06:28 20:25	38 19:19 (2) 07:22 19:57 (2) 19:09	07:18 17:00	08:16 16:12	40 08:16 15:36 (4) 08:44 16:11	29 14:56 (5) 08:44 15:36 (4) 16:11	29 15:05 (5) 15:34 (4)		
30	05:35 21:28	06:29 20:23	36 19:19 (2) 07:24 19:55 (2) 19:07	07:20 16:58	08:18 16:11	40 08:18 15:35 (4) 08:44 16:12	30 14:55 (5) 08:44 15:35 (4) 16:12	30 15:04 (5) 15:34 (4)		
31	05:37 21:27	06:31 20:21	33 19:19 (2) 07:25 19:52 (2) 16:56	4 07:22 16:56	4 15:14 (4) 15:18 (4)	259 16:11	233 08:44 16:13	30 15:05 (5) 15:35 (4)		
Potential sun hours	512	460	382	328	259	233				
Total, worst case		1013	239	316	1206	954				
Sun reduction		0.34	0.32	0.29	0.27	0.21				
Oper. time red.		1.00	1.00	1.00	1.00	1.00				
Wind dir. red.		0.66	0.67	0.67	0.66	0.65				
Total reduction		0.23	0.21	0.20	0.17	0.14				
Total, real		228	51	62	211	129				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EO - H145
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December					
1	08:44		15:15 (3)	08:14		15:32 (2)	07:16		07:01		05:52		05:03		04:59		05:39		06:33		07:26		07:24		15:10 (2)	08:19		15:03 (3)
	16:15	22	15:37 (3)	17:06	36	16:08 (2)	18:02		20:00		20:55		21:45		22:00		21:25		20:18		19:05		16:54	21	15:31 (2)	16:10	31	15:34 (2)
2	08:44		15:16 (3)	08:12		15:32 (2)	07:14		06:59		05:50		05:02		04:59		05:40		06:35		07:28		07:26		15:08 (2)	08:21		15:02 (3)
	16:16	23	15:39 (3)	17:08	36	16:08 (2)	18:04		20:02		20:57		21:47		22:00		21:23		20:16		19:02		16:52	25	15:33 (2)	16:09	30	15:32 (2)
3	08:44		15:16 (3)	08:10		15:32 (2)	07:12		06:56		05:48		05:01		05:00		05:42		06:36		07:30		07:28		15:07 (2)	08:22		15:03 (3)
	16:17	22	15:38 (3)	17:10	35	16:07 (2)	18:06		20:04		20:59		21:48		21:59		21:21		20:13		19:00		16:50	27	15:34 (2)	16:08	29	15:32 (2)
4	08:43		15:17 (3)	08:08		15:33 (2)	07:09		06:54		05:46		05:00		05:01		05:44		06:38		07:31		07:30		15:05 (2)	08:24		15:03 (3)
	16:18	22	15:39 (3)	17:12	34	16:07 (2)	18:07		20:06		21:01		21:49		21:59		21:19		20:11		18:57		16:48	30	15:35 (2)	16:08	28	15:31 (2)
5	08:43		15:17 (3)	08:07		15:34 (2)	07:07		06:51		05:44		04:59		05:02		05:45		06:40		07:33		07:32		15:04 (2)	08:25		15:03 (3)
	16:19	22	15:39 (3)	17:14	32	16:06 (2)	18:09		20:07		21:03		21:50		21:58		21:17		20:09		18:55		16:46	32	15:36 (2)	16:07	22	15:25 (3)
6	08:43		15:18 (3)	08:05		15:35 (2)	07:04		06:49		05:42		04:58		05:03		05:47		06:42		07:35		07:34		15:03 (2)	08:26		15:04 (3)
	16:21	22	15:40 (3)	17:16	31	16:06 (2)	18:11		20:09		21:04		21:51		21:58		21:15		20:06		18:52		16:44	33	15:36 (2)	16:07	22	15:26 (3)
7	08:42		15:18 (3)	08:03		15:36 (2)	07:02		06:47		05:40		04:58		05:04		05:49		06:43		07:37		07:36		15:03 (2)	08:28		15:04 (3)
	16:22	22	15:40 (3)	17:18	29	16:05 (2)	18:13		20:11		21:06		21:52		21:57		21:14		20:04		18:50		16:43	34	15:37 (2)	16:06	22	15:26 (3)
8	08:42		15:18 (3)	08:01		15:37 (2)	07:00		06:44		05:38		04:57		05:05		05:50		06:45		07:39		07:38		15:02 (2)	08:29		15:04 (3)
	16:24	28	15:46 (2)	17:20	27	16:04 (2)	18:15		20:13		21:08		21:53		21:56		21:12		20:01		18:48		16:41	35	15:37 (2)	16:06	22	15:26 (3)
9	08:41		15:20 (3)	07:59		15:39 (2)	06:57		06:42		05:36		04:57		05:06		05:52		06:47		07:41		07:40		15:03 (2)	08:30		15:05 (3)
	16:25	29	15:49 (2)	17:22	24	16:03 (2)	18:17		20:15		21:10		21:54		21:55		21:10		19:59		18:45		16:39	36	15:39 (2)	16:05	23	15:28 (3)
10	08:40		15:20 (3)	07:57		15:41 (2)	06:55		06:39		05:34		04:56		05:07		05:54		06:49		07:42		07:42		15:03 (2)	08:32		15:05 (3)
	16:26	30	15:50 (2)	17:24	20	16:01 (2)	18:19		20:17		21:11		21:55		21:55		21:08		19:56		18:43		16:37	36	15:39 (2)	16:05	23	15:28 (3)
11	08:40		15:21 (3)	07:55		15:43 (2)	06:53		06:37		05:33		04:56		05:08		05:56		06:50		07:44		07:44		15:02 (2)	08:33		15:05 (3)
	16:28	31	15:52 (2)	17:26	16	15:59 (2)	18:21		20:19		21:13		21:55		21:54		21:05		19:54		18:40		16:35	37	15:39 (2)	16:05	22	15:27 (3)
12	08:39		15:22 (3)	07:53		15:47 (2)	06:50		06:35		05:31		04:55		05:09		05:57		06:52		07:46		07:46		15:02 (2)	08:34		15:06 (3)
	16:30	32	15:54 (2)	17:28	8	15:55 (2)	18:23		20:20		21:15		21:56		21:53		21:03		19:51		18:38		16:34	37	15:39 (2)	16:05	21	15:27 (3)
13	08:38		15:22 (3)	07:51		16:48		06:32		05:29		04:55		05:10		05:59		06:54		07:48		07:47		15:02 (2)	08:35		15:06 (3)	
	16:31	33	15:55 (2)	17:30		18:25		20:22		21:17		21:57		21:52		21:01		19:49		18:36		16:32	37	15:39 (2)	16:05	20	15:26 (3)	
14	08:37		15:23 (3)	07:49		06:45		06:30		05:27		04:55		05:12		06:01		06:56		07:50		07:49		15:02 (2)	08:36		15:06 (3)	
	16:33	34	15:57 (2)	17:32		18:27		20:24		21:18		21:58		21:51		20:59		19:47		18:33		16:31	37	15:39 (2)	16:04	20	15:26 (3)	
15	08:36		15:25 (3)	07:47		06:43		06:28		05:26		04:54		05:13		06:03		06:58		07:52		17:39 (1) 07:51		15:02 (2)	08:37		15:07 (3)	
	16:34	33	15:58 (2)	17:34		18:28		20:26		21:20		21:58		21:50		20:57		19:44		18:31	7	17:46 (1) 16:29	37	15:39 (2)	16:04	19	15:26 (3)	
16	08:35		15:25 (3)	07:45		17:05 (1) 06:40		06:25		05:24		04:54		05:14		06:04		06:59		07:54		17:36 (1) 07:53		15:03 (2)	08:38		15:08 (3)	
	16:36	33	15:58 (2)	17:36	2	17:07 (1) 18:30		20:28		21:22		21:59		21:49		20:55		19:42		18:29	12	17:48 (1) 16:27	36	15:39 (2)	16:05	18	15:26 (3)	
17	08:34		15:27 (3)	07:43		17:04 (1) 06:38		06:23		05:22		04:54		05:16		06:06		07:01		07:55		17:35 (1) 07:55		15:03 (2)	08:38		15:08 (3)	
	16:38	33	16:00 (2)	17:38	5	17:09 (1) 18:32		20:30		21:23		21:59		21:47		20:53		19:39		18:26	14	17:49 (1) 16:26	36	15:39 (2)	16:05	19	15:27 (3)	
18	08:33		15:29 (3)	07:41		17:02 (1) 06:35		06:21		05:21		04:54		05:17		06:08		07:03		07:57		17:33 (1) 07:57		15:03 (2)	08:39		15:09 (3)	
	16:40	32	16:01 (2)	17:40	9	17:11 (1) 18:34		20:31		21:25		22:00		21:46		20:51		19:37		18:24	17	17:50 (1) 16:24	36	15:39 (2)	16:05	18	15:27 (3)	
19	08:32		15:31 (2)	07:39		17:02 (1) 06:33		06:18		05:19		04:54		05:18		06:10		07:05		07:59		17:33 (1) 07:59		15:04 (2)	08:40		15:10 (3)	
	16:41	31	16:02 (2)	17:42	11	17:13 (1) 18:36		20:33		21:27		22:00		21:45		20:48		19:34		18:22	17	17:50 (1) 16:23	35	15:39 (2)	16:05	18	15:28 (3)	
20	08:31		15:30 (2)	07:36		17:02 (1) 06:31		06:16		05:18		04:54		05:20		06:12		07:06		08:01		17:32 (1) 08:00		15:05 (2)	08:41		15:10 (3)	
	16:43	33	16:03 (2)	17:44	14	17:16 (1) 18:38		20:35		21:28		22:00		21:44		20:46		19:32		18:20	18	17:50 (1) 16:22	34	15:39 (2)	16:06	17	15:27 (3)	
21	08:30		15:30 (2)	07:34		17:02 (1) 06:28		06:14		05:16		04:54		05:21		06:13		07:08		08:03		17:32 (1) 08:02		15:05 (2)	08:41		15:10 (3)	
	16:45	34	16:04 (2)	17:46	16	17:18 (1) 18:40		20:37		21:30		22:01		21:42		20:44		19:29		18:17	16	17:48 (1) 16:20	34	15:39 (2)	16:06	18	15:28 (3)	
22	08:29		15:30 (2)	07:32		17:01 (1) 06:26		06:12		05:15		04:55		05:23		06:15		07:10		08:05		17:32 (1) 08:04		15:06 (2)	08:42		15:10 (3)	
	16:47	34	16:04 (2)	17:48	18	17:19 (1) 18:42		20:39		21:31		22:01		21:41		20:42		19:27		18:15	13	17:45 (1) 16:19	33	15:39 (2)	16:06	18	15:28 (3)	
23	08:27		15:30 (2)	07:30		17:02 (1) 06:23		06:09		05:13		04:55		05:24		06:17		07:12		08:07		17:32 (1) 08:06		15:07 (2)	08:42		15:12 (3)	
	16:49	35	16:05 (2)	17:50	17	17:19 (1) 18:43		20:41		21:33		22:01		21:39		20:39		19:24		18:13	11	17:43 (1) 16:18	31	15:38 (2)	16:07	17	15:29 (3)	
24	08:26		15:30 (2)	07:28		17:03 (1) 06:21		06:07		05:12		04:55		05:26		06:19		07:13		08:09		17:33 (1) 08:08		15:06 (3)	08:43		15:12 (3)	
	16:50	35	16:05 (2)	17:52	15	17:18 (1) 18:45		20:43		21:34		22:01		21:38		20:37		19:22		18:11	8	17:41 (1) 16:17	32	15:38 (2)	16:08	17	15:29 (3)	
25	08:25		15:30 (2)	07:25		17:03 (1) 06:18		06:05		05:11		04:55		05:27		06:												

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EP - H146

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44		15:17 (3)	08:14		15:34 (2)	07:16		17:10 (1)	07:01		05:52			05:03			
	16:15	20	15:37 (3)	17:06	42	16:16 (2)	18:02	13	17:23 (1)	20:00		20:55			21:45			
2	08:44		15:17 (3)	08:12		15:34 (2)	07:14		17:11 (1)	06:59		05:50			05:02			
	16:16	22	15:39 (3)	17:08	42	16:16 (2)	18:04	9	17:20 (1)	20:02		20:57			21:47			
3	08:44		15:17 (3)	08:10		15:34 (2)	07:12			06:56		05:48			05:01			
	16:17	22	15:39 (3)	17:10	42	16:16 (2)	18:06			20:04		20:59			21:48			
4	08:43		15:18 (3)	08:08		15:34 (2)	07:09			06:54		05:46			05:00			
	16:18	23	15:41 (3)	17:12	42	16:16 (2)	18:07			20:06		21:01			21:49			
5	08:43		15:18 (3)	08:07		15:35 (2)	07:07			06:51		05:44			04:59			
	16:19	24	15:42 (3)	17:14	41	16:16 (2)	18:09			20:07		21:03			21:50			
6	08:43		15:19 (3)	08:05		15:35 (2)	07:04			06:49		05:42			04:58			
	16:21	24	15:43 (3)	17:16	41	16:16 (2)	18:11			20:09		21:04			21:51			
7	08:42		15:19 (3)	08:03		15:35 (2)	07:02			06:47		05:40			04:58			
	16:22	24	15:43 (3)	17:18	41	16:16 (2)	18:13			20:11		21:06			21:52			
8	08:42		15:19 (3)	08:01		15:36 (2)	07:00			06:44		05:38			04:57			
	16:24	25	15:44 (3)	17:20	40	16:16 (2)	18:15			20:13		21:08			21:53			
9	08:41		15:21 (3)	07:59		15:37 (2)	06:57			06:42		05:36			04:57			
	16:25	24	15:45 (3)	17:22	38	16:15 (2)	18:17			20:15		21:10			21:54			
10	08:40		15:21 (3)	07:57		15:37 (2)	06:55			06:39		05:34			04:56			
	16:26	24	15:45 (3)	17:24	38	16:15 (2)	18:19			20:17		21:11			21:55			
11	08:40		15:21 (3)	07:55		15:38 (2)	06:53			06:37		05:33			04:56			
	16:28	24	15:45 (3)	17:26	36	16:14 (2)	18:21			20:19		21:13			21:55			
12	08:39		15:22 (3)	07:53		15:39 (2)	06:50			06:35		05:31			04:55			
	16:30	23	15:45 (3)	17:28	35	16:14 (2)	18:23			20:20		21:15			21:56			
13	08:38		15:23 (3)	07:51		15:40 (2)	06:48			06:32		05:29			04:55			
	16:31	23	15:50 (2)	17:30	32	16:12 (2)	18:25			20:22		21:17			21:57			
14	08:37		15:23 (3)	07:49		15:41 (2)	06:45			06:30		05:27			04:55			
	16:33	32	15:55 (2)	17:32	30	16:11 (2)	18:27			20:24		21:18			21:58			
15	08:36		15:24 (3)	07:47		15:43 (2)	06:43			06:28		05:26			04:54			
	16:34	34	15:58 (2)	17:34	26	16:09 (2)	18:28			20:26		21:20			21:58			
16	08:35		15:24 (3)	07:45		15:45 (2)	06:40			06:25		05:24			04:54			
	16:36	35	15:59 (2)	17:36	23	16:08 (2)	18:30			20:28		21:22			21:59			
17	08:34		15:26 (3)	07:43		15:48 (2)	06:38			06:23		05:22			04:54			
	16:38	36	16:02 (2)	17:38	17	16:05 (2)	18:32			20:30		21:23			21:59			
18	08:33		15:27 (3)	07:41		15:52 (2)	06:36			06:21		05:21			04:54			
	16:40	36	16:03 (2)	17:40	8	16:00 (2)	18:34			20:31		21:25			22:00			
19	08:32		15:29 (3)	07:39		17:12 (1)	06:33			06:18		05:19			04:54			
	16:41	36	16:05 (2)	17:42	1	17:13 (1)	18:36			20:33		21:27			22:00			
20	08:31		15:30 (3)	07:36		17:11 (1)	06:31			06:16		05:18			04:54			
	16:43	36	16:06 (2)	17:44	5	17:16 (1)	18:38			20:35		21:28			22:00			
21	08:30		15:32 (3)	07:34		17:10 (1)	06:28			06:14		05:16			04:54			
	16:45	36	16:08 (2)	17:46	8	17:18 (1)	18:40			20:37		21:30			22:01			
22	08:29		15:36 (2)	07:32		17:08 (1)	06:26			06:12		05:15			04:55			
	16:47	32	16:08 (2)	17:48	11	17:19 (1)	18:42			20:39		21:31			22:01			
23	08:27		15:36 (2)	07:30		17:08 (1)	06:23			06:09		05:13			04:55			
	16:49	34	16:10 (2)	17:50	14	17:22 (1)	18:43			20:41		21:33			22:01			
24	08:26		15:35 (2)	07:28		17:08 (1)	06:21			06:07		05:12			04:55			
	16:50	35	16:10 (2)	17:52	16	17:24 (1)	18:45			20:43		21:34			22:01			
25	08:25		15:35 (2)	07:25		17:07 (1)	06:18			06:05		05:11			04:55			
	16:52	37	16:12 (2)	17:54	19	17:26 (1)	18:47			20:44		21:36			22:01			
26	08:23		15:35 (2)	07:23		17:08 (1)	06:16			06:03		05:09			04:56			
	16:54	37	16:12 (2)	17:56	18	17:26 (1)	18:49			20:46		21:37			22:01			
27	08:22		15:34 (2)	07:21		17:08 (1)	06:13			06:01		05:08			04:56			
	16:56	39	16:13 (2)	17:58	18	17:26 (1)	18:51			20:48		21:39			22:01			
28	08:20		15:35 (2)	07:19		17:08 (1)	06:11			05:58		05:07			04:57			
	16:58	39	16:14 (2)	18:00	16	17:24 (1)	18:53			20:50		21:40			22:01			
29	08:19		15:34 (2)				07:09			05:56		05:06			04:57			
	17:00	40	16:14 (2)				19:55			20:52		21:41			22:01			
30	08:17		15:34 (2)				07:06			05:54		05:05			04:58			
	17:02	41	16:15 (2)				19:56			20:54		21:43			22:00			
31	08:15		15:34 (2)				07:04					05:04						
	17:04	41	16:15 (2)				19:58					21:44						
Potential sun hours	250		273		367		420		494		510							
Total, worst case	958		740		22													
Sun reduction	0.24		0.23		0.27													
Oper. time red.	1.00		1.00		1.00													
Wind dir. red.	0.66		0.66		0.67													
Total reduction	0.16		0.15		0.18													
Total, real	153		114		4													

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EP - H146

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	15:07 (2) 15:44 (2)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	15:06 (2) 15:45 (2)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	15:06 (2) 15:45 (2)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	15:05 (2) 15:46 (2)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	15:05 (2) 15:46 (2)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	15:04 (2) 15:46 (2)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43	15:04 (2) 15:46 (2)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	15:04 (2) 15:46 (2)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	15:05 (2) 15:47 (2)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	15:05 (2) 15:47 (2)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:48 (1) 17:52 (1)	08:33 16:35
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:44 (1) 17:55 (1)	08:34 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:42 (1) 17:57 (1)	08:35 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:41 (1) 17:58 (1)	08:36 16:31
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:40 (1) 17:58 (1)	08:37 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:40 (1) 17:58 (1)	08:38 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:39 (1) 17:57 (1)	08:38 16:26
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:39 (1) 17:55 (1)	08:39 16:24
19	05:18 21:45	06:10 20:48	07:05 19:35	07:59 18:22	17:39 (1) 17:52 (1)	08:40 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:40 (1) 17:50 (1)	08:41 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:40 (1) 17:48 (1)	08:41 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:41 (1) 17:45 (1)	08:42 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:40 (1) 16:18	08:42 16:18
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	16:21 (2) 16:32 (2)	08:43 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	08:11 18:09	15:17 (2) 15:35 (2)	08:43 16:16
26	05:29 21:35	06:22 20:32	07:17 19:17	08:13 18:07	15:14 (2) 15:38 (2)	08:43 16:14
27	05:30 21:33	06:24 20:30	07:19 19:14	08:15 18:04	15:12 (2) 15:39 (2)	08:44 16:13
28	05:32 21:32	06:26 20:28	07:21 19:12	08:16 18:02	15:10 (2) 15:40 (2)	08:44 16:12
29	05:34 21:30	06:27 20:25	07:22 19:09	08:18 18:00	15:09 (2) 15:41 (2)	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	08:20 17:58	15:08 (2) 15:42 (2)	08:44 16:11
31	05:37 21:27	06:31 20:21		08:22 16:56	15:08 (2) 15:44 (2)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case				364	1114	598
Sun reduction				0.29	0.27	0.21
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.66	0.66
Total reduction				0.20	0.18	0.14
Total, real				71	195	81

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EQ - H147

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: ER - H148

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:09 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:27 16:07
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8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:36 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:26	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:55 22:01	05:27 21:37	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:44 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:57 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: ES - H149

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** ET - H150

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:27 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
2	08:44	15:37 (1)	08:12	07:06	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
3	08:44	15:38 (1)	08:10	07:04	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
4	08:43	15:39 (1)	08:09	07:03	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
5	08:43	15:41 (1)	08:07	07:01	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
6	08:43	15:42 (1)	08:05	07:00	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
7	08:42	15:44 (1)	08:03	07:00	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
8	08:42	15:45 (1)	08:01	07:00	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
9	08:41	15:46 (1)	07:59	06:59	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
10	08:40	15:49 (1)	07:57	06:55	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
11	08:40	15:50 (1)	07:55	06:53	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
12	08:39	15:51 (1)	07:53	06:50	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
13	08:38	15:51 (1)	07:51	06:48	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
14	08:37	15:52 (1)	07:49	06:45	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
15	08:36	15:53 (1)	07:47	06:43	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
16	08:35	15:53 (1)	07:45	06:40	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
17	08:34	15:54 (1)	07:43	06:38	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
18	08:33	15:55 (1)	07:41	06:36	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
19	08:32	15:56 (1)	07:39	06:33	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
20	08:31	15:57 (1)	07:37	06:31	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
21	08:30	15:58 (1)	07:35	06:28	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
22	08:29	15:59 (1)	07:33	06:26	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
23	08:27	16:00 (1)	07:30	06:23	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
24	08:26	16:01 (1)	07:28	06:21	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
25	08:25	16:02 (1)	07:25	06:18	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
26	08:23	16:03 (1)	07:23	06:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
27	08:22	16:04 (1)	07:21	06:13	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
28	08:20	16:05 (1)	07:19	06:11	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
29	08:19	16:06 (1)	07:17	06:09	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
30	08:17	16:07 (1)	07:15	06:07	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
31	08:15	16:08 (1)	07:13	06:05	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:11 (1)									
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	237	307									
Total, worst case	412																						
Sun reduction	0.24																						
Oper. time red.	1.00																						
Wind dir. red.	0.66																						
Total reduction	0.16																						
Total, real	66																						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EU - H151

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		14:46 (4)	08:14		16:22 (3)	07:16		17:04 (2)	07:01		05:52			05:03		
	16:15	25	15:11 (4)	17:06	12	16:34 (3)	18:02	30	17:34 (2)	20:00		20:55			21:45		
2	08:44		14:47 (4)	08:12		16:22 (3)	07:14		17:03 (2)	06:59		20:50			05:02		
	16:16	25	15:12 (4)	17:08	15	16:37 (3)	18:04	33	17:36 (2)	20:02		20:57			21:46		
3	08:44		14:48 (4)	08:10		16:22 (3)	07:12		17:02 (2)	06:56		20:54			05:01		
	16:17	23	15:11 (4)	17:10	17	16:39 (3)	18:06	36	17:38 (2)	20:04		20:59			21:48		
4	08:43		14:49 (4)	08:08		16:22 (3)	07:09		17:02 (2)	06:54		20:56			05:00		
	16:18	23	15:12 (4)	17:12	19	16:41 (3)	18:07	37	17:39 (2)	20:06		21:01			21:49		
5	08:43		14:49 (4)	08:07		16:22 (3)	07:07		17:01 (2)	06:51		20:54			04:59		
	16:19	22	15:11 (4)	17:14	21	16:43 (3)	18:09	37	17:38 (2)	20:07		21:03			21:50		
6	08:43		14:51 (4)	08:05		16:23 (3)	07:04		17:01 (2)	06:49		20:52			04:58		
	16:21	21	15:12 (4)	17:16	22	16:45 (3)	18:11	37	17:38 (2)	20:09		21:04			21:51		
7	08:42		14:52 (4)	08:03		16:23 (3)	07:02		17:01 (2)	06:47		20:50			04:58		
	16:22	19	15:11 (4)	17:18	22	16:45 (3)	18:13	37	17:38 (2)	20:11		21:06			21:52		
8	08:42		14:53 (4)	08:01		16:24 (3)	07:00		17:01 (2)	06:44		20:53			04:57		
	16:24	17	15:10 (4)	17:20	20	16:44 (3)	18:15	37	17:38 (2)	20:13		21:08			21:53		
9	08:41		14:55 (4)	07:59		16:25 (3)	06:57		17:01 (2)	06:42		20:56			04:57		
	16:25	16	15:11 (4)	17:22	18	16:43 (3)	18:17	35	17:36 (2)	20:15		21:10			21:54		
10	08:40		14:56 (4)	07:57		16:26 (3)	06:55		17:01 (2)	06:39		20:53			04:56		
	16:26	14	15:10 (4)	17:24	16	16:42 (3)	18:19	35	17:36 (2)	20:17		21:11			21:55		
11	08:40		14:59 (4)	07:55		16:28 (3)	06:53		17:02 (2)	06:37		20:53			04:56		
	16:28	9	15:08 (4)	17:26	13	16:41 (3)	18:21	34	17:36 (2)	20:19		21:13			21:55		
12	08:39		15:02 (4)	07:53		16:32 (3)	06:50		17:02 (2)	06:35		20:51			04:55		
	16:30	4	15:06 (4)	17:28	6	16:38 (3)	18:23	32	17:34 (2)	20:20		21:15			21:56		
13	08:38			07:51			06:48		17:04 (2)	06:32		20:52			04:55		
	16:31			17:30			18:25	29	17:33 (2)	20:22		21:17			21:57		
14	08:37			07:49			06:45		17:04 (2)	06:30		20:52			04:55		
	16:33			17:32			18:27	27	17:31 (2)	20:24		21:18			21:58		
15	08:36			07:47			06:43		17:06 (2)	06:28		20:52			04:54		
	16:34			17:34			18:28	24	17:30 (2)	20:26		21:20			21:58		
16	08:35			07:45			06:40		17:07 (2)	06:25		20:54			04:54		
	16:36			17:36			18:30	20	17:27 (2)	20:28		21:22			21:59		
17	08:34			07:43			06:38		17:11 (2)	06:23		20:52			04:54		
	16:38			17:38			18:32	13	17:24 (2)	20:30		21:23			21:59		
18	08:33			07:41			06:35			06:21		20:51			04:54		
	16:40			17:40			18:34			20:31		21:25			22:00		
19	08:32			07:39			06:33			06:18		20:51			04:54		
	16:41			17:42			18:36			20:33		21:27			22:00		
20	08:31			07:36			06:31			06:16		20:51			04:54		
	16:43			17:44			18:38			20:35		21:28			22:00		
21	08:30			07:34			06:28			06:14		20:51			04:54		
	16:45			17:46			18:40			20:37		21:30			22:01		
22	08:29			07:32			06:26			06:12		20:51			04:55		
	16:47			17:48			18:42			20:39		21:31			22:01		
23	08:27			07:30			06:23			06:09		20:51			04:55		
	16:49			17:50	8	17:22 (2)	18:43			20:41		21:33			22:01		
24	08:26			07:28			06:21			06:07		20:52			04:55		
	16:50			17:52	12	17:24 (2)	18:45			20:43		21:34			22:01		
25	08:24			07:25			06:18			06:05		20:51			04:55		
	16:52			17:54	17	17:26 (2)	18:47			20:44		21:36			22:01		
26	08:23			07:23			06:16			06:03		20:50			04:56		
	16:54			17:56	20	17:28 (2)	18:49			20:46		21:37			22:01		
27	08:22			07:21			06:13			06:00		20:50			04:56		
	16:56			17:58	24	17:31 (2)	18:51			20:48		21:39			22:01		
28	08:20		16:24 (3)	07:18			06:11			05:58		20:50			04:57		
	16:58	2	16:26 (3)	18:00	27	17:05 (2)	18:53			20:50		21:40			22:01		
29	08:19		16:23 (3)				07:08			05:56		20:50			04:57		
	17:00	5	16:28 (3)				19:54			20:52		21:41			22:01		
30	08:17		16:22 (3)				07:06			05:54		20:50			04:58		
	17:02	7	16:29 (3)				19:56			20:54		21:43			22:00		
31	08:15		16:22 (3)				07:04					20:54					
	17:04	9	16:31 (3)				19:58					21:44					
Potential sun hours	250			273			367			420		494			510		
Total, worst case		241			309			533									
Sun reduction		0.24			0.23			0.27									
Oper. time red.		1.00			1.00			1.00									
Wind dir. red.		0.65			0.66			0.68									
Total reduction		0.16			0.15			0.18									
Total, real		38			48			98									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EU - H151

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:42 (2) 18:13 (2)	07:24 16:54	15:56 (3) 16:12 (3)	08:19 16:10	14:41 (4) 14:50 (4)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:40 (2) 18:13 (2)	07:26 16:52	15:54 (3) 16:13 (3)	08:21 16:09	14:39 (4) 14:52 (4)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:40 (2) 18:14 (2)	07:28 16:50	15:53 (3) 16:14 (3)	08:22 16:08	14:38 (4) 14:54 (4)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:39 (2) 18:14 (2)	07:30 16:48	15:53 (3) 16:14 (3)	08:24 16:08	14:38 (4) 14:55 (4)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:38 (2) 18:14 (2)	07:32 16:46	15:52 (3) 16:15 (3)	08:25 16:07	14:37 (4) 14:56 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:38 (2) 18:15 (2)	07:34 16:44	15:52 (3) 16:12 (3)	08:26 16:07	14:37 (4) 14:58 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:37 (2) 18:13 (2)	07:36 16:43	15:52 (3) 16:10 (3)	08:28 16:06	14:37 (4) 14:58 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:36 (2) 18:13 (2)	07:38 16:41	15:52 (3) 16:08 (3)	08:29 16:06	14:36 (4) 14:59 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:36 (2) 18:13 (2)	07:40 16:39	15:53 (3) 16:07 (3)	08:30 16:05	14:37 (4) 15:00 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:36 (2) 18:12 (2)	07:42 16:37	15:53 (3) 16:05 (3)	08:31 16:05	14:37 (4) 15:01 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:37 (2) 18:11 (2)	07:44 16:35	15:53 (3) 16:03 (3)	08:33 16:05	14:36 (4) 15:01 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:37 (2) 18:09 (2)	07:45 16:34	15:54 (3) 16:01 (3)	08:34 16:05	14:36 (4) 15:02 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:38 (2) 18:07 (2)	07:47 16:32	15:55 (3) 15:59 (3)	08:35 16:05	14:37 (4) 15:02 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:38 (2) 18:04 (2)	07:49 16:31	15:56 (3) 15:57 (3)	08:36 16:04	14:37 (4) 15:03 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:39 (2) 18:02 (2)	07:51 16:29		08:37 16:04	14:37 (4) 15:04 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:40 (2) 17:59 (2)	07:53 16:27		08:38 16:05	14:38 (4) 15:04 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:42 (2) 17:57 (2)	07:55 16:26		08:38 16:05	14:38 (4) 15:05 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:44 (2) 17:55 (2)	07:57 16:24		08:39 16:05	14:39 (4) 15:06 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:47 (2) 17:52 (2)	07:59 16:23		08:40 16:05	14:39 (4) 15:07 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20		08:00 16:22		08:41 16:06	14:39 (4) 15:07 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17		08:02 16:20		08:41 16:06	14:40 (4) 15:08 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:04 16:19		08:42 16:06	14:40 (4) 15:08 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13		08:06 16:18		08:42 16:07	14:41 (4) 15:09 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11		08:08 16:17		08:43 16:08	14:41 (4) 15:09 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09		08:09 16:16		08:43 16:08	14:42 (4) 15:09 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 18:04 (2)		08:11 16:14		08:43 16:09	14:42 (4) 15:09 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 18:08 (2)		08:13 16:13		08:44 16:10	14:43 (4) 15:10 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 18:10 (2)		08:14 16:12		08:44 16:10	14:44 (4) 15:11 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 18:12 (2)		08:16 16:12		08:44 16:11	14:45 (4) 15:11 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 18:12 (2)		15:59 (3) 16:07 (3)	08:18 16:11	14:44 (4) 14:46 (4)	08:44 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56	8 13	15:57 (3) 16:10 (3)	2 16:11	08:44 16:13	14:45 (4) 15:11 (4)
Potential sun hours	512	460	382	328			259	233	
Total, worst case			105	567			204		749
Sun reduction			0.32	0.29			0.27		0.21
Oper. time red.			1.00	1.00			1.00		1.00
Wind dir. red.			0.68	0.68			0.66		0.65
Total reduction			0.22	0.20			0.17		0.13
Total, real			23	112			36		100

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** EV - H152

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:09 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24				08:19						14:54 (2)	
	16:15	25	15:34 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54				16:10	28	15:22 (2)				16:10	28
2	08:44		15:09 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26				08:21						14:54 (2)	
	16:16	26	15:35 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				16:09	27	15:21 (2)				16:09	27
3	08:44		15:09 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28				08:22						14:54 (2)	
	16:17	26	15:35 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50				16:08	28	15:22 (2)				16:08	28
4	08:43		15:10 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30				08:24						14:55 (2)	
	16:18	26	15:36 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48				16:08	28	15:23 (2)				16:08	28
5	08:43		15:09 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32				08:25						14:55 (2)	
	16:19	27	15:36 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46				16:07	28	15:23 (2)				16:07	28
6	08:43		15:10 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34				08:26						14:56 (2)	
	16:21	27	15:37 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44				16:07	27	15:23 (2)				16:07	27
7	08:42		15:10 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				08:28						14:57 (2)	
	16:22	27	15:37 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				16:06	26	15:23 (2)				16:06	26
8	08:42		15:10 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38				08:29						14:57 (2)	
	16:23	28	15:38 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41				16:06	26	15:23 (2)				16:06	26
9	08:41		15:11 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				08:30						14:58 (2)	
	16:25	28	15:39 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39				16:05	26	15:24 (2)				16:05	26
10	08:40		15:12 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42				08:32						14:58 (2)	
	16:26	27	15:39 (2)	17:24	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37				16:05	26	15:24 (2)				16:05	26
11	08:40		15:12 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44				08:33						14:59 (2)	
	16:28	28	15:40 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35				16:05	25	15:24 (2)				16:05	25
12	08:39		15:12 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46				08:34						14:59 (2)	
	16:29	28	15:40 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34				16:05	25	15:24 (2)				16:05	25
13	08:38		15:13 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47				08:35						15:00 (2)	
	16:31	27	15:40 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32				16:04	24	15:24 (2)				16:04	24
14	08:37		15:13 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				08:36						15:01 (2)	
	16:33	28	15:41 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30				16:04	25	15:26 (2)				16:04	25
15	08:36		15:14 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51				08:37						15:01 (2)	
	16:34	27	15:41 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				16:04	24	15:25 (2)				16:04	24
16	08:35		15:13 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53				14:58 (2)						15:01 (2)	
	16:36	27	15:40 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	10			15:08 (2)						15:01 (2)	
17	08:34		15:14 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55				14:56 (2)						15:02 (2)	
	16:38	27	15:41 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	15			15:11 (2)						15:02 (2)	
18	08:33		15:15 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				14:55 (2)						15:03 (2)	
	16:40	26	15:41 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	17			15:12 (2)						15:04 (2)	
19	08:32		15:16 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				14:54 (2)						15:04 (2)	
	16:41	25	15:41 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	20			15:14 (2)						15:05 (2)	
20	08:31		15:16 (2)	07:36	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00				14:53 (2)						15:06 (2)	
	16:43	24	15:40 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	22			15:15 (2)						15:07 (2)	
21	08:30		15:18 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				14:53 (2)						15:08 (2)	
	16:45	23	15:41 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	23			15:16 (2)						15:09 (2)	
22	08:29		15:18 (2)	07:32	06:26	06:11	05:15	04:55	05:23	06:15	07:10	08:05	08:04				14:53 (2)						15:10 (2)	
	16:47	22	15:40 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	23			15:16 (2)						15:11 (2)	
23	08:27		15:20 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				14:52 (2)						15:12 (2)	
	16:49	20	15:40 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	25			15:17 (2)						15:13 (2)	
24	08:26		15:21 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08				14:52 (2)						15:14 (2)	
	16:50	17	15:38 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	26			15:18 (2)						15:15 (2)	
25	08:25		15:23 (2)	07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09				14:52 (2)						15:16 (2)	
	16:52	15	15:38 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	27			15:19 (2)						15:17 (2)	
26	08:23		15:26 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11				14:53 (2)						15:18 (2)	
	16:54	9	15:35 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	26			15:19 (2)						15:19 (2)	
27	08:22			07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13				14:53 (2)						15:20 (2)	
	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	27			15:20 (2)						15:21 (2)	
28	08:20			07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14				14:53 (2)						15:22 (2)	
	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	28			15:21 (2)						15:23 (2)	
29	08:19				07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16				14:53 (2)						15:24 (2)	
	17:00				19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	27			15:20 (2)						15:25 (2)	
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18				14:53 (2)						15:26 (2)	
	17:02				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	28			15:21 (							

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EW - H153

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EX - H154

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	08:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	08:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	08:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	08:19 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: EY - H155

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	17:06	18:02	07:47 (1)	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:10
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
	16:16	17:08	18:04	07:48 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
3	08:44	08:10	07:12	07:36 (1)	06:57	05:48	05:01	05:00	05:42	06:37	07:30	08:22
	16:17	17:10	18:06	07:48 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:09
4	08:44	08:09	07:09	07:34 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
	16:18	17:12	18:08	07:48 (1)	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:08
5	08:43	08:07	07:07	07:31 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:34	08:25
	16:20	17:14	18:10	07:47 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
6	08:43	08:05	07:05	07:29 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
	16:21	17:16	18:12	07:47 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:07
7	08:42	08:03	07:02	07:30 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
	16:22	17:18	18:13	07:46 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42	08:01	07:00	07:30 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
	16:24	17:20	18:15	07:45 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:06
9	08:41	07:59	06:58	07:32 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:31
	16:25	17:22	18:17	07:43 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:06
10	08:41	07:57	06:55	07:35 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32
	16:27	17:24	18:19	07:39 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:05
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:11	07:44
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	17:27	16:05
12	08:39	07:53	06:50	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:13	07:46
	16:30	17:28	18:23	20:21	21:15	21:55	21:53	21:04	19:52	18:38	17:24	16:05
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	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	17:22	16:05
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	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	17:20	16:05
15	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:19	07:51
	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	17:17	16:05
16	08:36	07:45	06:41	06:25	05:24	04:55	05:15	06:05	07:00	07:54	08:21	07:53
	16:36	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	17:14	16:05
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:23	07:55
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	17:12	16:05
18	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:25	07:57
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	17:09	16:05
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:26	07:59
	16:42	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	17:07	16:05
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:28	08:01
	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	17:05	16:06
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:30	08:03
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	17:03	16:06
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:32	08:04
	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	17:00	16:07
23	08:27	07:30	06:23	06:10	05:13	04:55	05:24	06:17	07:12	08:07	08:34	08:06
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:58	16:07
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:36	08:08
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:56	16:08
25	08:25	07:26	06:19	06:05	05:11	04:56	05:28	06:21	07:15	08:11	08:38	08:10
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09	16:58	16:08
26	08:23	07:23	06:16	06:03	05:10	04:56	05:29	06:22	07:17	08:13	08:40	08:11
	16:54	17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	18:07	16:59	16:09
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:42	08:13
	16:56	17:58	18:51	20:48	21:39	22:01	21:34	20:30	19:15	18:05	16:60	16:10
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:44	08:15
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:61	16:11
29	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:46	08:16
	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:62	16:12
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:48	08:18
	17:02		19:57	20:54	21:43	22:01	21:29	20:23	19:07	18:58	16:63	16:11
31	08:16		07:04	05:54	05:04	04:57	05:37	06:31	07:26	08:23	08:50	08:14
	17:04		19:58	21:44	21:44	21:27	20:21	19:16	18:56	17:41	16:64	16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case			3	121						124		
Sun reduction		0.23		0.27						0.29		
Oper. time red.		1.00		1.00						1.00		
Wind dir. red.		0.65		0.65						0.65		
Total reduction		0.15		0.18						0.19		
Total, real		0		21						24		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: EZ - H156

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	09:18 (4)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	16:15	13	09:31 (4)	17:06	15	08:57 (2)	18:02	20:05	21:45	22:00	21:25	19:05
3	08:44	09:18 (4)	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28
4	16:16	13	09:31 (4)	17:08	17	08:57 (2)	18:04	20:02	20:57	21:47	22:00	19:02
5	08:44	09:17 (4)	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
6	16:17	14	09:31 (4)	17:10	20	08:58 (2)	18:06	20:04	20:59	21:48	21:59	19:00
7	08:43	09:17 (4)	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32
8	16:18	15	09:32 (4)	17:12	22	08:58 (2)	18:08	20:06	21:01	21:49	21:59	18:57
9	08:43	09:16 (4)	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33
10	16:20	15	09:31 (4)	17:14	25	08:59 (2)	18:09	20:08	21:03	21:50	21:58	18:55
11	08:43	09:16 (4)	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35
12	16:21	16	09:32 (4)	17:16	27	08:59 (2)	18:11	20:09	21:05	21:51	21:58	18:53
13	08:42	09:15 (4)	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37
14	16:22	17	09:32 (4)	17:18	29	08:59 (2)	18:13	20:11	21:06	21:52	21:57	18:50
15	08:42	09:16 (4)	08:01	08:31 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
16	16:24	16	09:32 (4)	17:20	28	08:59 (2)	18:15	20:13	21:08	21:53	21:56	18:48
17	08:41	09:18 (4)	07:59	08:31 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
18	16:25	14	09:32 (4)	17:22	28	08:59 (2)	18:17	20:15	21:10	21:54	21:56	18:45
19	08:41	09:18 (4)	07:57	08:32 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43
20	16:27	14	09:32 (4)	17:24	26	08:58 (2)	18:19	20:17	21:12	21:55	21:58	18:43
21	08:40	09:20 (4)	07:55	08:32 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
22	16:28	11	09:31 (4)	17:26	26	08:58 (2)	18:21	20:19	21:13	21:56	21:54	18:41
23	08:39	09:21 (4)	07:53	08:33 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46
24	16:30	9	09:30 (4)	17:28	24	08:57 (2)	18:23	20:21	21:15	21:56	21:53	18:38
25	08:38	09:23 (4)	07:51	08:34 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48
26	16:31	6	09:29 (4)	17:30	23	08:57 (2)	18:25	20:22	21:17	21:57	21:52	18:36
27	08:37		07:49	08:35 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
28	16:33		17:32	08:54 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33
29	08:36		07:47	08:37 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52
30	16:34		17:34	08:53 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31
31	08:36		07:45	08:39 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54
32	16:36		17:36	08:50 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29
33	08:35		07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56
34	16:38		17:38		18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27
35	08:33		07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57
36	16:40		17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24
37	08:32		07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
38	16:41		17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22
39	08:31		07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
40	16:43		17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20
41	08:30		07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03
42	16:45		17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17
43	08:29		07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05
44	16:47		17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15
45	08:27		07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07
46	16:49		17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13
47	08:26		07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09
48	16:51		17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11
49	08:25		07:25		06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11
50	16:52		17:54		18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09
51	08:23		07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13
52	16:54		17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07
53	08:22		07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15
54	16:56		17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04
55	08:20		07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17
56	16:58	3	08:52 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02
57	08:19		08:47 (2)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19
58	17:00	6	08:53 (2)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00
59	08:17		08:45 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20
60	17:02	9	08:54 (2)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:08
61	08:15		08:44 (2)		07:04		05:04		05:37	06:31		07:22
62	17:04	12	08:56 (2)		19:58		21:44		21:27	20:21		16:56
63	Potential sun hours	250			367	420	494	510	512	460	382	328
64	Total, worst case	203	356									
65	Sun reduction	0.24	0.23									
66	Oper. time red.	1.00	1.00									
67	Wind dir. red.	0.60	0.61									
68	Total reduction	0.15	0.14									
69	Total, real	30	51									
70												
71												
72												
73												
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77												
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99												
100												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn.Feeney@jodireland.com Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Assumptions for shadow calculations

Shadow receptor: FA - H157

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	09:18 (4)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	16:15	14 09:32 (4)	17:06	19 09:01 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05
3	08:44	09:18 (4)	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28
4	16:16	15 09:33 (4)	17:08	21 09:01 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
5	08:44	09:17 (4)	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
6	16:17	15 09:32 (4)	17:10	24 09:02 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
7	08:43	09:17 (4)	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32
8	16:18	16 09:33 (4)	17:12	26 09:02 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
9	08:43	09:16 (4)	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33
10	16:20	16 09:32 (4)	17:14	28 09:02 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55
11	08:43	09:18 (4)	08:05	08:34 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35
12	16:21	15 09:33 (4)	17:16	28 09:02 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53
13	08:42	09:18 (4)	08:03	08:34 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37
14	16:22	15 09:33 (4)	17:18	28 09:02 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
15	08:42	09:19 (4)	08:01	08:35 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
16	16:24	13 09:32 (4)	17:20	26 09:01 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48
17	08:41	09:21 (4)	07:59	08:35 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
18	16:25	11 09:32 (4)	17:22	26 09:01 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45
19	08:41	09:22 (4)	07:57	08:36 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43
20	16:27	10 09:32 (4)	17:24	24 09:00 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43
21	08:40	09:24 (4)	07:55	08:37 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
22	16:28	6 09:30 (4)	17:26	22 08:59 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41
23	08:39		07:53	08:39 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46
24	16:30		17:28	19 08:58 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38
25	08:38		07:51	08:40 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48
26	16:31		17:30	17 08:57 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36
27	08:37		07:49	08:42 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
28	16:33		17:32	12 08:54 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33
29	08:36		07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52
30	16:34		17:34		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31
31	08:36		07:45		06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54
32	16:36		17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29
33	08:35		07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56
34	16:38		17:38		18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27
35	08:33		07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57
36	16:40		17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24
37	08:32		07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
38	16:41		17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22
39	08:31		07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
40	16:43		17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20
41	08:30		07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03
42	16:45		17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17
43	08:29		07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05
44	16:47		17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15
45	08:27		07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07
46	16:49		17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13
47	08:26		07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09
48	16:51		17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11
49	08:25		07:25		06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11
50	16:52		17:54		18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09
51	08:23		07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13
52	16:54		17:56		18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07
53	08:22		07:21		06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15
54	16:56		17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04
55	08:20		07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17
56	16:58		18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02
57	08:19				07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19
58	17:00				19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00
59	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20
60	17:02				19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00
61	08:15				07:04		05:04		05:37	06:31		07:22
62	17:04				19:58		21:44		21:27	20:21		16:56
Potential sun hours	250		273		367		420		494		510	
Total, worst case		205		320								
Sun reduction		0.24		0.23								
Oper. time red.		1.00		1.00								
Wind dir. red.		0.60		0.61								
Total reduction		0.15		0.14								
Total, real		30		45								

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FB - H158

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	09:46 (3)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:54 (4)
2	16:15	12:05 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:10
3	08:44	09:48 (3)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21
4	16:16	12:05 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:09
5	08:44	09:48 (3)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
6	16:17	12:05 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:08
7	08:43	09:51 (3)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24
8	16:18	12:05 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
9	08:43	09:53 (3)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	08:25
10	16:20	12:05 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:07
11	08:43	11:27 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27
12	16:21	12:05 (1)	17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:07
13	08:42	11:28 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28
14	16:22	12:05 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
15	08:42	11:29 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29
16	16:24	12:04 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
17	08:41	11:31 (1)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
18	16:25	12:04 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:05
19	08:41	11:32 (1)	07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	08:32
20	16:27	12:04 (1)	17:24	18:25	20:17	21:12	21:55	21:58	21:08	19:57	18:43	16:05
21	08:40	09:12 (4)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33
22	16:28	12:03 (1)	17:26	18:27	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:05
23	08:39	09:11 (4)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34
24	16:30	12:02 (1)	17:28	18:28	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05
25	08:38	09:10 (4)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35
26	16:31	12:01 (1)	17:30	18:29	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:05
27	08:37	09:09 (4)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
28	16:33	12:00 (1)	17:32	18:29	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05
29	08:36	09:08 (4)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37
30	16:35	11:58 (1)	17:34	18:30	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05
31	08:36	09:07 (4)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38
32	16:36	11:55 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
33	08:35	09:05 (4)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39
34	16:38	11:54 (1)	17:38	18:31	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05
35	08:33	09:04 (4)	07:41	06:27	06:12	05:21	04:54	05:17	06:08	07:03	07:57	08:39
36	16:40	11:53 (1)	17:40	18:31	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05
37	08:32	09:03 (4)	07:39	06:24	06:10	05:19	04:54	05:18	06:10	07:05	07:59	08:40
38	16:41	11:52 (1)	17:42	18:30	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:05
39	08:31	09:01 (4)	07:37	06:24	06:10	05:18	04:54	05:20	06:12	07:06	08:01	08:41
40	16:43	11:51 (1)	17:44	18:30	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:06
41	08:30	09:00 (4)	07:34	06:23	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:41
42	16:45	11:50 (1)	17:46	18:30	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06
43	08:29	09:00 (4)	07:32	06:22	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42
44	16:47	11:49 (1)	17:48	18:28	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:07
45	08:27	09:02 (4)	07:30	06:20	06:10	05:13	04:55	05:24	06:17	07:12	08:07	08:42
46	16:49	11:48 (1)	17:50	18:27	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:07
47	08:26	09:03 (4)	07:28	06:19	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43
48	16:51	11:47 (1)	17:52	18:26	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:08
49	08:25	09:02 (4)	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:43
50	16:52	11:46 (1)	17:54	18:24	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:08
51	08:23	09:01 (4)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:43
52	16:54	11:45 (1)	17:56	18:21	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:09
53	08:22	09:00 (4)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:44
54	16:56	11:44 (1)	17:58	18:21	20:48	21:39	22:01	21:33	20:30	19:15	17:04	16:10
55	08:20	09:00 (4)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:44
56	16:58	11:43 (1)	18:00	18:23	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:11
57	08:19	09:00 (4)	07:17	06:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:44
58	17:00	09:00 (4)	07:15	06:07	05:52	05:03	22:01	21:30	20:25	19:10	17:00	16:11
59	08:17	09:00 (4)	07:13	06:05	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:44
60	17:02	09:00 (4)	07:11	06:03	05:54	05:05	22:00	21:28	20:23	19:07	16:58	16:11
61	08:15	09:00 (4)	07:09	06:01	05:54	05:04	22:00	21:27	20:21	16:56	16:56	16:13
62	17:04	09:00 (4)	07:07	06:00	05:54	05:04	22:00	21:27	20:21	16:56	16:56	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	684	287										1676
Sun reduction	0.24	0.23										0.21
Oper. time red.	1.00	1.00										1.00
Wind dir. red.	0.60	0.64										0.60
Total reduction	0.15	0.15										0.12
Total, real	100	42										207

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FC - H159

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:05
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:15	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:12	08:44 16:10
29	08:19 17:00		07:08 19:55	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:11	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FD - H160

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FE - H161

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FF - H162

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04 21:44			05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FG - H163

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		11:47 (1)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		07:54 (2)	08:19		08:54 (4)				
	16:15	25	12:12 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54	17	08:11 (2)	16:10	10	09:04 (4)				
2	08:44		11:49 (1)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26		07:56 (2)	08:21		08:56 (4)				
	16:16	23	12:12 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	15	08:11 (2)	16:09	9	09:05 (4)				
3	08:44		09:17 (4)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		07:58 (2)	08:22		08:57 (4)				
	16:17	23	12:11 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50	12	08:10 (2)	16:08	7	09:04 (4)				
4	08:43		09:17 (4)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30		08:00 (2)	08:24		08:59 (4)				
	16:18	22	12:11 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	9	08:09 (2)	16:08	6	09:05 (4)				
5	08:43		09:16 (4)	08:07		08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32		08:02 (2)	08:25		09:00 (4)			
	16:20	21	12:10 (1)	17:14	3	08:37 (2)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46	6	08:08 (2)	16:07	13	11:51 (1)			
6	08:43		09:16 (4)	08:05		08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34		08:04 (2)	08:27		09:02 (4)			
	16:21	18	12:09 (1)	17:16	6	08:38 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:44	3	08:07 (2)	16:07	18	11:55 (1)			
7	08:42		09:15 (4)	08:03		08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36		08:07 (2)	08:28		09:03 (4)			
	16:22	13	12:06 (1)	17:18	9	08:39 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43			16:06	20	11:57 (1)			
8	08:42		09:14 (4)	08:01		08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38			08:29		09:05 (4)			
	16:24	6	09:20 (4)	17:20	12	08:40 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41			16:06	22	11:59 (1)			
9	08:41		09:14 (4)	07:59		08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40			08:30		09:06 (4)			
	16:25	7	09:21 (4)	17:22	15	08:41 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39			16:05	23	12:00 (1)			
10	08:41		09:13 (4)	07:57		08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42			08:32		11:38 (1)			
	16:27	8	09:21 (4)	17:24	18	08:42 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37			16:05	23	12:01 (1)			
11	08:40		09:12 (4)	07:55		08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44			08:33		11:37 (1)			
	16:28	10	09:22 (4)	17:26	20	08:42 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41		16:36			16:05	25	12:02 (1)			
12	08:39		09:11 (4)	07:53		08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46		07:46			08:34		11:38 (1)			
	16:30	11	09:22 (4)	17:28	22	08:42 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38		16:34			16:05	26	12:04 (1)			
13	08:38		09:10 (4)	07:51		08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48		07:48			08:35		11:38 (1)			
	16:31	12	09:22 (4)	17:30	25	08:43 (2)	18:24	20:22	21:17	21:57	21:52	21:01	19:49	18:36		16:32			16:05	27	12:05 (1)			
14	08:37		09:09 (4)	07:49		08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50		07:49			08:36		11:38 (1)			
	16:33	13	09:22 (4)	17:32	27	08:42 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:33		16:31			16:05	28	12:06 (1)			
15	08:36		09:08 (4)	07:47		08:16 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51			08:37		11:38 (1)			
	16:35	14	09:22 (4)	17:34	26	08:42 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29			16:05	29	12:07 (1)			
16	08:36		09:07 (4)	07:45		08:16 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54		07:53			08:38		11:37 (1)			
	16:36	15	09:22 (4)	17:36	25	08:41 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28			16:05	30	12:07 (1)			
17	08:35		09:07 (4)	07:43		08:17 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55			08:39		11:37 (1)			
	16:38	14	09:21 (4)	17:38	24	08:41 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26			16:05	30	12:07 (1)			
18	08:33		09:08 (4)	07:41		08:18 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57		07:57			08:39		11:38 (1)			
	16:40	13	09:21 (4)	17:40	22	08:40 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25			16:05	30	12:08 (1)			
19	08:32		09:10 (4)	07:39		08:18 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59		07:59			08:40		11:39 (1)			
	16:41	10	09:20 (4)	17:42	20	08:38 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22		16:23			16:05	30	12:09 (1)			
20	08:31		09:12 (4)	07:37		08:20 (2)	06:31	06:16	05:18	04:56	05:21	06:12	07:06	08:01		08:01		08:56 (2)	16:23		16:05			
	16:43	5	09:17 (4)	17:44	17	08:37 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20		16:22	6	09:02 (2)	16:22		16:06	31	12:09 (1)	
21	08:30		07:34			08:23 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03		08:03		08:52 (2)	08:02		08:41		11:39 (1)	
	16:45	11	17:46			08:34 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18		16:20	14	09:06 (2)	16:20		16:06	31	12:10 (1)	
22	08:29		07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:05		08:48 (4)	08:04		08:42		11:39 (1)		
	16:47		17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15		18	09:08 (2)	16:19	5	08:53 (4)	16:07	31	12:10 (1)		
23	08:27		07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07		08:07		08:48 (2)	08:06		08:46 (4)	08:42	11:40 (1)		
	16:49		17:50			18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13		21	09:09 (2)	16:18	10	08:56 (4)	16:07	31	12:11 (1)		
24	08:26		07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:09		08:47 (2)	08:08		08:45 (4)	08:43	11:40 (1)		
	16:51		17:52			18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11		23	09:10 (2)	16:17	13	08:58 (4)	16:08	31	12:11 (1)		
25	08:25		07:25			06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11		07:11		07:46 (2)	08:09		08:45 (4)	08:43	11:41 (1)		
	16:52		17:54			18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09		24	08:10 (2)	16:16	14	08:59 (4)	16:08	30	12:11 (1)		
26	08:23		07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13		07:13		07:46 (2)	08:11		08:45 (4)	08:44	11:42 (1)		
	16:54		17:56			18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07		25	08:11 (2)	16:15	15	09:00 (4)	16:09	30	12:12 (1)		
27	08:22		07:21			06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:13		08:13		07:45 (2)	08:12		08:47 (4)	08:44	11:43 (1)		
	16:56		17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04		26	08:11 (2)	16:14	14	09:01 (4)	16:10	30	12:13 (1)		
28	08:20		07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17		07:17		07:45 (2)	08:14		08:49 (4)	08:44	11:43 (1)		
	16:58		18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02		26	08:11 (2)	16:13	13	09:02 (4)	16:11	30	12:13 (1)		
29	08:19					07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19		07:19		07:47 (2)	08:16		08:50 (4)	08:44	11:44 (1)		
	17:00					19:55	20:52	21:42	22:01	21:30	20:25													

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FH - H164

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FI - H165

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FJ - H166

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:19 (5)	08:14	15:45 (4)	07:16	17:10 (3)	07:01	05:52	05:03		
	16:15	18	15:37 (5)	17:06	41	16:26 (4)	18:02	24	17:34 (3)	20:00	20:55
2	08:44	15:20 (5)	08:12	15:46 (4)	07:14	17:09 (3)	06:59		05:50	05:02	
	16:16	19	15:39 (5)	17:08	40	16:26 (4)	18:04	25	17:34 (3)	20:02	20:57
3	08:44	15:20 (5)	08:10	15:46 (4)	07:12	17:10 (3)	06:56		19:29 (2)	05:48	05:01
	16:17	19	15:39 (5)	17:10	40	16:26 (4)	18:06	24	17:34 (3)	20:04	20:59
4	08:43	15:21 (5)	08:08	15:46 (4)	07:09	17:11 (3)	06:54		19:26 (2)	05:46	05:00
	16:18	20	15:41 (5)	17:12	40	16:26 (4)	18:07	22	17:33 (3)	20:06	21:01
5	08:43	15:21 (5)	08:07	15:47 (4)	07:07	17:12 (3)	06:51	13	19:39 (2)	21:01	21:49
	16:19	21	15:42 (5)	17:14	38	16:25 (4)	18:09	18	19:40 (2)	21:03	21:50
6	08:43	15:22 (5)	08:05	15:47 (4)	07:04	17:14 (3)	06:49		19:21 (2)	05:42	04:59
	16:21	22	15:44 (5)	17:16	38	16:25 (4)	18:11	16	17:30 (3)	20:09	21:04
7	08:42	15:22 (5)	08:03	15:48 (4)	07:02	17:15 (3)	06:47		19:19 (2)	05:40	04:58
	16:22	23	15:45 (5)	17:18	36	16:24 (4)	18:13	12	17:27 (3)	20:11	21:06
8	08:42	15:22 (5)	08:01	15:49 (4)	07:00		06:44	24	19:43 (2)	21:06	21:52
	16:24	24	15:46 (5)	17:20	35	16:24 (4)	18:15	28	19:46 (2)	21:08	04:57
9	08:41	15:23 (5)	07:59	15:50 (4)	06:57		06:42		19:18 (2)	05:38	21:53
	16:25	24	15:47 (5)	17:22	33	16:23 (4)	18:17		19:17 (2)	05:36	04:57
10	08:40	15:23 (5)	07:57	15:51 (4)	06:55		06:39	31	19:48 (2)	21:10	21:54
	16:26	24	15:47 (5)	17:24	31	16:22 (4)	18:19		19:15 (2)	05:34	04:56
11	08:40	15:24 (5)	07:55	15:53 (4)	06:52		06:37	34	19:49 (2)	21:11	21:55
	16:28	25	15:52 (4)	17:26	28	16:21 (4)	18:21		19:15 (2)	05:33	04:56
12	08:39	15:24 (5)	07:53	15:55 (4)	06:50		06:35	36	19:51 (2)	21:13	21:55
	16:30	28	15:54 (4)	17:28	25	16:20 (4)	18:23		19:14 (2)	05:31	04:55
13	08:38	15:25 (5)	07:51	15:56 (4)	06:48		06:32	38	19:52 (2)	21:15	21:56
	16:31	29	15:55 (4)	17:30	21	16:17 (4)	18:25		19:13 (2)	05:29	04:55
14	08:37	15:26 (5)	07:49	15:59 (4)	06:45		06:30	39	19:52 (2)	21:17	21:57
	16:33	31	15:57 (4)	17:32	15	16:14 (4)	18:27		19:13 (2)	05:27	04:55
15	08:36	15:27 (5)	07:47	16:14 (4)	18:27		06:43	39	19:52 (2)	21:18	21:58
	16:34	32	15:59 (4)	17:34			06:28		19:13 (2)	05:26	04:54
16	08:35	15:27 (5)	07:45		06:40		06:26	39	19:52 (2)	21:20	21:58
	16:36	33	16:00 (4)	17:36			06:25		19:13 (2)	05:24	04:54
17	08:34	15:28 (5)	07:43		06:38		06:23	39	19:52 (2)	21:22	21:59
	16:38	34	16:02 (4)	17:38			06:20		19:12 (2)	05:22	04:54
18	08:33	15:29 (5)	07:41		06:35		06:21	39	19:51 (2)	21:23	21:59
	16:40	36	16:05 (4)	17:40			06:16		19:12 (2)	05:21	04:54
19	08:32	15:31 (5)	07:39		06:33		06:18	38	19:50 (2)	21:25	22:00
	16:41	36	16:07 (4)	17:42			06:16		19:13 (2)	05:19	04:54
20	08:31	15:32 (5)	07:36		06:31		06:18	37	19:50 (2)	21:27	22:00
	16:43	36	16:08 (4)	17:44			06:16		19:13 (2)	05:18	04:54
21	08:30	15:35 (5)	07:34		06:28		06:14	37	19:50 (2)	21:28	22:00
	16:45	35	16:11 (4)	17:46			06:14		19:13 (2)	05:16	04:54
22	08:29	15:44 (4)	07:32	2	17:18 (3)	18:40	06:12	35	19:48 (2)	21:30	22:01
	16:47	28	16:12 (4)	17:48	6	17:19 (3)	18:42		19:13 (2)	05:15	04:55
23	08:27	15:45 (4)	07:30		06:23		06:09	34	19:47 (2)	21:31	22:01
	16:49	30	16:15 (4)	17:50	10	17:22 (3)	18:43		19:14 (2)	05:13	04:55
24	08:26	15:44 (4)	07:28		06:21		06:07	32	19:46 (2)	21:33	22:01
	16:50	33	16:17 (4)	17:52	12	17:24 (3)	18:45		19:15 (2)	05:12	04:55
25	08:24	15:45 (4)	07:25		06:18		06:05	30	19:45 (2)	21:34	22:01
	16:52	34	16:19 (4)	17:54	16	17:26 (3)	18:47		19:46 (2)	05:11	04:55
26	08:23	15:44 (4)	07:23		06:16		06:03	28	19:44 (2)	21:36	22:01
	16:54	37	16:21 (4)	17:56	18	17:28 (3)	18:49		19:18 (2)	05:09	04:56
27	08:22	15:44 (4)	07:21		06:13		06:01	24	19:42 (2)	21:37	22:01
	16:56	39	16:23 (4)	17:58	21	17:31 (3)	18:51		19:20 (2)	05:08	04:56
28	08:20	15:45 (4)	07:18		06:11		05:58	20	19:40 (2)	21:39	22:01
	16:58	40	16:25 (4)	18:00	23	17:32 (3)	18:53		19:22 (2)	05:07	04:57
29	08:18	15:44 (4)			07:08		05:56	16	19:38 (2)	21:40	22:01
	17:00	41	16:25 (4)		19:54		05:52		19:25 (2)	05:06	04:57
30	08:17	15:44 (4)			07:06		05:54	9	19:34 (2)	21:41	22:01
	17:02	41	16:25 (4)		19:56		05:54			05:05	04:58
31	08:15	15:44 (4)			07:04		20:54			21:43	22:00
	17:04	41	16:25 (4)		19:58					05:04	
Potential sun hours	250		273		367		420		494		510
Total, worst case	933		569		142		786				
Sun reduction	0.24		0.23		0.27		0.35				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.66		0.66		0.68		0.66				
Total reduction	0.16		0.15		0.18		0.23				
Total, real	150		88		26		184				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FJ - H166

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	19:14 (2) 19:50 (2)	07:26 19:05	15:21 (4) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	19:14 (2) 19:48 (2)	07:28 19:02	15:20 (4) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	19:14 (2) 19:45 (2)	07:30 19:00	15:19 (4) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	19:15 (2) 19:43 (2)	07:31 18:57	15:18 (4) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	19:16 (2) 19:41 (2)	07:33 18:55	15:17 (4) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	19:17 (2) 19:39 (2)	07:35 18:52	15:17 (4) 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	19:17 (2) 19:35 (2)	07:36 18:50	15:16 (4) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	19:19 (2) 19:33 (2)	07:39 18:48	15:16 (4) 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	19:22 (2) 19:31 (2)	07:41 18:45	15:15 (4) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	18:07 (3) 18:08 (3)	15:16 (4) 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:44 (3) 18:08 (3)	15:16 (4) 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:43 (3) 18:08 (3)	15:16 (4) 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:43 (3) 18:07 (3)	15:16 (4) 16:05
14	05:12 21:51	06:01 20:59	19:32 (2) 19:43 (2)	06:56 19:47	07:50 18:33	15:17 (4) 16:04
15	05:13 21:50	06:03 20:57	19:29 (2) 19:46 (2)	06:58 19:44	07:52 18:31	15:17 (4) 16:05
16	05:14 21:49	06:04 20:55	19:26 (2) 19:42 (2)	06:59 19:42	07:54 18:29	15:17 (4) 16:05
17	05:16 21:47	06:06 20:53	19:24 (2) 19:49 (2)	07:01 19:39	07:55 18:26	15:18 (4) 16:05
18	05:17 21:46	06:08 20:51	19:23 (2) 19:51 (2)	07:03 19:37	07:57 18:24	15:18 (4) 16:05
19	05:18 21:45	06:10 20:48	19:21 (2) 19:51 (2)	07:05 19:34	07:59 18:22	15:19 (4) 16:05
20	05:20 21:44	06:12 20:46	19:20 (2) 19:52 (2)	07:06 19:32	08:01 18:20	15:19 (4) 16:06
21	05:21 21:42	06:13 20:44	19:19 (2) 19:53 (2)	07:08 19:29	08:03 18:17	15:10 (5) 16:06
22	05:23 21:41	06:15 20:42	19:17 (2) 19:53 (2)	07:10 19:27	08:05 18:15	15:08 (5) 16:06
23	05:24 21:39	06:17 20:39	19:17 (2) 19:53 (2)	07:12 19:24	08:07 18:13	15:07 (5) 16:07
24	05:26 21:38	06:19 20:37	19:16 (2) 19:54 (2)	07:13 19:22	08:09 18:11	15:06 (5) 16:07
25	05:27 21:36	06:20 20:35	19:15 (2) 19:53 (2)	07:15 19:19	08:09 17:09	15:06 (5) 16:08
26	05:29 21:35	06:22 20:32	19:15 (2) 19:53 (2)	07:17 19:17	08:11 17:06	15:06 (5) 16:09
27	05:30 21:33	06:24 20:30	19:15 (2) 19:54 (2)	07:19 19:14	08:13 17:04	15:06 (5) 16:10
28	05:32 21:32	06:26 20:28	19:14 (2) 19:53 (2)	07:21 19:12	08:14 17:02	15:06 (5) 16:11
29	05:34 21:30	06:27 20:25	19:14 (2) 19:53 (2)	07:22 19:09	08:16 17:00	15:05 (5) 16:11
30	05:35 21:28	06:29 20:23	19:14 (2) 19:52 (2)	07:24 19:07	08:18 16:58	15:06 (5) 16:12
31	05:37 21:27	06:31 20:21	19:13 (2) 19:51 (2)	07:25 16:56	15:21 (4) 15:50 (4)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		577	217	354	1067	528
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.66	0.66	0.67	0.66	0.66
Total reduction		0.23	0.21	0.20	0.18	0.14
Total, real		131	46	70	187	72

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FK - H167

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44		14:39 (4)	08:14		16:16 (3)	07:16		16:55 (2)	07:01		05:52			05:03		
	16:15	20	14:59 (4)	17:06	18	16:34 (3)	18:02	37	17:32 (2)	20:00		20:55			21:45		
2	08:44		14:40 (4)	08:12		16:16 (3)	07:14		16:54 (2)	06:59		20:50			05:02		
	16:16	20	15:00 (4)	17:08	21	16:37 (3)	18:04	38	17:32 (2)	20:02		20:57			21:46		
3	08:44		14:41 (4)	08:10		16:16 (3)	07:12		16:54 (2)	06:56		20:54			05:01		
	16:17	18	14:59 (4)	17:10	23	16:39 (3)	18:06	38	17:32 (2)	20:04		20:59			21:48		
4	08:43		14:43 (4)	08:08		16:17 (3)	07:09		16:54 (2)	06:54		20:56			05:00		
	16:18	16	14:59 (4)	17:12	23	16:40 (3)	18:07	39	17:33 (2)	20:06		21:01			21:49		
5	08:43		14:43 (4)	08:07		16:17 (3)	07:07		16:53 (2)	06:51		20:54			04:59		
	16:19	15	14:58 (4)	17:14	22	16:39 (3)	18:09	39	17:32 (2)	20:07		21:03			21:50		
6	08:43		14:46 (4)	08:05		16:18 (3)	07:04		16:54 (2)	06:49		20:52			04:58		
	16:21	12	14:58 (4)	17:16	21	16:39 (3)	18:11	38	17:32 (2)	20:09		21:04			21:51		
7	08:42		14:47 (4)	08:03		16:19 (3)	07:02		16:53 (2)	06:47		20:50			04:58		
	16:22	10	14:57 (4)	17:18	19	16:38 (3)	18:13	38	17:31 (2)	20:11		21:06			21:52		
8	08:42		14:50 (4)	08:01		16:20 (3)	07:00		16:54 (2)	06:44		20:53			04:57		
	16:24	5	14:55 (4)	17:20	17	16:37 (3)	18:15	37	17:31 (2)	20:13		21:08			21:53		
9	08:41			07:59		16:21 (3)	06:57		16:54 (2)	06:42		20:56			04:57		
	16:25			17:22	15	16:36 (3)	18:17	36	17:30 (2)	20:15		21:10			21:54		
10	08:40			07:57		16:24 (3)	06:55		16:55 (2)	06:39		20:54			04:56		
	16:26			17:24	10	16:34 (3)	18:19	34	17:29 (2)	20:17		21:11			21:55		
11	08:40			07:55			06:53		16:56 (2)	06:37		20:53			04:56		
	16:28			17:26			18:21	32	17:28 (2)	20:19		21:13			21:55		
12	08:39			07:53			06:50		16:56 (2)	06:35		20:51			04:55		
	16:30			17:28			18:23	30	17:26 (2)	20:20		21:15			21:56		
13	08:38			07:51			06:48		16:58 (2)	06:32		20:52			04:55		
	16:31			17:30			18:25	27	17:25 (2)	20:22		21:17			21:57		
14	08:37			07:49			06:45		16:59 (2)	06:30		20:52			04:55		
	16:33			17:32			18:27	24	17:23 (2)	20:24		21:18			21:58		
15	08:36			07:47			06:43		17:01 (2)	06:28		20:52			04:54		
	16:34			17:34			18:28	20	17:21 (2)	20:26		21:20			21:58		
16	08:35			07:45			06:40		17:04 (2)	06:25		20:54			04:54		
	16:36			17:36			18:30	13	17:17 (2)	20:28		21:22			21:59		
17	08:34			07:43			06:38			06:23		20:52			04:54		
	16:38			17:38			18:32			20:30		21:23			21:59		
18	08:33			07:41			06:35			06:21		20:51			04:54		
	16:40			17:40			18:34			20:31		21:25			22:00		
19	08:32			07:39			06:33			06:18		20:51			04:54		
	16:41			17:42			18:36			20:33		21:27			22:00		
20	08:31			07:36		17:12 (2)	06:31			06:16		20:51			04:54		
	16:43			17:44	4	17:16 (2)	18:38			20:35		21:28			22:00		
21	08:30			07:34		17:07 (2)	06:28			06:14		20:51			04:54		
	16:45			17:46	11	17:18 (2)	18:40			20:37		21:30			22:01		
22	08:29			07:32		17:04 (2)	06:26			06:12		20:51			04:55		
	16:47			17:48	15	17:19 (2)	18:42			20:39		21:31			22:01		
23	08:27			07:30		17:02 (2)	06:23			06:09		20:51			04:55		
	16:49			17:50	20	17:22 (2)	18:43			20:41		21:33			22:01		
24	08:26			07:28		17:01 (2)	06:21			06:07		20:52			04:55		
	16:50			17:52	23	17:24 (2)	18:45			20:43		21:34			22:01		
25	08:24		16:18 (3)	07:25		16:59 (2)	06:18			06:05		20:51			04:55		
	16:52	1	16:19 (3)	17:54	27	17:26 (2)	18:47			20:44		21:36			22:01		
26	08:23		16:17 (3)	07:23		16:58 (2)	06:16			06:03		20:50			04:56		
	16:54	4	16:21 (3)	17:56	30	17:28 (2)	18:49			20:46		21:37			22:01		
27	08:22		16:16 (3)	07:21		16:57 (2)	06:13			06:01		20:50			04:56		
	16:56	7	16:23 (3)	17:58	34	17:31 (2)	18:51			20:48		21:39			22:01		
28	08:20		16:16 (3)	07:18		16:56 (2)	06:11			05:58		20:50			04:57		
	16:58	10	16:26 (3)	18:00	36	17:32 (2)	18:53			20:50		21:40			22:01		
29	08:19		16:16 (3)				07:08			05:56		20:56			04:57		
	17:00	12	16:28 (3)				19:54			20:52		21:41			22:01		
30	08:17		16:15 (3)				07:06			05:54		20:55			04:58		
	17:02	14	16:29 (3)				19:56			20:54		21:43			22:00		
31	08:15		16:15 (3)				07:04					20:54					
	17:04	16	16:31 (3)				19:58					21:44					
Potential sun hours		250			273		367			420		494			510		
Total, worst case		180			389		520										
Sun reduction		0.24			0.23		0.27										
Oper. time red.		1.00			1.00		1.00										
Wind dir. red.		0.65			0.67		0.68										
Total reduction		0.16			0.16		0.18										
Total, real		29			60		95										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FK - H167

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:35 (2) 18:05 (2)	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:34 (2) 18:06 (2)	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:33 (2) 18:07 (2)	07:28 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:32 (2) 18:07 (2)	07:30 16:48
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:31 (2) 18:08 (2)	07:32 16:46
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:30 (2) 18:08 (2)	07:34 16:44
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:29 (2) 18:07 (2)	07:36 16:43
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:29 (2) 18:07 (2)	07:38 16:41
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:28 (2) 18:07 (2)	07:40 16:39
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:28 (2) 18:07 (2)	07:42 16:37
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:28 (2) 18:06 (2)	07:44 16:35
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:28 (2) 18:06 (2)	07:45 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:29 (2) 18:05 (2)	07:47 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:29 (2) 18:04 (2)	07:49 16:31
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:30 (2) 18:02 (2)	07:51 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:30 (2) 17:59 (2)	07:53 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:31 (2) 17:57 (2)	07:55 16:26
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:32 (2) 17:55 (2)	07:57 16:24
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:34 (2) 17:52 (2)	07:59 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:36 (2) 17:50 (2)	08:00 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:38 (2) 17:48 (2)	08:02 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:04 16:06
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:06 16:07
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:06	08:11 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	07:18 18:03 (2)	08:16 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 18:04 (2)	08:18 16:11	08:44 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56	15:57 (3) 15:58 (3)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case			78	660	253	576
Sun reduction			0.32	0.29	0.27	0.21
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.68	0.68	0.66	0.65
Total reduction			0.22	0.20	0.18	0.13
Total, real			17	130	44	77

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FL - H168

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	15:22 (3) 08:14	15:43 (2) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:10 (3)
2	16:15	15:37 (3) 17:06	16:08 (2) 18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	15:34 (2)
3	08:44	15:23 (3) 08:12	15:44 (2) 07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	15:09 (3)
4	16:16	15:38 (3) 17:08	16:07 (2) 18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	15:32 (2)
5	08:44	15:23 (3) 08:10	15:45 (2) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	15:10 (3)
6	16:17	15:39 (3) 17:10	16:06 (2) 18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	15:32 (2)
7	08:43	15:24 (3) 08:08	15:46 (2) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	15:10 (3)
8	16:18	15:41 (3) 17:12	16:05 (2) 18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	15:32 (2)
9	08:43	15:24 (3) 08:07	15:48 (2) 07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	15:10 (3)
10	16:19	15:42 (3) 17:14	16:03 (2) 18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:10	15:29 (3)
11	08:43	15:25 (3) 08:05	15:51 (2) 07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	15:11 (3)
12	16:21	15:44 (3) 17:16	16:01 (2) 18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:10	15:30 (3)
13	08:42	15:25 (3) 08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	15:11 (3)
14	16:22	15:44 (3) 17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:10	15:29 (3)
15	08:42	15:25 (3) 08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	15:11 (3)
16	16:23	15:46 (2) 17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:10	15:28 (3)
17	08:41	15:27 (3) 07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	15:12 (3)
18	16:25	15:49 (2) 17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:10	15:28 (3)
19	08:40	15:27 (3) 07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	15:12 (3)
20	16:26	15:50 (2) 17:24	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	16:10	15:28 (3)
21	08:40	15:28 (3) 07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33	15:12 (3)
22	16:28	15:52 (2) 17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:10	15:27 (3)
23	08:39	15:29 (3) 07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	15:13 (3)
24	16:29	15:54 (2) 17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:10	15:27 (3)
25	08:38	15:29 (3) 07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	15:13 (3)
26	16:31	15:55 (2) 17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:10	15:26 (3)
27	08:37	15:31 (3) 07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	15:13 (3)
28	16:33	15:57 (2) 17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:10	15:26 (3)
29	08:36	15:32 (3) 07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37	15:14 (3)
30	16:34	15:59 (2) 17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:10	15:26 (3)
31	08:35	15:33 (3) 07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	15:15 (3)
32	16:36	16:00 (2) 17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:10	15:26 (3)
33	08:34	15:35 (3) 07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:38	15:15 (3)
34	16:38	16:02 (2) 17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:10	15:27 (3)
35	08:33	15:39 (2) 07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	15:16 (3)
36	16:40	16:04 (2) 17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:10	15:27 (3)
37	08:32	15:39 (2) 07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	15:17 (3)
38	16:41	16:05 (2) 17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:10	15:28 (3)
39	08:31	15:38 (2) 07:36	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	08:41	15:17 (3)
40	16:43	16:06 (2) 17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:10	15:27 (3)
41	08:30	15:38 (2) 07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	15:18 (3)
42	16:45	16:07 (2) 17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:10	15:28 (3)
43	08:29	15:38 (2) 07:32	06:26	06:11	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42	15:18 (3)
44	16:47	16:07 (2) 17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:10	15:28 (3)
45	08:27	15:39 (2) 07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	15:19 (3)
46	16:49	16:08 (2) 17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:10	15:29 (3)
47	08:26	15:38 (2) 07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43	15:19 (3)
48	16:50	16:07 (2) 17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:10	15:29 (3)
49	08:25	15:39 (2) 07:25	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09	08:43	15:19 (3)
50	16:52	16:08 (2) 17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	16:10	15:30 (3)
51	08:23	15:39 (2) 07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43	15:19 (3)
52	16:54	16:08 (2) 17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	16:10	15:30 (3)
53	08:22	15:39 (2) 07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:44	15:20 (3)
54	16:56	16:08 (2) 17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:10	15:32 (3)
55	08:20	15:40 (2) 07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	08:44	15:21 (3)
56	16:58	16:09 (2) 18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16:10	15:33 (3)
57	08:19	15:40 (2)	07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	08:44	15:21 (3)
58	17:00	16:08 (2)	19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	16:10	15:34 (3)
59	08:17	15:41 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44	15:22 (3)
60	17:02	16:08 (2)	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:10	15:35 (3)
61	08:15	15:41 (2)	07:04	05:04	05:04	05:04	05:37	06:31	07:22	07:22	08:20	08:44	15:21 (3)
62	17:04	16:07 (2)	19:58	21:44	21:44	21:44	21:27	20:21	19:07	16:56	16:11	16:10	15:35 (3)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case	759	113									668		444
Sun reduction	0.24	0.23									0.27		0.21
Oper. time red.	1.00	1.00									1.00		1.00
Wind dir. red.	0.66	0.66									0.66		0.66
Total reduction	0.16	0.15									0.18		0.14
Total, real	122	17									117		60

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

6918 Kellystown

5 no. turbine Wind Farm, Co. Louth

Jennings O'Donovan

F91 RHH9 Sligo

+353719161416

Kathlyn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** FM - H169

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December			
1	08:44		10:02 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24				06:33	07:26	07:24				08:19	09:51 (2)		
	16:15	75	15:21 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54				20:18	19:05	16:54				16:10	70	15:07 (1)	
2	08:44		10:03 (2)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26				06:35	07:28	07:26				08:21		09:51 (2)	
	16:16	75	15:22 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52				20:16	19:02	16:52				16:09	71	15:08 (1)	
3	08:44		10:03 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28				06:36	07:30	07:28				08:22		09:51 (2)	
	16:17	74	15:21 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50				20:14	19:00	16:50				16:08	71	15:08 (1)	
4	08:43		10:04 (2)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30				05:44	06:38	07:32				08:24		09:51 (2)	
	16:18	74	15:22 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48				20:11	18:57	16:48				16:08	73	15:09 (1)	
5	08:43		10:04 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32				05:02	05:45	06:40				08:25		09:51 (2)	
	16:20	74	15:22 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46				21:17	20:09	18:55				16:07	73	15:09 (1)	
6	08:43		10:05 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34				05:03	05:47	06:42				08:27		09:51 (2)	
	16:21	73	15:23 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44				21:16	20:06	18:52				16:07	74	15:09 (1)	
7	08:42		10:06 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				05:04	05:49	06:43				08:28		09:51 (2)	
	16:22	72	15:23 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43				21:14	20:04	18:50				16:06	74	15:09 (1)	
8	08:42		10:06 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38				05:05	05:51	06:45				08:29		09:52 (2)	
	16:24	73	15:24 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41				21:12	20:01	18:48				16:06	74	15:10 (1)	
9	08:41		10:07 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40				05:06	05:52	06:47				08:30		09:52 (2)	
	16:25	72	15:25 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39				21:10	19:59	18:45				16:05	75	15:11 (1)	
10	08:40		10:08 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42				05:07	05:54	06:49				08:32		09:52 (2)	
	16:27	71	15:25 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37				21:08	19:56	18:43				16:05	75	15:11 (1)	
11	08:40		10:09 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44				05:08	05:56	06:51				08:33		09:52 (2)	
	16:28	70	15:25 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36				21:06	19:54	18:41				16:05	75	15:11 (1)	
12	08:39		10:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46				05:09	05:58	06:52				08:34		09:52 (2)	
	16:30	69	15:25 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34				21:03	19:52	18:38				16:05	75	15:11 (1)	
13	08:38		10:10 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47				05:11	05:59	06:54				08:35		09:54 (2)	
	16:31	68	15:25 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32				21:01	19:49	18:36				16:05	75	15:12 (1)	
14	08:37		10:11 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49				05:12	06:01	06:56				08:36		09:54 (2)	
	16:33	66	15:26 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31				20:59	19:47	18:33				16:05	75	15:13 (1)	
15	08:36		10:13 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51				06:03	06:58	07:52				08:37		09:54 (2)	
	16:34	63	15:26 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29				20:57	19:44	18:31				16:05	76	15:13 (1)	
16	08:35		10:14 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53				06:05	06:59	07:54			14:42 (1)	08:38		09:54 (2)	
	16:36	61	15:26 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27				20:55	19:42	18:29			8	14:50 (1)	16:05	75	15:13 (1)
17	08:34		10:14 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55				06:06	07:01	07:56				14:39 (1)	08:39		09:55 (2)
	16:38	59	15:25 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26				20:53	19:39	18:27			14	14:53 (1)	16:05	74	15:13 (1)
18	08:33		10:16 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57				06:08	07:03	07:57				14:37 (1)	08:39		09:55 (2)
	16:40	55	15:25 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25				20:51	19:37	18:24			18	14:55 (1)	16:05	76	15:14 (1)
19	08:32		10:18 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59				06:10	07:05	07:59				14:36 (1)	08:40		09:56 (2)
	16:41	52	15:25 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23				20:48	19:34	18:22			21	14:57 (1)	16:05	75	15:15 (1)
20	08:31		10:19 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01				06:12	07:06	08:01				09:59 (2)	08:41		09:56 (2)
	16:43	47	15:24 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22				20:46	19:32	18:20			34	14:58 (1)	16:06	75	15:15 (1)
21	08:30		10:21 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02				06:13	07:08	08:03				09:56 (2)	08:41		09:57 (2)
	16:45	42	15:24 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20				20:44	19:29	18:17			42	14:59 (1)	16:06	75	15:16 (1)
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	16:47	34	15:23 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19				20:42	19:27	18:15			47	15:00 (1)	16:06	75	15:16 (1)
23	08:27		15:02 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06				06:17	07:12	08:07				09:54 (2)	08:42		09:58 (2)
	16:49	21	15:23 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18				20:39	19:24	18:13			52	15:01 (1)	16:07	75	15:17 (1)
24	08:26		15:03 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08				06:19	07:14	08:09				09:53 (2)	08:43		09:58 (2)
	16:51	18	15:21 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17				20:37	19:22	18:11			55	15:02 (1)	16:08	75	15:17 (1)
25	08:25		15:06 (1)	07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09				06:20	07:15	07:11				09:52 (2)	08:43		09:58 (2)
	16:52	14	15:20 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16				20:35	19:19	17:09			59	15:03 (1)	16:08	76	15:17 (1)
26	08:23		15:09 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11				06:22	07:17	07:13				09:52 (2)	08:43		09:59 (2)
	16:54	8	15:17 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15				20:32	19:17	17:07			61	15:04 (1)	16:09	75	15:18 (1)
27	08:22			07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13				06:24	07:19	07:15				09:52 (2)	08:44		10:00 (2)
	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13				20:30	19:14	17:04			63	15:05 (1)	16:10	75	15:19 (1)
28	08:20			07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14				06:26	07:21	07:17							

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

Project: **6918 Kellystown**
Description: **5 no. turbine Wind Farm, Co. Louth**

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FN - H170

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:11 (3)	08:14		15:27 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24						08:19		15:01 (3)	
	16:15	26	15:37 (2)	17:06	28	15:55 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54						16:10	30	15:31 (2)	
2	08:44		15:12 (3)	08:12		15:28 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26						08:21		15:00 (3)	
	16:16	27	15:39 (2)	17:08	26	15:54 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52						16:09	31	15:31 (2)	
3	08:44		15:12 (3)	08:10		15:30 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28						08:22		15:00 (3)	
	16:17	27	15:39 (2)	17:10	23	15:53 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50						16:08	31	15:31 (2)	
4	08:43		15:13 (3)	08:08		15:31 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30						08:24		15:01 (3)	
	16:18	28	15:41 (2)	17:12	21	15:52 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48						16:08	30	15:31 (2)	
5	08:43		15:13 (3)	08:07		15:34 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32				15:06 (2)		08:25		15:00 (3)	
	16:19	29	15:42 (2)	17:14	16	15:50 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	11			15:17 (2)		16:07	30	15:30 (2)	
6	08:43		15:15 (3)	08:05		15:37 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34				15:03 (2)		08:26		15:01 (3)	
	16:21	29	15:44 (2)	17:16	10	15:47 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	17			15:20 (2)		16:07	29	15:30 (2)	
7	08:42		15:15 (3)	08:03		15:40 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36				15:01 (2)		08:28		15:00 (3)	
	16:22	30	15:45 (2)	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:22 (2)			15:22 (2)		16:06	29	15:29 (2)	
8	08:42		15:15 (3)	08:01		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	24	15:23 (2)			14:59 (2)		08:29		15:00 (3)	
	16:24	31	15:46 (2)	17:20		18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	26	15:25 (2)			14:59 (2)		08:30		15:01 (3)	
9	08:41		15:17 (3)	07:59		18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	26	15:25 (2)			14:58 (2)		08:32		15:01 (3)	
	16:25	31	15:48 (2)	17:22		18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	28	15:26 (2)			14:58 (2)		08:32		15:01 (3)	
10	08:40		15:18 (3)	07:57		18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	28	15:26 (2)			14:57 (2)		08:33		15:01 (3)	
	16:26	30	15:48 (2)	17:24		18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	30	15:27 (2)			14:56 (2)		08:34		15:01 (3)	
11	08:40		15:19 (3)	07:55		18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	30	15:27 (2)			14:55 (2)		08:35		15:02 (3)	
	16:28	30	15:49 (2)	17:26		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	30	15:27 (2)			14:56 (2)		08:35		15:02 (3)	
12	08:39		15:20 (2)	07:53		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	30	15:27 (2)			14:56 (2)		08:35		15:02 (3)	
	16:30	30	15:50 (2)	17:28		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	32	15:28 (2)			14:56 (2)		08:36		15:03 (3)	
13	08:38		15:20 (2)	07:51		18:27	20:24	21:18	21:58	21:51	21:01	19:47	18:33	16:31	32	15:28 (2)			14:56 (2)		08:36		15:03 (3)	
	16:31	31	15:51 (2)	17:30		18:27	20:24	21:18	21:58	21:51	21:01	19:47	18:33	16:31	32	15:28 (2)			14:56 (2)		08:37		15:03 (3)	
14	08:37		15:20 (2)	07:49		18:28	20:26	21:20	21:58	21:50	21:05	19:54	18:31	16:29	33	15:29 (2)			14:55 (2)		08:38		15:03 (3)	
	16:33	32	15:52 (2)	17:32		18:30	20:28	21:22	21:59	21:49	21:05	19:52	18:39	16:27	34	15:29 (2)			14:55 (2)		08:38		15:03 (3)	
15	08:36		15:21 (2)	07:47		18:30	20:28	21:22	21:59	21:49	21:05	19:52	18:39	16:27	34	15:29 (2)			14:55 (2)		08:39		15:04 (3)	
	16:34	31	15:52 (2)	17:34		18:32	20:30	21:23	21:59	21:47	21:03	19:53	18:26	16:26	35	15:30 (2)			14:55 (2)		08:39		15:04 (3)	
16	08:35		15:20 (2)	07:45		18:32	20:30	21:23	21:59	21:47	21:03	19:53	18:26	16:26	35	15:30 (2)			14:55 (2)		08:39		15:04 (3)	
	16:36	32	15:52 (2)	17:36		18:33	20:31	21:25	22:00	21:46	21:05	19:37	18:24	16:24	35	15:30 (2)			14:56 (2)		08:40		15:05 (3)	
17	08:34		15:20 (2)	07:43		18:34	20:31	21:25	22:00	21:46	21:05	19:37	18:24	16:24	35	15:30 (2)			14:56 (2)		08:40		15:05 (3)	
	16:38	33	15:53 (2)	17:38		18:36	20:33	21:27	22:00	21:45	21:08	19:34	18:22	16:23	34	15:30 (2)			14:56 (2)		08:41		15:05 (3)	
18	08:33		15:20 (2)	07:41		18:36	20:33	21:27	22:00	21:45	21:08	19:34	18:22	16:23	34	15:30 (2)			14:56 (2)		08:41		15:05 (3)	
	16:40	34	15:54 (2)	17:40		18:38	20:35	21:28	22:00	21:44	21:06	19:32	18:20	16:22	34	15:30 (2)			14:56 (2)		08:41		15:05 (3)	
19	08:32		15:21 (2)	07:39		18:38	20:35	21:28	22:00	21:44	21:06	19:32	18:20	16:22	34	15:30 (2)			14:56 (2)		08:41		15:05 (3)	
	16:41	34	15:55 (2)	17:42		18:40	20:37	21:30	22:01	21:42	21:04	19:29	18:17	16:20	35	15:31 (2)			14:56 (2)		08:42		15:06 (3)	
20	08:31		15:20 (2)	07:36		18:42	20:39	21:31	22:01	21:41	21:04	19:29	18:17	16:20	35	15:31 (2)			14:56 (2)		08:42		15:06 (3)	
	16:43	35	15:55 (2)	17:44		18:42	20:39	21:31	22:01	21:41	21:04	19:29	18:17	16:20	35	15:31 (2)			14:56 (2)		08:42		15:06 (3)	
21	08:30		15:21 (2)	07:34		18:42	20:39	21:31	22:01	21:41	21:04	19:29	18:17	16:20	35	15:31 (2)			14:56 (2)		08:42		15:06 (3)	
	16:45	35	15:56 (2)	17:46		18:42	20:39	21:31	22:01	21:41	21:04	19:29	18:17	16:20	35	15:31 (2)			14:56 (2)		08:42		15:06 (3)	
22	08:29		15:21 (2)	07:32		18:42	20:39	21:31	22:01	21:41	21:04	19:29	18:17	16:20	35	15:31 (2)			14:56 (2)		08:42		15:06 (3)	
	16:47	34	15:55 (2)	17:48		18:42	20:39	21:31	22:01	21:41	21:04	19:29	18:17	16:20	35	15:31 (2)			14:56 (2)		08:42		15:06 (3)	
23	08:27		15:22 (2)	07:30		18:42	20:39	21:31	22:01	21:41	21:04	19:29	18:17	16:20	35	15:31 (2)			14:56 (2)		08:42		15:06 (3)	
	16:49	34	15:56 (2)	17:50		18:43	20:41	21:33	22:01	21:39	21:24	20:39	19:24	18:13	16:18	34	15:31 (2)			14:57 (2)		08:42		15:07 (3)
24	08:26		15:21 (2)	07:28		18:43	20:41	21:33	22:01	21:39	21:24	20:39	19:24	18:13	16:18	34	15:31 (2)			14:57 (2)		08:42		15:07 (3)
	16:50	35	15:56 (2)	17:52		18:44	20:42	21:34	22:01	21:38	22:01	21:36	20:20	19:09	16:08	33	15:31 (2)			14:58 (2)		08:43		15:07 (3)
25	08:25		15:22 (2)	07:25		18:45	20:43	21:34	22:01	21:38	22:01	21:36	20:20	19:09	16:08	33	15:31 (2)			14:58 (2)		08:43		15:07 (3)
	16:52	35	15:57 (2)	17:54		18:45	20:43	21:34	22:01	21:38	22:01	21:36	20:20	19:09	16:08	33	15:31 (2)			14:58 (2)		08:43		15:07 (3)
26	08:23		15:22 (2)	07:23		18:45	20:43	21:34	22:01	21:38	22:01	21:36	20:20	19:09	16:08	33	15:31 (2)			14:58 (2)		08:43		15:07 (3)
	16:54	34	15:56 (2)	17:56		18:46	20:44	21:35	22:01	21:39	22:01	21:37	20:21	19:10	16:09	33	15:31 (2)			14:59 (2)		08:43		15:08 (3)
27	08:22		15:23 (2)	07:21		18:46	20:44	21:35	22:01	21:39	22:01	21:37	20:21	19:10	16:09	33	15:31 (2)			14:59 (2)		08:43		15:08 (3)
	16:56	33	15:56 (2)	17:58		18:49	20:46	21:37	22:01	21:35	22:01	21:35	20:21	19:10	16:09	33	15:31 (2)			14:59 (2)		08:43		15:08 (3)
28	08:20		15:24 (2)	07:19		18:49	20:46	21:37	22:01	21:35	22:01	21:35	20:21	19:10	16:09	33	15:31 (2)			14:59 (2)		08:43		15:08 (3)
	16:58	33	15:57 (2)	18:00		18:51	20:48	21:39	22:01	21:33	22:01	21:33	20:20	19:14	17:04	32	15:32 (2)			15:01 (2)		08:44		15:09 (3)
29	08:19		15:24 (2)			18:51	20:48	21:39	22:01	21:33	22:01	21:33	20:20	19:14	17:04	32	15:32 (2)			15:01 (2)		08:44		15:09 (3)
	16:58	33	15:57 (2)			18:53	20:50	21:40	22:01	21:32	22:01	21:32	20:20	19:12	17:02	31	15:32 (2)			15:01 (2)		08:44		15:09 (3)
30	08:17		15:25 (2)																					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FO - H171

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		14:59 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19										
	16:15	17	15:16 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10										
2	08:44		15:00 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21										
	16:16	17	15:17 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09										
3	08:44		15:00 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22									14:52 (2)	
	16:17	16	15:16 (2)	17:10	18:05	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08								5	14:57 (2)	
4	08:43		15:02 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24									14:51 (2)	
	16:18	15	15:17 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08								9	15:00 (2)	
5	08:43		15:02 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25									14:50 (2)	
	16:19	14	15:16 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07								11	15:01 (2)	
6	08:43		15:04 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26									14:50 (2)	
	16:21	13	15:17 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:06								13	15:03 (2)	
7	08:42		15:05 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28									14:49 (2)	
	16:22	11	15:16 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:42	16:06								14	15:03 (2)	
8	08:42		15:06 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29									14:49 (2)	
	16:23	9	15:15 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06								15	15:04 (2)	
9	08:41		15:09 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30									14:49 (2)	
	16:25	6	15:15 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05								16	15:05 (2)	
10	08:40			07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32									14:49 (2)	
	16:26			17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05								17	15:06 (2)	
11	08:40			07:55	06:52	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33									14:49 (2)	
	16:28			17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05								17	15:06 (2)	
12	08:39			07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34									14:49 (2)	
	16:29			17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05								18	15:07 (2)	
13	08:38			07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35									14:50 (2)	
	16:31			17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04								18	15:08 (2)	
14	08:37			07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36									14:51 (2)	
	16:33			17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04								18	15:09 (2)	
15	08:36			07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:57	07:52	07:51	08:37									14:50 (2)	
	16:34			17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04								19	15:09 (2)	
16	08:35			07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38									14:50 (2)	
	16:36			17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05								19	15:09 (2)	
17	08:34			07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39									14:51 (2)	
	16:38			17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05								19	15:10 (2)	
18	08:33			07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39									14:52 (2)	
	16:39			17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05								19	15:11 (2)	
19	08:32			07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40									14:52 (2)	
	16:41			17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05								19	15:11 (2)	
20	08:31			07:36	06:31	06:16	05:17	04:54	05:20	06:11	07:06	08:01	08:00	08:41									14:52 (2)	
	16:43			17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05								19	15:11 (2)	
21	08:30			07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41									14:53 (2)	
	16:45			17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06								19	15:12 (2)	
22	08:29			07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42									14:53 (2)	
	16:47			17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06								19	15:12 (2)	
23	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42									14:54 (2)	
	16:49			17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07								19	15:13 (2)	
24	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43									14:54 (2)	
	16:50			17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07								19	15:13 (2)	
25	08:25			07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	07:11	08:09	08:43									14:54 (2)	
	16:52			17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:15	16:08								20	15:14 (2)	
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43									14:56 (2)	
	16:54			17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	16:09								19	15:15 (2)	
27	08:22			07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:44									14:56 (2)	
	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:10								19	15:15 (2)	
28	08:20			07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	08:44									14:57 (2)	
	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16:10								18	15:15 (2)	
29	08:19				07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	08:44									14:57 (2)	
	17:00				19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	16:11								19	15:16 (2)	
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44									14:58 (2)	
	17:02				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:12								18	15:16 (2)	

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** FP - H172

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours), [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

			January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44		14:56 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	14	15:10 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44		14:57 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	
	16:16	13	15:10 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:44		14:58 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	
	16:17	11	15:09 (2)	17:10	18:05	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	
4	08:43		14:59 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	
	16:18	10	15:09 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43		15:01 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	
	16:19	7	15:08 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	
6	08:43		15:03 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	14:50 (2)
	16:21	5	15:08 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:06	3 14:53 (2)
7	08:42			08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	14:48 (2)
	16:22			17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:42	16:06	7 14:55 (2)
8	08:42			08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	14:47 (2)
	16:23			17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	9 14:56 (2)
9	08:41			07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	14:47 (2)
	16:25			17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	11 14:58 (2)
10	08:40			07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	14:46 (2)
	16:26			17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	13 14:59 (2)
11	08:40			07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33	14:46 (2)
	16:28			17:26	18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	16:05	14 15:00 (2)
12	08:39			07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	14:46 (2)
	16:29			17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	14 15:00 (2)
13	08:38			07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	14:47 (2)
	16:31			17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04	15 15:02 (2)
14	08:37			07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	14:47 (2)
	16:33			17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04	16 15:03 (2)
15	08:36			07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37	14:46 (2)
	16:34			17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	16 15:02 (2)
16	08:35			07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	14:47 (2)
	16:36			17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	16 15:03 (2)
17	08:34			07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39	14:47 (2)
	16:38			17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05	17 15:04 (2)
18	08:33			07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	14:48 (2)
	16:39			17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05	17 15:05 (2)
19	08:32			07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	14:49 (2)
	16:41			17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	17 15:06 (2)
20	08:31			07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00	08:41	14:48 (2)
	16:43			17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05	18 15:06 (2)
21	08:30			07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	14:49 (2)
	16:45			17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	17 15:06 (2)
22	08:29			07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42	14:49 (2)
	16:47			17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06	17 15:06 (2)
23	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	14:50 (2)
	16:49			17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07	17 15:07 (2)
24	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43	14:50 (2)
	16:50			17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07	18 15:08 (2)
25	08:25			07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	07:11	08:09	08:43	14:51 (2)
	16:52			17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:15	16:08	17 15:08 (2)
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43	14:52 (2)
	16:54			17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	16:09	17 15:09 (2)
27	08:22			07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:44	14:53 (2)
	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:10	16 15:09 (2)
28	08:20			07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	08:44	14:53 (2)
	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16:10	16 15:09 (2)
29	08:19				07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	08:44	14:54 (2)
	17:00				19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	16:11	16 15:10 (2)
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44	14:55 (2)
	17:02				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:12	15 15:10 (2)
31	08:15				07:04		05:04		05:37	06:31		07:22		08:44	14:55 (2)
	17:04				19:58		21:44		21:27	20:21		16:56		16:13	14 15:09 (2)
Potential sun hours	250			273	367	420	494	510	512	460	382	328	259	233	
Total, worst case		60													383
Sun reduction		0.24													0.21
Oper. time red.		1.00													1.00
Wind dir. red.		0.65													0.65
Total reduction		0.16													0.13
Total, real		9													51

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker (WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker (WTG causing flicker last time)
	Minutes with flicker	

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FQ - H173

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February	March	April	May	June	July	August	September	October	November	December
1	08:44	14:56 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
	16:15	10	15:06 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	19:05	16:10
2	08:44	14:58 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	08:21
	16:16	8	15:06 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	19:02	16:09
3	08:44	14:59 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	08:22
	16:17	5	15:04 (2)	17:10	18:05	20:04	20:59	21:48	21:59	21:21	19:00	16:08
4	08:43		08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	08:24
	16:18		17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:08
5	08:43		08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	08:25
	16:19		17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:07
6	08:43		08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	08:26
	16:21		17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:06
7	08:42		08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	08:28
	16:22		17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:06
8	08:42		08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	08:29
	16:23		17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:06
9	08:41		07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
	16:25		17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:05
10	08:40		07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	08:32
	16:26		17:24	18:19	20:17	21:12	21:55	21:58	21:08	19:56	18:43	16:05
11	08:40		07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	08:33
	16:28		17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:05
12	08:39		07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	08:34
	16:29		17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:05
13	08:38		07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	08:35
	16:31		17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:04
14	08:37		07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36
	16:33		17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:04
15	08:36		07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	08:37
	16:34		17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:04
16	08:35		07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	08:38
	16:36		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05
17	08:34		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	08:39
	16:38		17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:05
18	08:33		07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39
	16:39		17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:05
19	08:32		07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:40
	16:41		17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:05
20	08:31		07:36	06:31	06:16	05:17	04:54	05:20	06:11	07:06	08:01	08:41
	16:43		17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:05
21	08:30		07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:41
	16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:06
22	08:29		07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:42
	16:47		17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19
23	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42
	16:49		17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:07
24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:43
	16:50		17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:07
25	08:25		07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	07:11	08:09
	16:52		17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:08
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11
	16:54		17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14
27	08:22		07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13
	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13
28	08:20		07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14
	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:10
29	08:19			07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16
	17:00			19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18
	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11
31	08:15			07:04		05:04		05:37	06:31		07:22	
	17:04			19:58		21:44		21:27	20:21		16:56	
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259
Total, worst case		23										
Sun reduction		0.24										
Oper. time red.		1.00										
Wind dir. red.		0.65										
Total reduction		0.16										
Total, real		4										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FR - H174

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10	
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	
3	08:44 16:17	08:10 17:10	07:12 18:05	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08	
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08	
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07	
6	08:43 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:58 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:06	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:42	08:28 16:06	
8	08:42 16:23	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06	
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05	
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:32 16:05	
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:32 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:50 19:54	07:44 18:40	07:44 16:35	08:33 16:05	
12	08:39 16:29	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	07:46 16:34	08:34 16:05	
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:04	
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:30	08:36 16:04	14:47 (2)
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:25 21:20	04:54 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:04	3 14:50 (2)
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:38 16:05	5 14:51 (2)
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:39 16:05	7 14:52 (2)
18	08:33 16:39	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:24	08:39 16:05	7 14:53 (2)
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05	8 14:54 (2)
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:17 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:05	9 14:55 (2)
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06	9 14:56 (2)
22	08:29 16:47	07:32 17:48	06:26 18:42	06:11 20:39	05:15 21:31	04:54 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06	9 14:57 (2)
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07	9 14:58 (2)
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:08 16:17	08:43 16:07	9 14:59 (2)
25	08:25 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:10 21:36	04:55 22:01	05:27 21:36	06:20 20:35	07:15 19:19	08:11 17:09	08:09 16:15	08:43 16:08	8 14:50 (2)
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	08:13 17:06	08:11 16:14	08:43 16:09	8 14:51 (2)
27	08:22 16:56	07:21 17:58	06:13 18:51	06:00 20:48	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	07:19 19:14	08:15 17:04	08:13 16:13	08:44 16:10	7 14:52 (2)
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	08:14 17:02	08:14 16:12	08:44 16:10	6 14:53 (2)
29	08:19 17:00		07:08 19:54	05:56 20:52	05:06 21:41	04:57 22:01	05:34 21:30	06:27 20:25	07:22 19:09	08:16 17:00	08:16 16:11	08:44 16:11	4 14:54 (2)
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	08:18 16:58	08:18 16:11	08:44 16:12	
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:13	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	117
Total, worst case													0.21
Sun reduction													1.00
Oper. time red.													0.65
Wind dir. red.													0.13
Total reduction													16
Total, real													

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FS - H175

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:23 (5)	07:16	17:02 (4)	07:01		05:52	05:03		
	16:15	17:06	11 16:34 (5)	18:02	19 17:21 (4)	20:00		20:55	21:45		
2	08:44	08:12	16:24 (5)	07:14	17:03 (4)	06:59		05:50	05:02		
	16:16	17:08	13 16:37 (5)	18:04	15 17:18 (4)	20:02		20:57	21:46		
3	08:43	08:10	16:24 (5)	07:11	17:06 (4)	06:56		19:33 (2)	05:48	05:01	
	16:17	17:10	15 16:39 (5)	18:05	10 17:16 (4)	20:04	4	19:37 (2)	20:59	21:48	
4	08:43	08:08	16:24 (5)	07:09		06:54		19:31 (2)	05:46	05:00	
	16:18	17:12	17 16:41 (5)	18:07		20:06	8	19:39 (2)	21:01	21:49	
5	08:43	08:07	16:25 (5)	07:07	17:41 (3)	06:51		19:29 (2)	05:44	04:59	
	16:19	17:14	17 16:42 (5)	18:09	1 17:42 (3)	20:07	11	19:40 (2)	21:03	21:50	
6	08:42	08:05	16:25 (5)	07:04	17:40 (3)	06:49		19:28 (2)	05:42	04:58	
	16:21	17:16	17 16:42 (5)	18:11	5 17:45 (3)	20:09	14	19:42 (2)	21:04	21:51	
7	08:42	08:03	16:26 (5)	07:02	17:39 (3)	06:47		19:27 (2)	05:40	04:58	
	16:22	17:18	15 16:41 (5)	18:13	7 17:46 (3)	20:11	16	19:43 (2)	21:06	21:52	
8	08:42	08:01	16:28 (5)	07:00	17:39 (3)	06:44		19:27 (2)	05:38	04:57	
	16:24	17:20	12 16:40 (5)	18:15	9 17:48 (3)	20:13	19	19:46 (2)	21:08	21:53	
9	08:41	07:59	16:30 (5)	06:57	17:38 (3)	06:42		19:26 (2)	05:36	04:57	
	16:25	17:22	8 16:38 (5)	18:17	12 17:50 (3)	20:15	22	19:48 (2)	21:10	21:54	
10	08:40	07:57		06:55	17:38 (3)	06:39		19:25 (2)	05:34	04:56	
	16:26	17:24		18:19	14 17:52 (3)	20:17	24	19:49 (2)	21:11	21:55	
11	08:40	07:55		06:52	17:39 (3)	06:37		19:26 (2)	05:32	04:56	
	16:28	17:26		18:21	16 17:55 (3)	20:18	24	19:50 (2)	21:13	21:55	
12	08:39	07:53		06:50	17:39 (3)	06:35		19:26 (2)	05:31	04:55	
	16:30	17:28		18:23	16 17:55 (3)	20:20	23	19:49 (2)	21:15	21:56	
13	08:38	07:51		06:48	17:41 (3)	06:32		19:26 (2)	05:29	04:55	
	16:31	17:30		18:25	12 17:53 (3)	20:22	22	19:48 (2)	21:17	21:57	
14	08:37	07:49		06:45	17:42 (3)	06:30		19:27 (2)	05:27	04:55	
	16:33	17:32		18:27	8 17:50 (3)	20:24	20	19:47 (2)	21:18	21:57	
15	08:36	07:47		06:43		06:28		19:28 (2)	05:25	04:54	
	16:34	17:34		18:28		20:26	18	19:46 (2)	21:20	21:58	
16	08:35	07:45	17:04 (4)	06:40		06:25		19:28 (2)	05:24	04:54	
	16:36	17:36	3 17:07 (4)	18:30		20:28	15	19:43 (2)	21:22	21:59	
17	08:34	07:43	17:03 (4)	06:38		06:23		19:31 (2)	05:22	04:54	
	16:38	17:38	6 17:09 (4)	18:32		20:30	10	19:41 (2)	21:23	21:59	
18	08:33	07:41	17:01 (4)	06:35		06:21		05:21	04:54		
	16:40	17:40	10 17:11 (4)	18:34		20:31		21:25	22:00		
19	08:32	07:39	17:00 (4)	06:33		06:18		05:19	04:54		
	16:41	17:42	13 17:13 (4)	18:36		20:33		21:27	22:00		
20	08:31	07:36	17:00 (4)	06:31		06:16		05:18	04:54		
	16:43	17:44	16 17:16 (4)	18:38		20:35		21:28	22:00		
21	08:30	07:34	17:00 (4)	06:28		06:14		05:16	04:54		
	16:45	17:46	18 17:18 (4)	18:40		20:37		21:30	22:01		
22	08:28	07:32	16:59 (4)	06:26		06:11		05:15	04:55		
	16:47	17:48	20 17:19 (4)	18:41		20:39		21:31	22:01		
23	08:27	07:30	16:59 (4)	06:23		06:09		05:13	04:55		
	16:49	17:50	23 17:22 (4)	18:43		20:41		21:33	22:01		
24	08:26	07:28	16:59 (4)	06:21		06:07		05:12	04:55		
	16:50	17:52	25 17:24 (4)	18:45		20:42		21:34	22:01		
25	08:24	07:25	16:59 (4)	06:18		06:05		05:11	04:55		
	16:52	17:54	25 17:24 (4)	18:47		20:44		21:36	22:01		
26	08:23	07:23	16:59 (4)	06:16		06:03		05:09	04:56		
	16:54	17:56	25 17:24 (4)	18:49		20:46		21:37	22:01		
27	08:22	07:21	17:00 (4)	06:13		06:00		05:08	04:56		
	16:56	17:58	24 17:24 (4)	18:51		20:48		21:39	22:01		
28	08:20	16:25 (5)	07:18	06:11		05:58		05:07	04:57		
	16:58	16:26 (5)	18:00	18:53		20:50		21:40	22:01		
29	08:18	16:24 (5)		07:08		05:56		05:06	04:57		
	17:00	4 16:28 (5)		19:54		20:52		21:41	22:01		
30	08:17	16:24 (5)		07:06		05:54		05:05	04:58		
	17:02	6 16:30 (5)		19:56		20:53		21:43	22:00		
31	08:15	16:23 (5)		07:04				05:04			
	17:04	8 16:31 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494	510		
Total, worst case	19		355	144		250					
Sun reduction	0.24		0.23	0.27		0.35					
Oper. time red.	1.00		1.00	1.00		1.00					
Wind dir. red.	0.66		0.67	0.67		0.67					
Total reduction	0.16		0.16	0.18		0.23					
Total, real	3		55	26		59					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FS - H175

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December			
1	04:59 22:00	05:39 21:25	06:33 20:18	19:25 (2) 19:49 (2)	07:26 19:05	18:18 (3) 18:33 (3)	07:24 16:54	08:19 16:10	
2	04:59 22:00	05:40 21:23	06:35 20:16	19:24 (2) 19:48 (2)	07:28 19:02	18:17 (3) 18:33 (3)	07:26 16:52	15:59 (5) 16:08 (5)	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	19:23 (2) 19:45 (2)	07:30 19:00	18:16 (3) 18:31 (3)	07:28 16:50	15:57 (5) 16:10 (5)	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	19:24 (2) 19:43 (2)	07:31 18:57	18:16 (3) 18:29 (3)	07:30 16:48	15:56 (5) 16:11 (5)	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	19:24 (2) 19:41 (2)	07:33 18:55	18:16 (3) 18:26 (3)	07:32 16:46	15:55 (5) 16:11 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	19:24 (2) 19:39 (2)	07:35 18:52	18:16 (3) 18:24 (3)	07:34 16:44	15:54 (5) 16:12 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	19:24 (2) 19:35 (2)	07:37 18:50	18:15 (3) 18:21 (3)	07:36 16:43	15:54 (5) 16:10 (5)	08:28 16:06
8	05:05 21:56	05:50 21:11	06:45 20:01	19:25 (2) 19:33 (2)	07:39 18:48	18:16 (3) 18:18 (3)	07:38 16:41	15:54 (5) 16:08 (5)	08:29 16:06
9	05:06 21:55	05:52 21:09	06:47 19:59	19:27 (2) 19:31 (2)	07:41 18:45		07:40 16:39	15:54 (5) 16:06 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	06:49 19:56		07:42 18:43	17:43 (4) 17:47 (4)	07:42 16:37	15:55 (5) 16:05 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54		07:44 18:40	17:39 (4) 17:51 (4)	07:44 16:35	15:55 (5) 16:03 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51		07:46 18:38	17:36 (4) 17:53 (4)	07:45 16:34	15:56 (5) 16:01 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49		07:48 18:36	17:34 (4) 17:55 (4)	07:47 16:32	15:56 (5) 15:59 (5)	08:35 16:04
14	05:12 21:51	06:01 20:59	06:56 19:47		07:50 18:33	17:33 (4) 17:55 (4)	07:49 16:31	15:57 (5) 15:58 (5)	08:36 16:04
15	05:13 21:50	06:03 20:57	06:57 19:44		07:52 18:31	17:32 (4) 17:56 (4)	07:51 16:29		08:37 16:04
16	05:14 21:49	06:04 20:55	06:59 19:42		07:54 18:29	17:31 (4) 17:57 (4)	07:53 16:27		08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39		07:55 18:26	17:31 (4) 17:57 (4)	07:55 16:26		08:38 16:05
18	05:17 21:46	06:08 20:50	07:03 19:37		07:57 18:24	17:30 (4) 17:55 (4)	07:57 16:24		08:39 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34		07:59 18:22	17:30 (4) 17:52 (4)	07:59 16:23		08:40 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32		08:01 18:20	17:30 (4) 17:50 (4)	08:00 16:22		08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29		08:03 18:17	17:30 (4) 17:48 (4)	08:02 16:20		08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27		08:05 18:15	17:30 (4) 17:45 (4)	08:04 16:19		08:42 16:06
23	05:24 21:39	06:17 20:39	07:12 19:24		08:07 18:13	17:31 (4) 17:43 (4)	08:06 16:18		08:42 16:07
24	05:26 21:38	06:19 20:37	07:13 19:22		08:09 18:11	17:32 (4) 17:41 (4)	08:08 16:17		08:43 16:08
25	05:27 21:36	06:20 20:35	07:15 19:19		07:11 17:09	16:32 (4) 16:38 (4)	08:09 16:16		08:43 16:08
26	05:29 21:35	06:22 20:32	19:33 (2) 19:44 (2)		07:13 17:06	16:34 (4) 16:36 (4)	08:11 16:14		08:43 16:09
27	05:30 21:33	06:24 20:30	19:31 (2) 19:46 (2)		07:19 17:04		08:13 16:13		08:44 16:10
28	05:32 21:32	06:26 20:28	19:29 (2) 19:47 (2)		07:21 17:02		08:14 16:12		08:44 16:10
29	05:34 21:30	06:27 20:25	19:27 (2) 19:48 (2)	18:25 (3) 18:30 (3)	07:18 17:00		08:16 16:11		08:44 16:11
30	05:35 21:28	06:29 20:23	19:27 (2) 19:49 (2)	18:20 (3) 18:32 (3)	07:20 16:58		08:18 16:11		08:44 16:12
31	05:37 21:26	06:31 20:21	19:25 (2) 19:48 (2)		07:22 16:56				08:44 16:13
Potential sun hours	512	460	382		328		259		233
Total, worst case		110	161		366		140		
Sun reduction		0.34	0.32		0.29		0.27		
Oper. time red.		1.00	1.00		1.00		1.00		
Wind dir. red.		0.67	0.67		0.67		0.66		
Total reduction		0.23	0.21		0.20		0.17		
Total, real		25	34		72		24		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FT - H176

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June			
1	08:44	15:15 (5)	08:14	15:39 (4)	07:16	17:05 (3)	07:01	19:04 (2)	05:52	05:03				
	16:15	22	15:37 (5)	17:06	35	16:14 (4)	18:02	18	17:23 (3)	20:00	29	19:33 (2)	20:55	21:45
2	08:44	15:16 (5)	08:12	15:40 (4)	07:14	17:06 (3)	06:59	19:02 (2)	05:50	05:02				
	16:16	23	15:39 (5)	17:08	33	16:13 (4)	18:04	15	17:21 (3)	20:02	33	19:35 (2)	20:57	21:46
3	08:44	15:16 (5)	08:10	15:41 (4)	07:12	17:09 (3)	06:56	19:01 (2)	05:48	05:01				
	16:17	23	15:39 (5)	17:10	31	16:12 (4)	18:06	9	17:18 (3)	20:04	36	19:37 (2)	20:59	21:48
4	08:43	15:17 (5)	08:08	15:42 (4)	07:09		06:54	19:01 (2)	05:46	05:00				
	16:18	24	15:41 (4)	17:12	30	16:12 (4)	18:07		20:06	37	19:38 (2)	21:01	21:49	
5	08:43	15:17 (5)	08:07	15:43 (4)	07:07		06:51	19:00 (2)	05:44	04:59				
	16:19	25	15:42 (4)	17:14	27	16:10 (4)	18:09		20:07	38	19:38 (2)	21:03	21:50	
6	08:43	15:18 (5)	08:05	15:45 (4)	07:04		06:49	19:00 (2)	05:42	04:59				
	16:21	26	15:44 (4)	17:16	24	16:09 (4)	18:11		20:09	38	19:38 (2)	21:04	21:51	
7	08:42	15:18 (5)	08:03	15:47 (4)	07:02		06:47	18:59 (2)	05:40	04:58				
	16:22	27	15:45 (4)	17:18	21	16:08 (4)	18:13		20:11	38	19:37 (2)	21:06	21:52	
8	08:42	15:18 (5)	08:01	15:49 (4)	07:00		06:44	18:59 (2)	05:38	04:57				
	16:24	28	15:46 (4)	17:20	16	16:05 (4)	18:15		20:13	38	19:37 (2)	21:08	21:53	
9	08:41	15:20 (5)	07:59	15:54 (4)	06:57		06:42	18:59 (2)	05:36	04:57				
	16:25	29	15:49 (4)	17:22	8	16:02 (4)	18:17		20:15	38	19:37 (2)	21:10	21:54	
10	08:40	15:20 (5)	07:57		06:55		06:39	18:59 (2)	05:34	04:56				
	16:26	30	15:50 (4)	17:24		18:19		20:17	37	19:36 (2)	21:11	21:55		
11	08:40	15:21 (5)	07:55		06:52		06:37	18:59 (2)	05:33	04:56				
	16:28	31	15:52 (4)	17:26		18:21		20:19	36	19:35 (2)	21:13	21:55		
12	08:39	15:22 (5)	07:53		06:50		06:35	19:00 (2)	05:31	04:55				
	16:30	32	15:54 (4)	17:28		18:23		20:20	35	19:35 (2)	21:15	21:56		
13	08:38	15:23 (5)	07:51		06:48		06:32	19:00 (2)	05:29	04:55				
	16:31	32	15:55 (4)	17:30		18:25		20:22	33	19:33 (2)	21:17	21:57		
14	08:37	15:24 (5)	07:49		06:45		06:30	19:01 (2)	05:27	04:55				
	16:33	33	15:57 (4)	17:32		18:27		20:24	31	19:32 (2)	21:18	21:58		
15	08:36	15:25 (5)	07:47		06:43		06:28	19:02 (2)	05:26	04:54				
	16:34	34	15:59 (4)	17:34		18:28		20:26	29	19:31 (2)	21:20	21:58		
16	08:35	15:26 (5)	07:45		06:40		06:25	19:03 (2)	05:24	04:54				
	16:36	34	16:00 (4)	17:36		18:30		20:28	27	19:30 (2)	21:22	21:59		
17	08:34	15:28 (5)	07:43	17:07 (3)	06:38		06:23	19:04 (2)	05:22	04:54				
	16:38	34	16:02 (4)	17:38	2	17:09 (3)	18:32		20:30	23	19:27 (2)	21:23	21:59	
18	08:33	15:31 (5)	07:41	17:05 (3)	06:35		06:21	19:06 (2)	05:21	04:54				
	16:40	34	16:05 (4)	17:40	6	17:11 (3)	18:34		20:31	19	19:25 (2)	21:25	22:00	
19	08:32	15:35 (4)	07:39	17:04 (3)	06:33		06:18	19:09 (2)	05:19	04:54				
	16:41	32	16:07 (4)	17:42	9	17:13 (3)	18:36		20:33	14	19:23 (2)	21:27	22:00	
20	08:31	15:34 (4)	07:36	17:03 (3)	06:31		06:16		05:18	04:54				
	16:43	34	16:08 (4)	17:44	13	17:16 (3)	18:38		20:35		21:28	22:00		
21	08:30	15:35 (4)	07:34	17:03 (3)	06:28		06:14		05:16	04:54				
	16:45	36	16:11 (4)	17:46	15	17:18 (3)	18:40		20:37		21:30	22:01		
22	08:29	15:34 (4)	07:32	17:02 (3)	06:26		06:12		05:15	04:55				
	16:47	38	16:12 (4)	17:48	17	17:19 (3)	18:42		20:39		21:31	22:01		
23	08:27	15:35 (4)	07:30	17:02 (3)	06:23		06:09		05:13	04:55				
	16:49	38	16:13 (4)	17:50	20	17:22 (3)	18:43		20:41		21:33	22:01		
24	08:26	15:35 (4)	07:28	17:02 (3)	06:21		06:07		05:12	04:55				
	16:50	38	16:13 (4)	17:52	22	17:24 (3)	18:45		20:43		21:34	22:01		
25	08:24	15:36 (4)	07:25	17:02 (3)	06:18		06:05		05:11	04:55				
	16:52	38	16:14 (4)	17:54	24	17:26 (3)	18:47		20:44		21:36	22:01		
26	08:23	15:36 (4)	07:23	17:02 (3)	06:16		06:03		05:09	04:56				
	16:54	38	16:14 (4)	17:56	24	17:26 (3)	18:49	5	18:23 (2)	20:46		21:37	22:01	
27	08:22	15:36 (4)	07:21	17:03 (3)	06:13		06:01		05:08	04:56				
	16:56	38	16:14 (4)	17:58	23	17:26 (3)	18:51	11	18:24 (2)	20:48		21:39	22:01	
28	08:20	15:37 (4)	07:18	17:03 (3)	06:11		05:58		05:07	04:57				
	16:58	37	16:14 (4)	18:00	21	17:24 (3)	18:53	15	18:26 (2)	20:50		21:40	22:01	
29	08:18	15:37 (4)			07:08		05:56		05:06	04:57				
	17:00	37	16:14 (4)		19:54	20	19:28 (2)	20:52		21:41		22:01		
30	08:17	15:37 (4)			07:06		05:54		05:05	04:58				
	17:02	37	16:14 (4)		19:56	23	19:30 (2)	20:54		21:43		22:00		
31	08:15	15:38 (4)			07:04		05:52		05:04					
	17:04	35	16:13 (4)		19:58	27	19:31 (2)		21:44					
Potential sun hours	250		273		367		420		494	510				
Total, worst case	997		421		143		609							
Sun reduction	0.24		0.23		0.27		0.35							
Oper. time red.	1.00		1.00		1.00		1.00							
Wind dir. red.	0.66		0.67		0.67		0.67							
Total reduction	0.16		0.16		0.18		0.24							
Total, real	160		65		26		145							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FT - H176

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:58 (2) 19:34 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:58 (2) 19:35 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:56 (2) 19:34 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:56 (2) 19:34 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:56 (2) 19:34 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:56 (2) 19:34 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:55 (2) 19:33 (2)	07:37 16:43	08:28 16:06
8	05:05 21:56	05:50 21:12	06:45 20:01	18:55 (2) 19:32 (2)	07:39 16:41	08:29 16:06
9	05:06 21:55	05:52 21:10	06:47 19:59	18:56 (2) 19:31 (2)	07:41 16:39	08:30 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:55 (2) 19:28 (2)	07:42 17:41 (3)	08:31 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:56 (2) 19:26 (2)	07:44 17:53 (3)	08:33 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:57 (2) 19:24 (2)	07:46 17:55 (3)	08:34 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:58 (2) 19:22 (2)	07:48 17:57 (3)	08:35 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:58 (2) 19:18 (2)	07:50 17:57 (3)	08:36 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	19:00 (2) 19:16 (2)	07:52 17:58 (3)	08:37 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	19:02 (2) 19:14 (2)	07:54 17:58 (3)	08:38 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	19:04 (2) 19:11 (2)	07:55 17:57 (3)	08:38 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	18:26 18:24	16:26 17:55 (3)	16:05 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	18:22 18:22	16:23 17:52 (3)	16:05 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	18:20 18:20	16:22 17:50 (3)	16:06 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	18:03 18:17	16:20 17:48 (3)	16:06 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	18:05 18:15	16:19 17:45 (3)	16:06 16:06
23	05:24 21:39	06:17 20:39	19:17 (2) 19:22 (2)	18:07 18:13	16:18 17:43 (3)	16:07 16:07
24	05:26 21:38	06:19 20:37	19:12 (2) 19:27 (2)	18:09 18:11	16:17 17:41 (3)	16:08 16:08
25	05:27 21:36	06:20 20:35	19:08 (2) 19:28 (2)	17:15 17:19	16:16 16:38 (3)	16:09 16:08
26	05:29 21:35	06:22 20:32	19:06 (2) 19:30 (2)	17:17 17:06	16:14 16:14	16:09 16:09
27	05:30 21:33	06:24 20:30	19:05 (2) 19:32 (2)	17:19 17:04	16:13 16:13	16:10 16:10
28	05:32 21:32	06:26 20:28	19:02 (2) 19:32 (2)	17:21 17:02	16:12 16:12	16:11 16:11
29	05:34 21:30	06:27 20:25	19:01 (2) 19:33 (2)	17:22 17:00	16:12 16:12	16:11 16:11
30	05:35 21:28	06:29 20:23	19:00 (2) 19:34 (2)	17:24 16:58	16:11 16:11	16:12 16:12
31	05:37 21:27	06:31 20:21	18:59 (2) 19:34 (2)	17:22 16:56		16:13 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		222	504	238	939	676
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.66
Total reduction		0.23	0.22	0.20	0.18	0.14
Total, real		51	109	47	165	92

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FU - H177

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:09 (5)	08:14	15:33 (4)	07:16	17:04 (3)	07:01	18:59 (2)	05:52	05:03	
	16:15	28	15:37 (4)	17:06	29	16:02 (4)	18:02	19:33 (2)	20:55	21:45	
2	08:44	15:10 (5)	08:12	15:34 (4)	07:14	17:08 (3)	06:59	18:57 (2)	05:50	05:02	
	16:16	29	15:39 (4)	17:08	27	16:01 (4)	18:04	19:35 (2)	20:57	21:46	
3	08:44	15:10 (5)	08:10	15:35 (4)	07:12		06:56	18:57 (2)	05:48	05:01	
	16:17	29	15:39 (4)	17:10	24	15:59 (4)	18:06	19:36 (2)	20:59	21:48	
4	08:43	15:11 (5)	08:08	15:37 (4)	07:09		06:54	18:57 (2)	05:46	05:00	
	16:18	30	15:41 (4)	17:12	20	15:57 (4)	18:07	19:36 (2)	21:01	21:49	
5	08:43	15:11 (5)	08:07	15:40 (4)	07:07		06:51	18:56 (2)	05:44	04:59	
	16:19	31	15:42 (4)	17:14	15	15:55 (4)	18:09	19:36 (2)	21:03	21:50	
6	08:43	15:13 (5)	08:05	15:45 (4)	07:04		06:49	18:56 (2)	05:42	04:59	
	16:21	31	15:44 (4)	17:16	6	15:51 (4)	18:11	19:36 (2)	21:04	21:51	
7	08:42	15:13 (5)	08:03		07:02		06:47	18:55 (2)	05:40	04:58	
	16:22	32	15:45 (4)	17:18		18:13	20:11	19:35 (2)	21:06	21:52	
8	08:42	15:14 (5)	08:01		07:00		06:44	18:55 (2)	05:38	04:57	
	16:24	32	15:46 (4)	17:20		18:15	20:13	19:35 (2)	21:08	21:53	
9	08:41	15:15 (5)	07:59		06:57		06:42	18:55 (2)	05:36	04:57	
	16:25	34	15:49 (4)	17:22		18:17	20:15	19:34 (2)	21:10	21:54	
10	08:40	15:16 (5)	07:57		06:55		06:39	18:55 (2)	05:34	04:56	
	16:26	34	15:50 (4)	17:24		18:19	20:17	19:33 (2)	21:11	21:55	
11	08:40	15:17 (5)	07:55		06:53		06:37	18:55 (2)	05:33	04:56	
	16:28	35	15:52 (4)	17:26		18:21	20:19	19:33 (2)	21:13	21:55	
12	08:39	15:18 (5)	07:53		06:50		06:35	18:56 (2)	05:31	04:55	
	16:30	36	15:54 (4)	17:28		18:23	20:20	19:32 (2)	21:15	21:56	
13	08:38	15:20 (5)	07:51		06:48		06:32	18:56 (2)	05:29	04:55	
	16:31	35	15:55 (4)	17:30		18:25	20:22	19:30 (2)	21:17	21:57	
14	08:37	15:22 (5)	07:49		06:45		06:30	18:57 (2)	05:27	04:55	
	16:33	35	15:57 (4)	17:32		18:27	20:24	19:29 (2)	21:18	21:58	
15	08:36	15:23 (4)	07:47	17:02 (3)	06:43		06:28	18:58 (2)	05:26	04:54	
	16:34	36	15:59 (4)	17:34	3	17:05 (3)	18:28	19:28 (2)	21:20	21:58	
16	08:35	15:22 (4)	07:45	17:01 (3)	06:40		06:25	19:00 (2)	05:24	04:54	
	16:36	38	16:00 (4)	17:36	6	17:07 (3)	18:30	19:27 (2)	21:22	21:59	
17	08:34	15:23 (4)	07:43	17:00 (3)	06:38		06:23	19:01 (2)	05:22	04:54	
	16:38	39	16:02 (4)	17:38	9	17:09 (3)	18:32	19:24 (2)	21:23	21:59	
18	08:33	15:23 (4)	07:41	16:58 (3)	06:35		06:21	19:03 (2)	05:21	04:54	
	16:40	40	16:03 (4)	17:40	13	17:11 (3)	18:34	19:22 (2)	21:25	22:00	
19	08:32	15:24 (4)	07:39	16:58 (3)	06:33		06:18	19:06 (2)	05:19	04:54	
	16:41	40	16:04 (4)	17:42	15	17:13 (3)	18:36	19:19 (2)	21:27	22:00	
20	08:31	15:24 (4)	07:36	16:58 (3)	06:31		06:16		05:18	04:54	
	16:43	39	16:03 (4)	17:44	18	17:16 (3)	18:38		21:28	22:00	
21	08:30	15:24 (4)	07:34	16:58 (3)	06:28	18:10 (1)	06:14		05:16	04:54	
	16:45	40	16:04 (4)	17:46	20	17:18 (3)	18:40		21:30	22:01	
22	08:29	15:24 (4)	07:32	16:57 (3)	06:26	3	18:13 (1)		05:15	04:55	
	16:47	40	16:04 (4)	17:48	22	17:19 (3)	18:42		21:31	22:01	
23	08:27	15:25 (4)	07:30	16:58 (3)	06:23	7	18:15 (1)		05:13	04:55	
	16:49	39	16:04 (4)	17:50	24	17:22 (3)	18:43		21:33	22:01	
24	08:26	15:25 (4)	07:28	16:58 (3)	06:21	9	18:07 (1)		05:12	04:55	
	16:50	39	16:04 (4)	17:52	25	17:23 (3)	18:45		21:34	22:01	
25	08:24	15:26 (4)	07:25	16:58 (3)	06:18	11	18:18 (1)		05:11	04:55	
	16:52	38	16:04 (4)	17:54	23	17:21 (3)	18:47		21:36	22:01	
26	08:23	15:27 (4)	07:23	16:59 (3)	06:16	14	18:21 (2)		05:09	04:56	
	16:54	37	16:04 (4)	17:56	22	17:21 (3)	18:49		21:37	22:01	
27	08:22	15:27 (4)	07:21	17:00 (3)	06:13	15	18:23 (2)		05:08	04:56	
	16:56	36	16:03 (4)	17:58	20	17:20 (3)	18:51		21:39	22:01	
28	08:20	15:28 (4)	07:18	17:01 (3)	06:11	18	18:24 (2)		05:07	04:57	
	16:58	36	16:04 (4)	18:00	17	17:18 (3)	18:53		21:40	22:01	
29	08:19	15:29 (4)			07:09	22	18:26 (2)		05:06	04:57	
	17:00	34	16:03 (4)		19:54	26	19:02 (2)		21:41	22:01	
30	08:17	15:30 (4)			07:06	29	19:28 (2)		05:05	04:58	
	17:02	32	16:02 (4)		19:56	32	19:30 (2)		21:43	22:00	
31	08:15	15:31 (4)			07:04		18:59 (2)		05:04		
	17:04	31	16:02 (4)		19:58		19:31 (2)		21:44		
Potential sun hours	250		273		367		420		494	510	
Total, worst case	1085		358		199		639				
Sun reduction	0.24		0.23		0.27		0.35				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.66		0.67		0.67		0.67				
Total reduction	0.16		0.16		0.18		0.24				
Total, real	173		56		36		152				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FU - H177

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:54 (2) 19:32 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:54 (2) 19:32 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:52 (2) 19:31 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:52 (2) 19:32 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:52 (2) 19:32 (2)	07:33 16:46	15:14 (4) 15:21 (4)
6	05:03 21:58	05:47 21:15	06:42 20:06	18:52 (2) 19:32 (2)	07:34 16:44	15:10 (4) 15:25 (4)
7	05:04 21:57	05:49 21:14	06:43 20:04	18:51 (2) 19:31 (2)	07:36 16:43	15:07 (4) 15:27 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	18:51 (2) 19:30 (2)	07:39 16:41	15:05 (4) 15:29 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	18:51 (2) 19:30 (2)	07:40 16:39	15:04 (4) 15:30 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	18:50 (2) 19:28 (2)	07:42 16:37	15:03 (4) 15:33 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	18:51 (2) 19:26 (2)	07:44 16:35	15:02 (4) 15:34 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	18:52 (2) 19:24 (2)	07:45 17:39 (3)	15:01 (4) 15:34 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	18:52 (2) 19:22 (2)	07:47 17:36 (3)	15:01 (4) 15:35 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	18:52 (2) 19:18 (2)	07:49 17:33 (3)	15:00 (4) 15:36 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	18:54 (2) 19:16 (2)	07:51 17:32 (3)	15:00 (4) 15:36 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	18:55 (2) 19:14 (2)	07:53 17:31 (3)	15:00 (4) 15:37 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	18:55 (1) 19:11 (2)	07:55 17:30 (3)	14:59 (4) 15:37 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	18:55 (1) 19:08 (2)	07:57 17:29 (3)	14:59 (4) 15:38 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	18:54 (1) 19:06 (1)	07:59 17:29 (3)	14:59 (4) 15:38 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	18:54 (1) 19:04 (1)	08:00 17:28 (3)	14:59 (4) 15:39 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	18:53 (1) 19:01 (1)	08:02 17:28 (3)	14:59 (4) 15:39 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	18:54 (1) 18:58 (1)	08:04 17:28 (3)	15:00 (4) 15:39 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	18:55 (1) 18:56 (1)	08:06 17:29 (3)	15:00 (4) 15:40 (4)
24	05:26 21:38	06:19 20:37	19:09 (2) 19:23 (2)	07:13 19:22	08:09 17:29 (3)	15:00 (4) 15:40 (4)
25	05:27 21:36	06:20 20:35	19:05 (2) 19:25 (2)	07:15 19:19	08:09 17:28 (3)	15:01 (4) 15:40 (4)
26	05:29 21:35	06:22 20:32	19:03 (2) 19:27 (2)	07:17 19:17	08:11 17:28 (3)	15:01 (4) 15:39 (4)
27	05:30 21:33	06:24 20:30	19:01 (2) 19:29 (2)	07:19 19:14	08:13 17:04	15:02 (4) 15:38 (4)
28	05:32 21:32	06:26 20:28	18:59 (2) 19:29 (2)	07:21 19:12	08:14 17:02	15:02 (5) 15:37 (4)
29	05:34 21:30	06:27 20:25	18:58 (2) 19:30 (2)	07:22 19:09	08:16 17:00	15:00 (5) 15:36 (4)
30	05:35 21:28	06:29 20:23	18:57 (2) 19:31 (2)	07:24 19:07	08:18 16:58	14:59 (5) 16:12
31	05:37 21:27	06:31 20:21	18:55 (2) 19:31 (2)	07:22 16:56	08:44 16:11	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		218	619	256	865	851
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.65
Total reduction		0.23	0.22	0.20	0.17	0.14
Total, real		50	134	50	151	115

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FV - H178

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January			February			March			April			May			June		
1	08:44		15:06 (5)	08:14		15:30 (4)	07:16			07:01		18:54 (2)	05:52		05:03			
	16:15	31	15:37 (4)	17:06	23	15:53 (4)	18:02		20:00	39	19:33 (2)	20:55		21:45				
2	08:44		15:07 (5)	08:12		15:32 (4)	07:14		06:59		18:53 (2)	05:50		05:02				
	16:16	32	15:39 (4)	17:08	19	15:51 (4)	18:04		20:02	40	19:33 (2)	20:57		21:46				
3	08:44		15:07 (5)	08:10		15:34 (4)	07:12		06:56		18:53 (2)	05:48		05:01				
	16:17	32	15:39 (4)	17:10	14	15:48 (4)	18:06		20:04	40	19:33 (2)	20:59		21:48				
4	08:43		15:08 (5)	08:08		15:40 (4)	07:09		06:54		18:52 (2)	05:46		05:00				
	16:18	33	15:41 (4)	17:12	3	15:43 (4)	18:07		20:06	41	19:33 (2)	21:01		21:49				
5	08:43		15:09 (5)	08:07			07:07		06:51		18:52 (2)	05:44		04:59				
	16:19	33	15:42 (4)	17:14			18:09		20:07	41	19:33 (2)	21:03		21:50				
6	08:43		15:10 (5)	08:05			07:04		06:49		18:52 (2)	05:42		04:59				
	16:21	34	15:44 (4)	17:16			18:11		20:09	41	19:33 (2)	21:04		21:51				
7	08:42		15:11 (5)	08:03			07:02		06:47		18:51 (2)	05:40		04:58				
	16:22	34	15:45 (4)	17:18			18:13		20:11	41	19:32 (2)	21:06		21:52				
8	08:42		15:11 (5)	08:01			07:00		06:44		18:51 (2)	05:38		04:57				
	16:24	35	15:46 (4)	17:20			18:15		20:13	40	19:31 (2)	21:08		21:53				
9	08:41		15:13 (5)	07:59			06:57		06:42		18:52 (2)	05:36		04:57				
	16:25	36	15:49 (4)	17:22			18:17		20:15	39	19:31 (2)	21:10		21:54				
10	08:40		15:14 (5)	07:57			06:55		06:39		18:52 (2)	05:34		04:56				
	16:26	36	15:50 (4)	17:24			18:19		20:17	38	19:30 (2)	21:11		21:55				
11	08:40		15:15 (4)	07:55			06:53		06:37		18:52 (2)	05:33		04:56				
	16:28	37	15:52 (4)	17:26			18:21		20:19	37	19:29 (2)	21:13		21:55				
12	08:39		15:15 (4)	07:53			06:50		06:35		18:53 (2)	05:31		04:55				
	16:30	39	15:54 (4)	17:28			18:23		20:20	35	19:28 (2)	21:15		21:56				
13	08:38		15:16 (4)	07:51		16:59 (3)	06:48		06:32		18:53 (2)	05:29		04:55				
	16:31	39	15:55 (4)	17:30	1	17:00 (3)	18:25		20:22	33	19:26 (2)	21:17		21:57				
14	08:37		15:16 (4)	07:49		16:58 (3)	06:45		06:30		18:55 (2)	05:27		04:55				
	16:33	40	15:56 (4)	17:32	4	17:02 (3)	18:27		20:24	30	19:25 (2)	21:18		21:58				
15	08:36		15:16 (4)	07:47		16:57 (3)	06:43		06:28		18:56 (2)	05:26		04:54				
	16:34	40	15:56 (4)	17:34	8	17:05 (3)	18:28		20:26	28	19:24 (2)	21:20		21:58				
16	08:35		15:16 (4)	07:45		16:56 (3)	06:40		06:25		18:58 (2)	05:24		04:54				
	16:36	40	15:56 (4)	17:36	11	17:07 (3)	18:30		20:28	24	19:22 (2)	21:22		21:59				
17	08:34		15:17 (4)	07:43		16:56 (3)	06:38		06:23		18:59 (2)	05:22		04:54				
	16:38	39	15:56 (4)	17:38	13	17:09 (3)	18:32		20:30	20	19:19 (2)	21:23		21:59				
18	08:33		15:17 (4)	07:41		16:54 (3)	06:35		06:21		19:02 (2)	05:21		04:54				
	16:40	40	15:57 (4)	17:40	17	17:11 (3)	18:34		20:31	14	19:16 (2)	21:25		22:00				
19	08:32		15:18 (4)	07:39		16:54 (3)	06:33		06:18			05:19		04:54				
	16:41	39	15:57 (4)	17:42	19	17:13 (3)	18:36		20:33			21:27		22:00				
20	08:31		15:18 (4)	07:36		16:54 (3)	06:31		18:08 (1)	06:16		05:18		04:54				
	16:43	39	15:57 (4)	17:44	22	17:16 (3)	18:38	3	18:11 (1)	20:35		21:28		22:00				
21	08:30		15:19 (4)	07:34		16:55 (3)	06:28		18:07 (1)	06:14		05:16		04:54				
	16:45	39	15:58 (4)	17:46	23	17:18 (3)	18:40	6	18:13 (1)	20:37		21:30		22:01				
22	08:29		15:19 (4)	07:32		16:54 (3)	06:26		18:06 (1)	06:12		05:15		04:55				
	16:47	38	15:57 (4)	17:48	25	17:19 (3)	18:42	9	18:15 (1)	20:39		21:31		22:01				
23	08:27		15:20 (4)	07:30		16:55 (3)	06:23		18:06 (1)	06:09		05:13		04:55				
	16:49	38	15:58 (4)	17:50	24	17:19 (3)	18:43	11	18:17 (2)	20:41		21:33		22:01				
24	08:26		15:20 (4)	07:28		16:56 (3)	06:21		18:05 (1)	06:07		05:12		04:55				
	16:50	37	15:57 (4)	17:52	23	17:19 (3)	18:45	13	18:18 (2)	20:43		21:34		22:01				
25	08:24		15:21 (4)	07:25		16:56 (3)	06:18		18:04 (2)	06:05		05:11		04:55				
	16:52	36	15:57 (4)	17:54	21	17:17 (3)	18:47	17	18:21 (2)	20:44		21:36		22:01				
26	08:23		15:22 (4)	07:23		16:57 (3)	06:16		18:02 (2)	06:03		05:09		04:56				
	16:54	35	15:57 (4)	17:56	19	17:16 (3)	18:49	21	18:23 (2)	20:46		21:37		22:01				
27	08:22		15:22 (4)	07:21		16:59 (3)	06:13		18:00 (2)	06:01		05:08		04:56				
	16:56	34	15:56 (4)	17:58	16	17:15 (3)	18:51	24	18:24 (2)	20:48		21:39		22:01				
28	08:20		15:24 (4)	07:18		17:01 (3)	06:11		17:59 (2)	05:58		05:07		04:57				
	16:58	32	15:56 (4)	18:00	11	17:12 (3)	18:53	27	18:26 (2)	20:50		21:40		22:01				
29	08:19		15:25 (4)				07:09		18:57 (2)	05:56		05:06		04:57				
	17:00	30	15:55 (4)				19:54	31	19:28 (2)	20:52		21:41		22:01				
30	08:17		15:26 (4)				07:06		18:56 (2)	05:54		05:05		04:58				
	17:02	28	15:54 (4)				19:56	34	19:30 (2)	20:54		21:43		22:00				
31	08:15		15:27 (4)				07:04		18:54 (2)			05:04						
	17:04	26	15:53 (4)				19:58	37	19:31 (2)			21:44						
Potential sun hours	250		273		367		420		494		510							
Total, worst case	1101		316		233		621											
Sun reduction	0.24		0.23		0.27		0.35											
Oper. time red.	1.00		1.00		1.00		1.00											
Wind dir. red.	0.66		0.67		0.67		0.67											
Total reduction	0.16		0.16		0.18		0.24											
Total, real	176		49		43		148											

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FV - H178

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:51 (2) 19:28 (2)	07:26 16:54	08:19 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	18:50 (2) 19:29 (2)	07:28 16:52	08:21 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	18:49 (2) 19:28 (2)	07:30 16:50	08:22 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	18:48 (2) 19:28 (2)	07:31 16:48	08:24 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	18:48 (2) 19:29 (2)	07:33 16:46	08:25 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	18:48 (2) 19:29 (2)	07:35 16:44	08:26 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:47 (2) 19:28 (2)	07:37 16:43	08:28 15:14 (4)
8	05:05 21:56	05:50 21:12	06:45 20:01	18:47 (2) 19:28 (2)	07:39 16:41	08:29 15:19 (4)
9	05:06 21:55	05:52 21:10	06:47 19:59	18:47 (2) 19:27 (2)	07:41 16:39	08:30 15:21 (4)
10	05:07 21:55	05:54 21:08	06:49 19:56	18:46 (2) 19:26 (2)	07:42 16:37	08:31 15:24 (4)
11	05:08 21:54	05:56 21:05	06:50 19:54	18:46 (2) 19:26 (2)	07:44 16:35	08:33 15:25 (4)
12	05:09 21:53	05:57 21:03	06:52 19:51	18:47 (2) 19:24 (2)	07:46 16:34	08:34 15:26 (4)
13	05:10 21:52	05:59 21:01	06:54 19:49	18:47 (2) 19:22 (2)	07:48 16:32	08:35 15:27 (4)
14	05:12 21:51	06:01 20:59	06:56 19:47	18:47 (2) 19:18 (2)	07:50 16:31	08:36 15:28 (4)
15	05:13 21:50	06:03 20:57	06:58 19:44	18:48 (2) 19:16 (2)	07:51 16:29	08:37 15:29 (4)
16	05:14 21:49	06:04 20:55	06:59 19:42	18:49 (2) 19:14 (2)	07:53 16:27	08:38 15:30 (4)
17	05:16 21:47	06:06 20:53	07:01 19:39	18:50 (2) 19:11 (2)	07:55 16:26	08:38 15:30 (4)
18	05:17 21:46	06:08 20:51	07:03 19:37	18:51 (2) 19:08 (2)	07:57 16:24	08:39 15:31 (4)
19	05:18 21:45	06:10 20:48	07:05 19:34	18:53 (1) 19:06 (2)	07:59 16:23	08:40 15:32 (4)
20	05:20 21:44	06:12 20:46	07:06 19:32	18:52 (1) 19:04 (2)	08:00 16:22	08:41 15:32 (4)
21	05:21 21:42	06:13 20:44	07:08 19:29	18:52 (1) 19:01 (1)	08:02 16:20	08:41 15:33 (4)
22	05:23 21:41	06:15 20:42	07:10 19:27	18:52 (1) 18:58 (1)	08:04 16:19	08:42 15:33 (4)
23	05:24 21:39	06:17 20:39	07:12 19:24	18:53 (1) 18:56 (1)	08:06 16:18	08:42 15:34 (4)
24	05:26 21:38	06:19 20:37	07:13 19:22	18:56 (1) 18:11	08:08 16:17	08:43 15:34 (4)
25	05:27 21:36	06:20 20:35	07:15 19:19	16:25 (3) 17:09	08:09 16:16	08:43 15:34 (4)
26	05:29 21:35	06:22 20:32	07:17 19:17	16:26 (3) 16:36 (3)	08:11 16:14	08:43 15:35 (4)
27	05:30 21:33	06:24 20:30	07:19 19:14	16:26 (3) 17:04	08:13 16:13	08:44 15:35 (4)
28	05:32 21:32	06:26 20:28	07:21 19:12	16:27 (3) 17:02	08:14 16:12	08:44 15:36 (4)
29	05:34 21:30	06:27 20:25	07:22 19:09	16:31 (3) 17:00	08:16 16:12	08:44 15:35 (4)
30	05:35 21:28	06:29 20:23	07:24 19:07	16:11 16:58	08:18 16:11	08:44 15:35 (4)
31	05:37 21:27	06:31 20:21	18:52 (2) 19:27 (2)	07:22 16:56	08:44 16:13	15:05 (5) 15:35 (4)
Potential sun hours	512	460	382	328	259	233
Total, worst case		189	676	266	792	944
Sun reduction		0.34	0.32	0.29	0.27	0.21
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.66	0.65
Total reduction		0.23	0.22	0.20	0.17	0.14
Total, real		44	146	52	138	128

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FW - H179

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June	
1	08:44	14:41 (4)	08:14		07:16		07:01	18:32 (2)	05:52	05:03		
	16:15	40	15:21 (4)	17:06	18:02		20:00	45	19:17 (2)	20:55	21:45	
2	08:44	14:42 (4)	08:12		07:14		06:59	18:31 (2)	05:50	05:02		
	16:16	39	15:21 (4)	17:08	18:04		20:02	44	19:15 (2)	20:57	21:46	
3	08:44	14:41 (4)	08:10		07:12		06:56	18:32 (2)	05:48	05:01		
	16:17	40	15:21 (4)	17:10	18:06		20:04	43	19:15 (2)	20:59	21:48	
4	08:43	14:43 (4)	08:08		07:09		06:54	18:33 (2)	05:46	05:00		
	16:18	39	15:22 (4)	17:12	18:07		20:06	41	19:14 (2)	21:01	21:49	
5	08:43	14:43 (4)	08:07		07:07		06:51	18:33 (2)	05:44	04:59		
	16:19	39	15:22 (4)	17:14	16:43 (3)	18:09	20:07	40	19:13 (2)	21:03	21:50	
6	08:43	14:44 (4)	08:05		07:04		06:49	18:34 (2)	05:42	04:59		
	16:21	38	15:22 (4)	17:16	16:45 (3)	18:11	20:09	38	19:12 (2)	21:04	21:51	
7	08:42	14:44 (4)	08:03		07:02		06:47	18:34 (2)	05:40	04:58		
	16:22	38	15:22 (4)	17:18	16:47 (3)	18:13	20:11	36	19:10 (2)	21:06	21:52	
8	08:42	14:44 (4)	08:01		07:00		06:44	18:35 (2)	05:38	04:57		
	16:24	38	15:22 (4)	17:20	16:50 (3)	18:15	20:13	34	19:09 (2)	21:08	21:53	
9	08:41	14:46 (4)	07:59		06:57		06:42	18:37 (2)	05:36	04:57		
	16:25	37	15:23 (4)	17:22	16:52 (3)	18:17	20:15	30	19:07 (2)	21:10	21:54	
10	08:40	14:46 (4)	07:57		06:55		06:39	18:38 (2)	05:34	04:56		
	16:26	37	15:23 (4)	17:24	16:54 (3)	18:19	20:17	27	19:05 (2)	21:11	21:55	
11	08:40	14:47 (4)	07:55		06:53		06:37	18:40 (2)	05:33	04:56		
	16:28	36	15:23 (4)	17:26	16:56 (3)	18:21	20:19	23	19:03 (2)	21:13	21:55	
12	08:39	14:48 (4)	07:53		06:50		06:35	18:44 (2)	05:31	04:55		
	16:30	35	15:23 (4)	17:28	16:59 (3)	18:23	20:20	16	19:00 (2)	21:15	21:56	
13	08:38	14:49 (4)	07:51		06:48		06:32		05:29	04:55		
	16:31	34	15:23 (4)	17:30	17:00 (3)	18:25	20:22		21:17	21:57		
14	08:37	14:50 (4)	07:49		06:45		06:30		05:27	04:55		
	16:33	33	15:23 (4)	17:32	17:02 (3)	18:27	20:24		21:18	21:58		
15	08:36	14:51 (4)	07:47		06:43		17:53 (2)	06:28	05:26	04:54		
	16:34	32	15:23 (4)	17:34	17:04 (3)	18:28	9	18:02 (2)	20:26	21:20	21:58	
16	08:35	14:51 (4)	07:45		06:40		17:48 (2)	06:25	05:24	04:54		
	16:36	31	15:22 (4)	17:36	17:04 (3)	18:30	16	18:04 (2)	20:28	21:22	21:59	
17	08:34	14:52 (4)	07:43		06:38		17:46 (2)	06:23	05:22	04:54		
	16:38	30	15:22 (4)	17:38	17:04 (3)	18:32	20	18:06 (2)	20:30	21:23	21:59	
18	08:33	14:54 (4)	07:41		06:35		17:43 (2)	06:21	05:21	04:54		
	16:40	27	15:21 (4)	17:40	17:02 (3)	18:34	24	18:07 (2)	20:31	21:25	22:00	
19	08:32	14:56 (4)	07:39		06:33		17:41 (2)	06:18	05:19	04:54		
	16:41	25	15:21 (4)	17:42	17:01 (3)	18:36	29	18:10 (2)	20:33	21:27	22:00	
20	08:31	14:57 (4)	07:36		06:31		17:39 (2)	06:16	05:18	04:54		
	16:43	22	15:19 (4)	17:44	17:00 (3)	18:38	32	18:11 (2)	20:35	21:28	22:00	
21	08:30	14:59 (4)	07:34		06:28		17:38 (2)	06:14	05:16	04:54		
	16:45	20	15:19 (4)	17:46	16:59 (3)	18:40	35	18:13 (2)	20:37	21:30	22:01	
22	08:29	15:01 (4)	07:32		06:26		17:36 (2)	06:12	05:15	04:55		
	16:47	15	15:16 (4)	17:48	16:46 (3)	18:42	39	18:15 (2)	20:39	21:31	22:01	
23	08:27	15:05 (4)	07:30		06:23		17:36 (2)	06:09	05:13	04:55		
	16:49	9	15:14 (4)	17:50	18:43	41	18:17 (2)	20:41	21:33	22:01		
24	08:26		07:28		06:21		17:34 (2)	06:07	05:12	04:55		
	16:50		17:52		18:45	44	18:18 (2)	20:43	21:34	22:01		
25	08:24		07:25		06:18		17:34 (2)	06:05	05:11	04:55		
	16:52		17:54		18:47	44	18:18 (2)	20:44	21:36	22:01		
26	08:23		07:23		06:16		17:34 (2)	06:03	05:09	04:56		
	16:54		17:56		18:49	45	18:19 (2)	20:46	21:37	22:01		
27	08:22		07:21		06:13		17:33 (2)	06:01	05:08	04:56		
	16:56		17:58		18:51	45	18:18 (2)	20:48	21:39	22:01		
28	08:20		07:18		06:11		17:33 (2)	05:58	05:07	04:57		
	16:58		18:00		18:53	46	18:19 (2)	20:50	21:40	22:01		
29	08:19				07:09		18:32 (2)	05:56	05:06	04:57		
	17:00				19:55	46	19:18 (2)	20:52	21:41	22:01		
30	08:17				07:06		18:32 (2)	05:54	05:05	04:58		
	17:02				19:56	46	19:18 (2)	20:54	21:43	22:00		
31	08:15				07:04		18:31 (2)		05:04			
	17:04				19:58	46	19:17 (2)		21:44			
Potential sun hours	250		273		367		420		494	510		
Total, worst case	734		303		607		417					
Sun reduction	0.24		0.23		0.27		0.35					
Oper. time red.	1.00		1.00		1.00		1.00					
Wind dir. red.	0.65		0.66		0.68		0.68					
Total reduction	0.16		0.15		0.18		0.24					
Total, real	115		46		111		99					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FW - H179

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	18:39 (2) 19:02 (2)	07:26 16:54	16:08 (3) 16:23 (3)
2	04:59 22:00	05:40 21:23	06:35 20:16	18:37 (2) 19:04 (2)	07:28 16:52	16:08 (3) 16:21 (3)
3	05:00 21:59	05:42 21:21	06:36 20:13	18:35 (2) 19:05 (2)	07:30 16:50	16:09 (3) 16:19 (3)
4	05:01 21:59	05:44 21:19	06:38 20:11	18:32 (2) 19:06 (2)	07:31 16:48	16:09 (3) 16:17 (3)
5	05:02 21:58	05:45 21:17	06:40 20:09	18:31 (2) 19:07 (2)	07:33 16:46	16:10 (3) 16:15 (3)
6	05:03 21:58	05:47 21:15	06:42 20:06	18:30 (2) 19:08 (2)	07:35 16:44	16:07 16:07
7	05:04 21:57	05:49 21:14	06:43 20:04	18:28 (2) 19:08 (2)	07:37 16:43	16:06 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	18:27 (2) 19:09 (2)	07:39 16:41	16:05 16:05
9	05:06 21:55	05:52 21:10	06:47 19:59	18:26 (2) 19:09 (2)	07:41 16:39	16:04 16:05
10	05:07 21:55	05:54 21:08	06:49 19:56	18:25 (2) 19:09 (2)	07:42 16:37	16:03 16:05
11	05:08 21:54	05:56 21:05	06:50 19:54	18:24 (2) 19:09 (2)	07:44 16:35	16:02 16:05
12	05:09 21:53	05:57 21:03	06:52 19:51	18:24 (2) 19:09 (2)	07:46 16:34	16:01 16:05
13	05:10 21:52	05:59 21:01	06:54 19:49	18:23 (2) 19:09 (2)	07:48 16:32	16:00 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	18:22 (2) 19:08 (2)	07:50 16:31	16:00 16:04
15	05:13 21:50	06:03 20:57	06:58 19:44	18:22 (2) 19:08 (2)	07:52 16:29	16:00 16:05
16	05:14 21:49	06:04 20:55	06:59 19:42	18:22 (2) 19:08 (2)	07:54 16:27	16:00 16:05
17	05:16 21:47	06:06 20:53	07:01 19:39	18:21 (2) 19:06 (2)	07:55 16:26	16:00 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	18:21 (2) 19:06 (2)	07:57 16:24	16:00 16:05
19	05:18 21:45	06:10 20:48	07:05 19:34	18:22 (2) 19:05 (2)	07:59 16:23	16:00 16:05
20	05:20 21:44	06:12 20:46	07:06 19:32	18:22 (2) 19:04 (2)	08:00 16:22	16:00 16:05
21	05:21 21:42	06:13 20:44	07:08 19:29	18:22 (2) 19:01 (2)	08:02 16:20	16:00 16:05
22	05:23 21:41	06:15 20:42	07:10 19:27	18:23 (2) 18:58 (2)	08:05 16:19	16:00 16:05
23	05:24 21:39	06:17 20:39	07:12 19:24	18:24 (2) 18:56 (2)	08:07 16:18	16:00 16:05
24	05:26 21:38	06:19 20:37	07:13 19:22	18:25 (2) 18:54 (2)	08:08 16:17	16:00 16:05
25	05:27 21:36	06:20 20:35	07:15 19:19	18:25 (2) 18:51 (2)	08:09 16:16	16:00 16:05
26	05:29 21:35	06:22 20:32	07:17 19:17	18:27 (2) 18:48 (2)	08:11 16:14	16:00 16:05
27	05:30 21:33	06:24 20:30	07:19 19:14	18:29 (2) 18:46 (2)	08:13 16:13	16:00 16:05
28	05:32 21:32	06:26 20:28	07:21 19:12	18:32 (2) 18:44 (2)	08:14 16:12	16:00 16:05
29	05:34 21:30	06:28 20:25	07:22 19:09	18:38 (2) 18:41 (2)	08:16 16:12	16:00 16:05
30	05:35 21:28	06:29 20:23	07:24 19:07	17:00 16:58	16:12 16:27 (3)	16:00 16:11
31	05:37 21:27	06:31 20:21	18:50 (2) 18:53 (2) 18:59 (2)	07:22 16:56 16:25 (3)	16:11 16:06 (3) 16:25 (3)	16:00 16:13 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		20	1020		259	1225
Sun reduction		0.34	0.32		0.29	0.21
Oper. time red.		1.00	1.00		1.00	1.00
Wind dir. red.		0.68	0.68		0.65	0.65
Total reduction		0.23	0.22		0.17	0.13
Total, real		5	221		63	164

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FX - H180

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	14:40 (4)	08:14	16:13 (3)	07:16	16:48 (2)	07:01	05:52	05:03		
	16:15	13	14:53 (4)	17:06	21	16:34 (3)	18:02	38	17:26 (2)	20:00	21:45
2	08:44	14:42 (4)	08:12	16:13 (3)	07:14	16:47 (2)	06:59	05:50	05:02		
	16:16	10	14:52 (4)	17:08	23	16:36 (3)	18:04	38	17:25 (2)	20:02	21:46
3	08:44	14:43 (4)	08:10	16:13 (3)	07:12	16:48 (2)	06:56	05:48	05:01		
	16:17	8	14:51 (4)	17:10	22	16:35 (3)	18:06	37	17:25 (2)	20:04	21:48
4	08:43	14:48 (4)	08:08	16:14 (3)	07:09	16:48 (2)	06:54	05:46	05:00		
	16:18	1	14:49 (4)	17:12	21	16:35 (3)	18:07	37	17:25 (2)	20:06	21:49
5	08:43		08:07	16:15 (3)	07:07	16:48 (2)	06:51	05:44	04:59		
	16:19		17:14	19	16:34 (3)	18:09	36	17:24 (2)	20:07	21:03	21:50
6	08:43		08:05	16:16 (3)	07:04	16:49 (2)	06:49	05:42	04:58		
	16:21		17:16	17	16:33 (3)	18:11	34	17:23 (2)	20:09	21:04	21:51
7	08:42		08:03	16:18 (3)	07:02	16:49 (2)	06:47	05:40	04:58		
	16:22		17:18	14	16:32 (3)	18:13	33	17:22 (2)	20:11	21:06	21:52
8	08:42		08:01	16:20 (3)	07:00	16:50 (2)	06:44	05:38	04:57		
	16:24		17:20	10	16:30 (3)	18:15	31	17:21 (2)	20:13	21:08	21:53
9	08:41		07:59		06:57	16:51 (2)	06:42	05:36	04:57		
	16:25		17:22		18:17	28	17:19 (2)	20:15	21:10	21:54	
10	08:40		07:57		06:55	16:53 (2)	06:39	05:34	04:56		
	16:26		17:24		18:19	25	17:18 (2)	20:17	21:11	21:55	
11	08:40		07:55		06:53	16:55 (2)	06:37	05:33	04:56		
	16:28		17:26		18:21	21	17:16 (2)	20:19	21:13	21:55	
12	08:39		07:53		06:50	16:57 (2)	06:35	05:31	04:55		
	16:30		17:28		18:23	16	17:13 (2)	20:20	21:15	21:56	
13	08:38		07:51		06:48	17:02 (2)	06:32	05:29	04:55		
	16:31		17:30		18:25	6	17:08 (2)	20:22	21:17	21:57	
14	08:37		07:49		06:45		06:30	05:27	04:55		
	16:33		17:32		18:27		20:24	21:18	21:58		
15	08:36		07:47		06:43		06:28	05:26	04:54		
	16:34		17:34		18:28		20:26	21:20	21:58		
16	08:35		07:45		06:40		06:25	05:24	04:54		
	16:36		17:36		18:30		20:28	21:22	21:59		
17	08:34		07:43	17:02 (2)	06:38		06:23	05:22	04:54		
	16:38		17:38	7	17:09 (2)		20:30	21:23	21:59		
18	08:33		07:41	16:58 (2)	06:35		06:21	05:21	04:54		
	16:40		17:40	13	17:11 (2)		20:31	21:25	22:00		
19	08:32		07:39	16:56 (2)	06:33		06:18	05:19	04:54		
	16:41		17:42	17	17:13 (2)		20:33	21:27	22:00		
20	08:31		07:36	16:55 (2)	06:31		06:16	05:18	04:54		
	16:43		17:44	21	17:16 (2)		20:35	21:28	22:00		
21	08:30		07:34	16:54 (2)	06:28		06:14	05:16	04:54		
	16:45		17:46	24	17:18 (2)		20:37	21:30	22:01		
22	08:29		07:32	16:52 (2)	06:26		06:12	05:15	04:55		
	16:47		17:48	27	17:19 (2)		20:39	21:31	22:01		
23	08:27	16:13 (3)	07:30	16:51 (2)	06:23		06:09	05:13	04:55		
	16:49	2	16:15 (3)	17:50	31	17:22 (2)	20:41	21:33	22:01		
24	08:26	16:12 (3)	07:28	16:51 (2)	06:21		06:07	05:12	04:55		
	16:50	5	16:17 (3)	17:52	33	17:24 (2)	20:43	21:34	22:01		
25	08:24	16:13 (3)	07:25	16:49 (2)	06:18		06:05	05:11	04:55		
	16:52	6	16:19 (3)	17:54	36	17:25 (2)	20:44	21:36	22:01		
26	08:23	16:12 (3)	07:23	16:49 (2)	06:16		06:03	05:09	04:56		
	16:54	9	16:21 (3)	17:56	37	17:26 (2)	20:46	21:37	22:01		
27	08:22	16:11 (3)	07:21	16:49 (2)	06:13		06:00	05:08	04:56		
	16:56	12	16:23 (3)	17:58	37	17:26 (2)	20:48	21:39	22:01		
28	08:20	16:12 (3)	07:18	16:48 (2)	06:11		05:58	05:07	04:57		
	16:58	14	16:26 (3)	18:00	38	17:26 (2)	20:50	21:40	22:01		
29	08:19	16:12 (3)			07:08		05:56	05:06	04:57		
	17:00	16	16:28 (3)		19:54		20:52	21:41	22:01		
30	08:17	16:12 (3)			07:06		05:54	05:05	04:58		
	17:02	17	16:29 (3)		19:56		20:54	21:43	22:00		
31	08:15	16:12 (3)			07:04			05:04			
	17:04	19	16:31 (3)		19:58			21:44			
Potential sun hours	250		273		367		420	494	510		
Total, worst case	132		468		380						
Sun reduction	0.24		0.23		0.27						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.66		0.67		0.67						
Total reduction	0.16		0.16		0.18						
Total, real	21		73		69						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: FX - H180

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:37 (2) 17:50 (2)	07:24 16:54
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:34 (2) 17:53 (2)	07:26 16:52
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:31 (2) 17:55 (2)	07:28 16:50
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:29 (2) 17:56 (2)	07:30 16:48
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:28 (2) 17:58 (2)	07:32 16:46
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:27 (2) 17:58 (2)	07:34 16:44
7	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50	17:24 (2) 17:58 (2)	07:36 16:43
8	05:05 21:56	05:50 21:12	06:45 20:01	07:39 18:48	17:24 (2) 17:59 (2)	07:38 16:41
9	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	17:23 (2) 17:59 (2)	07:40 16:39
10	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	17:22 (2) 17:59 (2)	07:42 16:37
11	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	17:22 (2) 17:59 (2)	07:44 16:35
12	05:09 21:53	05:57 21:03	06:52 19:51	07:46 18:38	17:21 (2) 17:59 (2)	07:45 16:34
13	05:10 21:52	05:59 21:01	06:54 19:49	07:48 18:36	17:21 (2) 17:59 (2)	07:47 16:32
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	17:21 (2) 17:59 (2)	07:49 16:31
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	17:21 (2) 17:58 (2)	07:51 16:29
16	05:14 21:49	06:04 20:55	06:59 19:42	07:54 18:29	17:21 (2) 17:58 (2)	07:53 16:27
17	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	17:22 (2) 17:57 (2)	07:55 16:26
18	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	17:22 (2) 17:55 (2)	07:57 16:24
19	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	17:23 (2) 17:52 (2)	07:59 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	17:24 (2) 17:50 (2)	08:00 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	17:25 (2) 17:48 (2)	08:02 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	17:26 (2) 17:45 (2)	08:04 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	17:27 (2) 17:43 (2)	08:06 16:18
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	17:29 (2) 17:41 (2)	08:08 16:17
25	05:27 21:36	06:20 20:35	07:15 19:19	08:11 18:09	16:33 (2) 16:38 (2)	08:09 16:16
26	05:29 21:35	06:22 20:32	07:17 19:17	08:13 18:07	16:16 16:14	16:16 16:13
27	05:30 21:33	06:24 20:30	07:19 19:14	08:15 18:04	16:13 16:13	16:13 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	08:16 18:02	16:12 16:12	16:12 16:10
29	05:34 21:30	06:27 20:25	07:22 19:09	08:18 18:00	16:11 16:11	16:11 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	08:20 17:58	16:18 16:11	16:18 16:12
31	05:37 21:27	06:31 20:21	07:26 19:05	08:22 17:56	16:19 16:13	16:19 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case				709	248	374
Sun reduction				0.29	0.27	0.21
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.66	0.65
Total reduction				0.20	0.18	0.13
Total, real				140	43	50

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: FY - H181

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	16:04 (3)	07:16	16:33 (2)	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	16:15	17:06	10 16:14 (3)	18:02	18 16:51 (2)	20:00	20:55	21:45	22:00	21:25	20:18	19:05
3	08:44	08:12	07:14	16:36 (2)	06:59	05:50	05:02	04:59	05:40	06:35	07:28	08:21
4	16:16	17:08	18:04	20:02	20:57	21:46	22:00	21:23	20:16	19:02	16:52	22 16:21 (2)
5	08:44	08:10	07:12	16:36 (2)	06:59	05:50	05:02	04:59	05:40	06:35	07:28	08:21
6	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	19 16:19 (2)
7	08:44	08:08	07:09	16:32 (2)	07:02	06:54	05:46	05:01	05:44	06:38	07:31	08:24
8	16:18	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	15 16:17 (2)
9	08:43	08:07	16:38 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	08:25
10	16:19	17:14	5 16:43 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46
11	08:43	08:05	16:34 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	08:26
12	16:21	17:16	11 16:45 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44
13	08:42	08:03	16:32 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	08:28
14	16:22	17:18	15 16:47 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43
15	08:42	08:01	16:31 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	08:29
16	16:24	17:20	19 16:50 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41
17	08:41	07:59	16:29 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30
18	16:25	17:22	23 16:52 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39
19	08:40	07:57	16:28 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	08:31
20	16:26	17:24	26 16:54 (2)	18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37
21	08:40	07:55	16:27 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	08:33
22	16:28	17:26	29 16:56 (2)	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35
23	08:39	07:53	16:27 (2)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	08:34
24	16:30	17:28	32 16:59 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34
25	08:38	07:51	16:25 (2)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	08:35
26	16:31	17:30	34 16:59 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32
27	08:37	15:55 (3)	07:49	16:25 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
28	16:33	2 15:57 (3)	17:32	17:00 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33
29	08:36	15:55 (3)	07:47	16:25 (2)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52
30	16:34	4 15:59 (3)	17:34	17:01 (2)	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31
31	08:35	15:54 (3)	07:45	16:25 (2)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54
32	16:36	6 16:00 (3)	17:36	17:01 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29
33	08:34	15:54 (3)	07:43	16:25 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55
34	16:38	8 16:02 (3)	17:38	17:02 (2)	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26
35	08:33	15:55 (3)	07:41	16:24 (2)	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57
36	16:40	10 16:05 (3)	17:40	17:01 (2)	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24
37	08:32	15:55 (3)	07:39	16:24 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
38	16:41	12 16:07 (3)	17:42	17:01 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22
39	08:31	15:54 (3)	07:36	16:24 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
40	16:43	14 16:08 (3)	17:44	17:01 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20
41	08:30	15:55 (3)	07:34	16:25 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03
42	16:45	16 16:11 (3)	17:46	17:01 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17
43	08:29	15:55 (3)	07:32	16:24 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05
44	16:47	17 16:12 (3)	17:48	17:00 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15
45	08:27	15:55 (3)	07:30	16:25 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07
46	16:49	20 16:15 (3)	17:50	16:25 (2)	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13
47	08:26	15:55 (3)	07:28	16:26 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09
48	16:50	22 16:17 (3)	17:52	16:25 (2)	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11
49	08:25	15:56 (3)	07:25	16:26 (2)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11
50	16:52	23 16:19 (3)	17:54	16:57 (2)	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09
51	08:23	15:56 (3)	07:23	16:28 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13
52	16:54	22 16:18 (3)	17:56	16:56 (2)	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06
53	08:22	15:57 (3)	07:21	16:29 (2)	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15
54	16:56	21 16:18 (3)	17:58	16:55 (2)	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04
55	08:20	15:58 (3)	07:18	16:30 (2)	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16
56	16:58	20 16:18 (3)	18:00	23 16:53 (2)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02
57	08:19	15:59 (3)	07:17	16:31 (2)	06:10	05:56	05:06	04:57	05:34	06:27	07:22	08:17
58	16:59	18 16:17 (3)	18:01	19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:12
59	08:17	16:00 (3)	07:16	19:56	20:54	21:43	22:00	21:28	20:23	19:07	17:02	16:13
60	17:02	17 16:17 (3)	18:02	19:56	20:54	21:43	22:00	21:28	20:23	19:07	17:02	16:13
61	08:15	16:01 (3)	07:15	19:58	20:56	21:45	22:01	21:29	20:21	19:05	17:04	16:14
62	17:04	14 16:15 (3)	18:03	19:58	20:56	21:45	22:01	21:29	20:21	19:05	17:04	16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	266	706	29	29	29	29	29	29	29	29	29	29
Sun reduction	0.24	0.23	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Oper. time red.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wind dir. red.	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Total reduction	0.16	0.15	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Total, real	43	108	5	5	5	5	5	5	5	5	5	5

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** FZ - H182

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		15:10 (3)	08:14	15:24 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		06:33	07:26	07:24		07:24		08:19	14:59 (3)
	16:15	27	15:37 (2)	17:06	15:58 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54		16:10	16:54	16:10		16:10		16:10	15:31 (2)
2	08:44		15:11 (3)	08:12	15:25 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28		07:26		15:07 (2)	07:26	15:07 (2)		15:07 (2)		15:07 (2)	14:58 (3)
	16:16	28	15:39 (2)	17:08	15:57 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52	9	15:16 (2)	16:52	15:16 (2)		15:16 (2)		15:16 (2)	15:30 (2)
3	08:44		15:11 (3)	08:10	15:26 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28		15:04 (2)	07:28	15:04 (2)		15:04 (2)		15:04 (2)	14:59 (3)
	16:17	28	15:39 (2)	17:10	15:57 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00		16:50	16	15:20 (2)	16:50	15:20 (2)		15:20 (2)		15:20 (2)	15:31 (2)
4	08:43		15:12 (3)	08:08	15:27 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31		07:30		15:01 (2)	07:30	15:01 (2)		15:01 (2)		15:01 (2)	14:59 (3)
	16:18	29	15:41 (2)	17:12	15:56 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48	21	15:22 (2)	16:48	15:22 (2)		15:22 (2)		15:22 (2)	15:31 (2)
5	08:43		15:12 (3)	08:07	15:28 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33		07:32		14:59 (2)	07:32	14:59 (2)		14:59 (2)		14:59 (2)	15:30 (2)
	16:19	30	15:42 (2)	17:14	15:55 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55		16:46	24	15:23 (2)	16:46	15:23 (2)		15:23 (2)		15:23 (2)	15:30 (2)
6	08:43		15:13 (3)	08:05	15:30 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35		07:34		14:58 (2)	07:34	14:58 (2)		14:58 (2)		14:58 (2)	15:30 (2)
	16:21	31	15:44 (2)	17:16	15:53 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52		16:44	27	15:25 (2)	16:44	15:25 (2)		15:25 (2)		15:25 (2)	15:30 (2)
7	08:42		15:14 (3)	08:03	15:32 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37		07:36		14:57 (2)	07:36	14:57 (2)		14:57 (2)		14:57 (2)	15:30 (2)
	16:22	31	15:45 (2)	17:18	15:52 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43	29	15:26 (2)	16:43	15:26 (2)		15:26 (2)		15:26 (2)	15:30 (2)
8	08:42		15:14 (3)	08:01	15:34 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39		07:38		14:56 (2)	07:38	14:56 (2)		14:56 (2)		14:56 (2)	15:30 (2)
	16:24	32	15:46 (2)	17:20	15:50 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41	30	15:26 (2)	16:41	15:26 (2)		15:26 (2)		15:26 (2)	15:30 (2)
9	08:41		15:16 (3)	07:59	15:39 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40		14:56 (2)	07:40	14:56 (2)		14:56 (2)		14:56 (2)	15:30 (2)
	16:25	31	15:47 (2)	17:22	15:46 (2)	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45		16:39	32	15:28 (2)	16:39	15:28 (2)		15:28 (2)		15:28 (2)	15:30 (2)
10	08:40		15:16 (3)	07:57	15:48 (2)	17:24	18:19	20:17	21:11	21:55	21:55	21:08	19:56		16:37	34	15:29 (2)	16:37	15:29 (2)		15:29 (2)		15:29 (2)	15:30 (2)
	16:26	32	15:48 (2)	17:24	15:50 (2)	18:20	20:18	21:13	21:55	21:54	21:05	19:54	18:40		16:35	34	15:29 (2)	16:35	15:29 (2)		15:29 (2)		15:29 (2)	15:30 (2)
11	08:40		15:17 (3)	07:55	15:50 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54		16:34	34	15:29 (2)	16:34	15:29 (2)		15:29 (2)		15:29 (2)	15:30 (2)
	16:28	32	15:49 (2)	17:26	15:51 (3)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52		07:46		14:54 (2)	07:46	14:54 (2)		14:54 (2)		14:54 (2)	15:30 (2)
12	08:39		15:18 (3)	07:53	15:50 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51		16:34	36	15:30 (2)	16:34	15:30 (2)		15:30 (2)		15:30 (2)	15:30 (2)
	16:30	32	15:50 (2)	17:28	15:51 (3)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54		07:47		14:54 (2)	07:47	14:54 (2)		14:54 (2)		14:54 (2)	15:30 (2)
13	08:38		15:19 (3)	07:51	15:51 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49		16:32	36	15:30 (2)	16:32	15:30 (2)		15:30 (2)		15:30 (2)	15:30 (2)
	16:31	32	15:51 (2)	17:30	15:52 (2)	17:30	18:27	20:24	21:18	21:58	21:51	20:59	19:47		16:31	36	15:30 (2)	16:31	15:30 (2)		15:30 (2)		15:30 (2)	15:30 (2)
14	08:37		15:20 (2)	07:49	15:52 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47		16:31	36	15:30 (2)	16:31	15:30 (2)		15:30 (2)		15:30 (2)	15:30 (2)
	16:33	32	15:52 (2)	17:32	15:53 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47		16:31	36	15:30 (2)	16:31	15:30 (2)		15:30 (2)		15:30 (2)	15:30 (2)
15	08:36		15:20 (2)	07:47	15:53 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44		16:29	37	15:31 (2)	16:29	15:31 (2)		15:31 (2)		15:31 (2)	15:30 (2)
	16:34	33	15:53 (2)	17:34	15:54 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44		16:29	37	15:31 (2)	16:29	15:31 (2)		15:31 (2)		15:31 (2)	15:30 (2)
16	08:35		15:19 (2)	07:45	15:59 (1)	18:30	18:25	20:24	21:18	21:58	21:50	20:57	19:44		16:27	37	15:31 (2)	16:27	15:31 (2)		15:31 (2)		15:31 (2)	15:30 (2)
	16:36	34	15:53 (2)	17:36	15:59 (1)	18:30	18:25	20:24	21:18	21:58	21:50	20:57	19:44		16:27	37	15:31 (2)	16:27	15:31 (2)		15:31 (2)		15:31 (2)	15:30 (2)
17	08:34		15:19 (2)	07:43	15:59 (1)	18:30	18:25	20:24	21:18	21:58	21:50	20:57	19:44		16:27	37	15:31 (2)	16:27	15:31 (2)		15:31 (2)		15:31 (2)	15:30 (2)
	16:38	35	15:54 (2)	17:38	15:59 (1)	18:32	18:27	20:24	21:18	21:58	21:50	20:57	19:44		16:27	37	15:31 (2)	16:27	15:31 (2)		15:31 (2)		15:31 (2)	15:30 (2)
18	08:33		15:20 (2)	07:41	15:57 (1)	18:34	18:27	20:24	21:18	21:58	21:50	20:57	19:44		16:27	37	15:31 (2)	16:27	15:31 (2)		15:31 (2)		15:31 (2)	15:30 (2)
	16:40	35	15:55 (2)	17:40	15:58 (1)	18:34	18:27	20:24	21:18	21:58	21:50	20:57	19:44		16:27	37	15:31 (2)	16:27	15:31 (2)		15:31 (2)		15:31 (2)	15:30 (2)
19	08:32		15:20 (2)	07:39	15:57 (1)	18:33	18:26	20:23	21:17	21:57	21:50	20:57	19:44		16:27	37	15:31 (2)	16:27	15:31 (2)		15:31 (2)		15:31 (2)	15:30 (2)
	16:41	36	15:56 (2)	17:42	15:58 (1)	18:36	18:29	20:26	21:20	21:58	21:50	20:57	19:44		16:27	37	15:31 (2)	16:27	15:31 (2)		15:31 (2)		15:31 (2)	15:30 (2)
20	08:31		15:21 (2)	07:36	15:58 (1)	18:36	18:29	20:26	21:20	21:58	21:50	20:57	19:44		16:27	37	15:31 (2)	16:27	15:31 (2)		15:31 (2)		15:31 (2)	15:30 (2)
	16:43	37	15:56 (2)	17:44	15:59 (1)	18:38	18:31	20:30	21:24	21:61	21:51	20:57	19:44		16:25	38	15:32 (2)	16:25	15:32 (2)		15:32 (2)		15:32 (2)	15:30 (2)
21	08:30		15:20 (2)	07:34	15:58 (1)	18:38	18:31	20:30	21:24	21:61	21:51	20:57	19:44		16:25	38	15:32 (2)	16:25	15:32 (2)		15:32 (2)		15:32 (2)	15:30 (2)
	16:45	36	15:56 (2)	17:46	15:59 (1)	18:40	18:33	20:32	21:26	21:63	21:53	20:59	19:46		16:25	38	15:32 (2)	16:25	15:32 (2)		15:32 (2)		15:32 (2)	15:30 (2)
22	08:29		15:20 (2)	07:32	15:58 (1)	18:40	18:33	20:30	21:24	21:61	21:51	20:57	19:44		16:25	38	15:32 (2)	16:25	15:32 (2)		15:32 (2)		15:32 (2)	15:30 (2)
	16:47	36	15:56 (2)	17:48	15:59 (1)	18:42	18:35	20:32	21:26	21:63	21:53	20:59	19:46		16:25	38	15:32 (2)	16:25	15:32 (2)		15:32 (2)		15:32 (2)	15:30 (2)
23	08:27		15:20 (2)	07:30	15:58 (1)	18:42	18:35	20:32	21:26	21:63	21:53	20:59	19:46		16:25	38	15:32 (2)	16:25	15:32 (2)		15:32 (2)		15:32 (2)	15:30 (2)
	16:49	37	15:57 (2)	17:50	15:58 (1)	18:43	18:36	20:34	21:28	21:65	21:55	20:61	19:48		16:25	38	15:32 (2)	16:25	15:32 (2)		15:32 (2)		15:32 (2)	15:30 (2)
24	08:26		15:20 (2)	07:28	15:58 (1)	18:43	18:36	20:34	21:28	21:65	21:55	20:61	19:48		16:25	38	15:32 (2)	16:25	15:32 (2)		15:32 (2)		15:32 (2)	15:30 (2)
	16:50	37	15:57 (2)	17:52	15:59 (1)	18:45	18:38	20:36	21:30	21:67	21:57	20:63	19:50		16:25	38	15:32 (2)	16:25	15:32 (2)		15:32 (2)		15:32 (2)	15:30 (2)
25	08:25		15:21 (2)	07:25	15:58 (1)	18:45	18:38	20:36	21:30	21:67	21:57	20:63	19:50		16:25	38	15:32 (2)	16:25	15:32 (2)		15:32 (2)		15:32 (2)	15:30 (2)
	16:52	37	15:58 (2)	17:54	15:59 (1)	18:47	18:40	20:38	21:32	21:69	21:59	20:65	19:52		16:25	38	15:32 (2)	16:25	15:32 (2)		15:32 (2)		15:32 (2)	15:30 (2)
26	08:23		15:21 (2)	07:23	15:58 (1)	18:47	18:40	20:38	21:32	21:69	21:59	20:65	19:52		16:25	38	15:32 (2)	16:25						

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GA - H183

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	15:07 (3) 15:37 (2)	08:14 17:06	15:20 (2) 15:53 (2)	07:16 18:02	05:52 20:00	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	08:19 16:10
2	08:44 16:16	15:08 (3) 15:38 (2)	08:12 17:08	15:20 (2) 15:52 (2)	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	04:59 22:00	05:40 20:16	06:35 19:02	07:28 16:52
3	08:44 16:17	15:08 (3) 15:38 (2)	08:10 17:10	15:21 (2) 15:51 (2)	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 20:13	06:36 19:00	07:30 16:50
4	08:43 16:18	15:09 (3) 15:40 (2)	08:08 17:12	15:23 (2) 15:50 (2)	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 20:11	06:38 18:57	07:31 16:48
5	08:43 16:19	15:09 (3) 15:40 (2)	08:07 17:14	15:24 (2) 15:49 (2)	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:58	05:02 21:17	05:45 20:09	06:40 18:55	07:33 16:46
6	08:43 16:21	15:10 (3) 15:42 (2)	08:05 17:16	15:26 (2) 15:48 (2)	07:04 18:11	06:49 20:09	05:42 21:04	05:03 21:51	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44
7	08:42 16:22	15:11 (3) 15:42 (2)	08:03 17:18	15:28 (2) 15:46 (2)	07:02 18:13	06:47 20:11	05:40 21:06	05:04 21:52	05:49 21:14	06:43 20:04	07:37 18:50	07:36 16:43
8	08:42 16:24	15:11 (3) 15:43 (2)	08:01 17:20	15:32 (2) 15:43 (2)	07:00 18:15	06:44 20:13	05:38 21:08	05:05 21:53	05:50 21:12	06:45 20:01	07:39 18:48	07:38 16:41
9	08:41 16:25	15:13 (3) 15:45 (2)	07:59 17:22	15:43 (2) 15:14 (2)	18:15 17:57	06:42 06:55	05:36 05:39	05:52 05:34	05:52 05:07	06:47 05:54	07:41 06:49	07:40 07:42
10	08:40 16:26	15:14 (2) 15:45 (2)	07:57 17:24	15:14 (2) 15:45 (2)	18:19 17:58	06:53 06:55	05:37 05:39	05:33 05:35	05:56 05:58	06:50 06:52	07:44 07:46	14:50 (2) 15:24 (2)
11	08:40 16:28	15:14 (2) 15:46 (2)	07:55 17:26	15:14 (2) 15:46 (2)	18:21 17:59	06:53 06:55	05:37 05:39	05:33 05:35	05:56 05:58	06:50 06:52	07:44 07:46	14:50 (2) 15:24 (2)
12	08:39 16:30	15:14 (2) 15:47 (2)	07:53 17:28	15:14 (2) 15:47 (2)	18:23 17:59	06:50 06:52	05:35 05:37	05:09 05:11	05:57 05:59	06:52 06:54	07:46 07:48	14:49 (2) 15:25 (2)
13	08:38 16:31	15:14 (2) 15:48 (2)	07:51 17:30	15:14 (2) 15:48 (2)	18:25 17:59	06:48 06:50	05:32 05:34	05:09 05:11	05:59 06:01	06:54 06:56	07:48 07:50	14:49 (2) 15:25 (2)
14	08:37 16:33	15:14 (2) 15:48 (2)	07:49 17:32	15:14 (2) 15:48 (2)	18:27 17:59	06:45 06:47	05:27 05:29	05:05 05:07	06:01 06:03	06:56 06:58	07:50 07:52	14:49 (2) 15:26 (2)
15	08:36 16:34	15:14 (2) 15:49 (2)	07:47 17:34	15:14 (2) 15:49 (2)	18:28 17:59	06:43 06:45	05:25 05:27	05:03 05:05	06:03 06:05	06:58 06:59	07:52 07:54	14:48 (2) 15:26 (2)
16	08:35 16:36	15:13 (2) 15:49 (2)	07:45 17:36	15:13 (2) 15:49 (2)	18:30 17:59	06:40 06:42	05:24 05:26	05:04 05:06	06:04 06:06	06:59 07:01	07:54 07:56	14:48 (2) 15:26 (2)
17	08:34 16:38	15:13 (2) 15:50 (2)	07:43 17:38	15:13 (2) 15:50 (2)	18:32 17:59	06:38 06:40	05:22 05:24	05:04 05:06	06:06 06:08	07:01 07:03	07:55 07:57	14:48 (2) 15:27 (2)
18	08:33 16:40	15:14 (2) 15:51 (2)	07:41 17:40	15:14 (2) 15:51 (2)	18:34 17:59	06:36 06:38	05:21 05:23	05:03 05:05	06:08 06:10	07:03 07:05	07:57 07:59	14:49 (2) 15:27 (2)
19	08:32 16:41	15:14 (2) 15:52 (2)	07:39 17:42	15:14 (2) 15:52 (2)	18:36 17:59	06:33 06:35	05:19 05:21	05:08 05:10	06:10 06:12	07:05 07:07	07:59 08:01	14:49 (2) 15:27 (2)
20	08:31 16:43	15:14 (2) 15:52 (2)	07:36 17:44	15:14 (2) 15:52 (2)	18:38 17:59	06:31 06:33	05:18 05:20	05:06 05:08	06:12 06:14	07:06 07:08	08:01 08:03	14:49 (2) 15:27 (2)
21	08:30 16:45	15:14 (2) 15:53 (2)	07:34 17:46	15:14 (2) 15:53 (2)	18:40 17:59	06:28 06:30	05:16 05:18	05:04 05:06	06:13 06:15	07:08 07:10	08:03 08:05	14:49 (2) 15:27 (2)
22	08:29 16:47	15:14 (2) 15:52 (2)	07:32 17:48	15:14 (2) 15:52 (2)	18:42 17:59	06:26 06:28	05:15 05:17	05:03 05:05	06:15 06:17	07:10 07:12	08:05 08:07	14:49 (2) 15:27 (2)
23	08:27 16:49	15:15 (2) 15:53 (2)	07:30 17:50	15:15 (2) 15:53 (2)	18:43 17:59	06:23 06:25	05:13 05:15	05:02 05:04	06:19 06:21	07:13 07:15	08:09 08:11	14:50 (2) 15:28 (2)
24	08:26 16:50	15:15 (2) 15:53 (2)	07:28 17:52	15:15 (2) 15:53 (2)	18:45 17:59	06:21 06:23	05:12 05:14	05:05 05:07	06:19 06:21	07:13 07:15	08:09 08:11	14:51 (2) 15:28 (2)
25	08:25 16:52	15:15 (2) 15:54 (2)	07:25 17:54	15:15 (2) 15:54 (2)	18:45 17:59	06:18 06:20	05:11 05:13	05:05 05:07	06:20 06:22	07:15 07:17	08:09 08:11	14:52 (2) 15:29 (2)
26	08:23 16:54	15:15 (2) 15:54 (2)	07:23 17:56	15:15 (2) 15:54 (2)	18:47 17:59	06:16 06:18	05:09 05:11	05:04 05:06	06:22 06:24	07:17 07:19	08:13 08:15	14:52 (2) 15:30 (2)
27	08:22 16:56	15:16 (2) 15:53 (2)	07:21 17:58	15:16 (2) 15:53 (2)	18:49 17:59	06:13 06:15	05:08 05:10	05:04 05:06	06:24 06:26	07:19 07:21	08:15 08:17	14:53 (2) 15:31 (2)
28	08:20 16:58	15:17 (2) 15:54 (2)	07:19 18:00	15:17 (2) 15:54 (2)	18:50 17:59	06:11 06:13	05:08 05:10	05:04 05:06	06:26 06:28	07:21 07:23	08:16 08:18	14:54 (2) 15:32 (2)
29	08:19 17:00	15:17 (2) 15:54 (2)	07:19 18:00	15:17 (2) 15:54 (2)	18:50 17:59	06:10 06:12	05:07 05:09	05:04 05:06	06:27 06:29	07:22 07:24	08:17 08:19	14:54 (2) 15:33 (2)
30	08:17 17:02	15:17 (2) 15:53 (2)	07:19 18:00	15:17 (2) 15:53 (2)	18:50 17:59	06:09 06:11	05:06 05:08	05:04 05:06	06:28 06:30	07:23 07:25	08:18 08:20	14:55 (2) 15:34 (2)
31	08:15 17:04	15:18 (2) 15:53 (2)	07:19 18:00	15:18 (2) 15:53 (2)	18:50 17:59	06:08 06:10	05:05 05:07	05:04 05:06	06:29 06:31	07:24 07:26	08:19 08:21	14:55 (2) 15:35 (2)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	1077	347										
Sun reduction	0.24	0.23										
Oper. time red.	1.00	1.00										
Wind dir. red.	0.66	0.66										
Total reduction	0.16	0.15										
Total, real	172	53										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GB - H184

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	15:06 (3)	08:14	15:18 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	16:15	30	15:36 (2)	17:06	33	15:51 (2)	18:02	20:00	20:55	21:45	22:00	19:05
3	08:44	15:07 (3)	08:12	15:19 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28
4	16:16	30	15:37 (2)	17:08	31	15:50 (2)	18:04	20:02	20:57	21:47	22:00	19:02
5	08:44	15:07 (3)	08:10	15:20 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
6	16:17	30	15:37 (2)	17:10	29	15:49 (2)	18:06	20:04	20:59	21:48	21:59	19:00
7	08:43	15:08 (3)	08:08	15:21 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31
8	16:18	31	15:39 (2)	17:12	27	15:48 (2)	18:07	20:06	21:01	21:49	21:59	18:57
9	08:43	15:08 (3)	08:07	15:23 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33
10	16:19	31	15:39 (2)	17:14	24	15:47 (2)	18:09	20:07	21:03	21:50	21:58	18:55
11	08:43	15:09 (3)	08:05	15:25 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35
12	16:21	32	15:41 (2)	17:16	20	15:45 (2)	18:11	20:09	21:04	21:51	21:58	18:52
13	08:42	15:10 (3)	08:03	15:27 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37
14	16:22	31	15:41 (2)	17:18	16	15:43 (2)	18:13	20:11	21:06	21:52	21:57	18:50
15	08:42	15:10 (3)	08:01	15:31 (2)	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39
16	16:24	32	15:42 (2)	17:20	8	15:39 (2)	18:15	20:13	21:08	21:53	21:56	18:48
17	08:41	15:12 (2)	07:59	15:57 (1)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
18	16:25	31	15:43 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45
19	08:40	15:11 (2)	07:57	15:55 (1)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42
20	16:26	33	15:44 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43
21	08:40	15:11 (2)	07:55	15:56 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44
22	16:28	34	15:45 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40
23	08:39	15:11 (2)	07:53	15:50 (1)	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46
24	16:30	34	15:45 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38
25	08:38	15:11 (2)	07:51	15:51 (1)	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48
26	16:31	35	15:46 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36
27	08:37	15:11 (2)	07:49	15:59 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50
28	16:33	36	15:47 (2)	17:32	3	17:02 (1)	18:27	20:24	21:18	21:58	21:51	18:33
29	08:36	15:12 (2)	07:47	16:58 (1)	06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52
30	16:34	36	15:48 (2)	17:34	7	17:05 (1)	18:28	20:26	21:20	21:58	21:50	18:31
31	08:35	15:11 (2)	07:45	16:57 (1)	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54
32	16:36	37	15:48 (2)	17:36	10	17:07 (1)	18:30	20:28	21:22	21:59	21:49	18:29
33	08:34	15:11 (2)	07:43	16:57 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55
34	16:38	37	15:48 (2)	17:38	12	17:09 (1)	18:32	20:30	21:23	21:59	21:47	18:26
35	08:33	15:12 (2)	07:41	16:56 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57
36	16:40	37	15:49 (2)	17:40	15	17:11 (1)	18:34	20:31	21:25	22:00	21:46	18:24
37	08:32	15:12 (2)	07:39	16:56 (1)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59
38	16:41	38	15:50 (2)	17:42	17	17:13 (1)	18:36	20:33	21:27	22:00	21:45	18:22
39	08:31	15:12 (2)	07:36	16:56 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01
40	16:43	38	15:50 (2)	17:44	19	17:15 (1)	18:38	20:35	21:28	22:00	21:44	18:20
41	08:30	15:12 (2)	07:34	16:57 (1)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03
42	16:45	39	15:51 (2)	17:46	18	17:15 (1)	18:40	20:37	21:30	22:01	21:42	18:17
43	08:29	15:12 (2)	07:32	16:56 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05
44	16:47	39	15:51 (2)	17:48	17	17:13 (1)	18:42	20:39	21:31	22:01	21:41	18:15
45	08:27	15:13 (2)	07:30	16:58 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07
46	16:49	38	15:51 (2)	17:50	15	17:13 (1)	18:43	20:41	21:33	22:01	21:39	18:13
47	08:26	15:12 (2)	07:28	16:59 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09
48	16:50	39	15:51 (2)	17:52	12	17:11 (1)	18:45	20:43	21:34	22:01	21:38	18:11
49	08:25	15:13 (2)	07:25	17:01 (1)	06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11
50	16:52	39	15:52 (2)	17:54	7	17:08 (1)	18:47	20:44	21:36	22:01	21:36	18:09
51	08:23	15:13 (2)	07:23	16:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	18:08
52	16:54	39	15:52 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06
53	08:22	15:14 (2)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	18:03
54	16:56	37	15:51 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04
55	08:20	15:15 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	18:02
56	16:58	37	15:52 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02
57	08:19	15:15 (2)	07:18	07:09	05:56	05:06	04:57	05:34	06:27	07:22	07:18	18:01
58	17:00	37	15:52 (2)	19:00	19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00
59	08:17	15:16 (2)	07:17	07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	18:00
60	17:02	35	15:51 (2)	19:06	19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58
61	08:15	15:16 (2)	07:16	07:04	05:54	05:04	04:57	05:37	06:31	07:26	07:22	18:00
62	17:04	35	15:51 (2)	19:08	19:58	20:56	21:44	22:01	21:27	20:21	16:56	16:56
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	1087	340									152	905
Sun reduction	0.24	0.23									0.29	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.66	0.66									0.67	0.65
Total reduction	0.16	0.15									0.20	0.14
Total, real	173	52									30	122

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GC - H185

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		16:04 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24										08:19
	16:15		17:06	16	16:20 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54										16:10
2	08:44		08:12		16:06 (1)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26										08:21
	16:16		17:08	12	16:18 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52										16:09
3	08:44		08:10		16:08 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28										08:22
	16:17		17:10	8	16:16 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50										16:08
4	08:43		08:08			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30										08:24
	16:18		17:12			18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48										16:08
5	08:43		08:07			07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32										08:25
	16:19		17:14			18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46										16:07
6	08:43		08:05			07:05	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34										08:26
	16:21		17:16			18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44										16:07
7	08:42		08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36										08:28
	16:22		17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43										16:06
8	08:42		08:01			07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38								15:38 (1)		08:29
	16:24		17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41						8			15:46 (1)	16:06
9	08:41		07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40								15:37 (1)		08:30
	16:25		17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39						12			15:49 (1)	16:05
10	08:40		07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42								15:35 (1)		08:32
	16:26		17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37						15			15:50 (1)	16:05
11	08:40		07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:44								15:34 (1)		08:33
	16:28		17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:35						17			15:51 (1)	16:05
12	08:39		07:53			06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46								15:34 (1)		08:34
	16:30		17:28			18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34						18			15:52 (1)	16:05
13	08:38		07:51			06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47								15:33 (1)		08:35
	16:31		17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32						20			15:53 (1)	16:05
14	08:37		07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49								15:33 (1)		08:36
	16:33		17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31						20			15:53 (1)	16:04
15	08:36		07:47			06:43	06:28	05:26	04:54	05:13	06:03	06:58	07:52	07:51								15:33 (1)		08:37
	16:34		17:34			18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29						20			15:53 (1)	16:04
16	08:35		07:45			06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53								15:33 (1)		08:38
	16:36		17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27						21			15:54 (1)	16:05
17	08:34		16:01 (1)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55								15:33 (1)		08:39
	16:38	1	16:02 (1)	17:38		18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26						19			15:52 (1)	16:05
18	08:33		16:01 (1)	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57								15:33 (1)		08:39
	16:40	4	16:05 (1)	17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:24						17			15:50 (1)	16:05
19	08:32		16:01 (1)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59								15:34 (1)		08:40
	16:41	6	16:07 (1)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23						15			15:49 (1)	16:05
20	08:31		16:00 (1)	07:37		06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01								15:34 (1)		08:41
	16:43	8	16:08 (1)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22						13			15:47 (1)	16:06
21	08:30		16:00 (1)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02								15:35 (1)		08:41
	16:45	11	16:11 (1)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20						11			15:46 (1)	16:06
22	08:29		15:59 (1)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04								15:36 (1)		08:42
	16:47	13	16:12 (1)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19						8			15:44 (1)	16:06
23	08:27		16:00 (1)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06								15:37 (1)		08:42
	16:49	15	16:15 (1)	17:50		18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18						6			15:43 (1)	16:07
24	08:26		15:59 (1)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08								15:38 (1)		08:43
	16:50	17	16:16 (1)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17						4			15:42 (1)	16:08
25	08:25		16:00 (1)	07:25		06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09								15:39 (1)		08:43
	16:52	19	16:19 (1)	17:54		18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16						1			15:40 (1)	16:08
26	08:23		16:00 (1)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11										08:43
	16:54	21	16:21 (1)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14										16:09
27	08:22		16:00 (1)	07:21		06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13										08:44
	16:56	20	16:20 (1)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13										16:10
28	08:20		16:01 (1)	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14										08:44
	16:58	20	16:21 (1)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12										16:10
29	08:19		16:01 (1)			07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16										08:44
	17:00	20	16:21 (1)			19:55	20:52	21:42	22:01	21:30	20:25	19:09	17:00	16:12										16:11
30	08:17		16:02 (1)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18										08:44
	17:02	18	16:20 (1)			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11										16:12
31	08:15		16:02 (1)			07:04		05:04		05:37	06:31		07:22											08:44
	17:04	17	16:19 (1)			19:58		21:44		21:27	20:21		16:56											16:13
Potential sun hours	250		273			367	420	494	510		512	460	382	328	259									233
Total, worst case	210		36												245									
Sun reduction	0.24		0.23												0.27									
Oper. time red.	1.00		1.00												1.00									
Wind dir. red.	0.66		0.66												0.66									
Total reduction	0.16		0.15																					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GD - H186

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		10:59 (2)	08:14		15:41 (1)	07:16		07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24		08:19			10:51 (2)		
2	08:44	42	11:41 (2)	17:06	27	16:08 (1)	18:02		20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10		44	15:34 (1)			
	16:16	41	11:42 (2)	17:08	25	16:07 (1)	18:04		20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09		43	15:33 (1)			
3	08:44		11:01 (2)	08:10		15:43 (1)	07:12		06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22			10:50 (2)			
	16:17	41	11:42 (2)	17:10	23	16:06 (1)	18:06		20:04	20:59	21:40	21:59	21:21	20:59	19:46	16:50		16:08		42	15:32 (1)			
4	08:43		11:02 (2)	08:09		15:44 (1)	07:09		06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24			10:40 (2)			
	16:18	40	11:42 (2)	17:12	21	16:05 (1)	18:08		20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	10	15:30 (1)	08:14		41	15:32 (1)		
5	08:43		11:02 (2)	08:07		15:46 (1)	07:07		06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25		10	15:17 (1)			
	16:20	40	11:42 (2)	17:14	18	16:04 (1)	18:09		20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	15	15:32 (1)	08:26		38	11:27 (2)		
6	08:43		11:04 (2)	08:05		15:48 (1)	07:05		06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:26			10:50 (2)			
	16:21	38	11:42 (2)	17:16	14	16:02 (1)	18:11		20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	19	15:34 (1)	08:27		38	11:28 (2)		
7	08:42		11:04 (2)	08:03		15:51 (1)	07:02		06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36		08:28			10:49 (2)			
	16:22	38	11:42 (2)	17:18	8	15:59 (1)	18:13		20:11	21:06	21:52	21:57	21:14	20:04	18:57	16:43	21	15:35 (1)	08:29		40	11:29 (2)		
8	08:42		11:05 (2)	08:01		15:59 (1)	07:00		06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38		08:30			10:50 (2)			
	16:24	39	15:46 (1)	17:20		18:15			20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	23	15:36 (1)	08:31		40	11:30 (2)		
9	08:41		11:07 (2)	07:59		18:17			20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	25	15:38 (1)	08:32		41	11:31 (2)		
	16:25	42	15:49 (1)	17:22		18:19			20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	27	15:39 (1)	08:33		41	11:31 (2)		
10	08:40		11:07 (2)	07:57		18:19			20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	27	15:39 (1)	08:34		41	11:31 (2)		
	16:26	44	15:50 (1)	17:24		18:21			20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36	28	15:39 (1)	08:35		42	11:32 (2)		
11	08:40		11:08 (2)	07:55		18:21			20:19	21:13	21:56	21:54	21:06	19:54	18:40	16:36	28	15:39 (1)	08:36		42	11:32 (2)		
	16:28	45	15:52 (1)	17:26		18:23			20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	29	15:40 (1)	08:37		42	11:32 (2)		
12	08:39		11:10 (2)	07:53		18:25			20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	29	15:40 (1)	08:38		43	11:34 (2)		
	16:30	45	15:54 (1)	17:28		18:27			20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	29	15:40 (1)	08:39		43	11:34 (2)		
13	08:38		11:11 (2)	07:51		18:28			20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	31	15:41 (1)	08:40		44	11:35 (2)		
	16:31	45	15:55 (1)	17:30		18:30			20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	30	15:41 (1)	08:41		44	11:35 (2)		
14	08:37		11:13 (2)	07:49		18:32			20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	30	15:41 (1)	08:42		44	11:35 (2)		
	16:33	44	15:57 (1)	17:32		18:34			20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	30	15:41 (1)	08:43		44	11:36 (2)		
15	08:36		11:15 (2)	07:47		18:36			20:34	21:27	22:00	21:45	20:48	19:34	18:22	16:23	30	15:41 (1)	08:44		44	11:37 (2)		
	16:34	44	15:59 (1)	17:34		18:38			20:36	21:29	22:00	21:48	20:53	19:46	18:33	16:30	31	15:41 (1)	08:45		44	11:38 (2)		
16	08:35		11:17 (2)	07:45		18:40			20:38	21:31	22:00	21:50	20:55	19:42	18:29	16:27	30	15:41 (1)	08:46		44	11:39 (2)		
	16:36	43	16:01 (1)	17:36		18:42			20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	28	15:41 (1)	08:47		45	11:40 (2)		
17	08:34		11:19 (2)	07:43		18:44			20:40	21:33	22:01	21:52	20:57	19:44	18:31	16:29	31	15:41 (1)	08:48		44	11:41 (2)		
	16:38	40	16:02 (1)	17:38		18:46			20:42	21:35	22:01	21:54	20:59	19:46	18:33	16:30	31	15:41 (1)	08:49		44	11:42 (2)		
18	08:33		11:23 (2)	07:41		18:48			20:44	21:37	22:01	21:56	20:61	19:54	18:36	16:32	31	15:41 (1)	08:50		44	11:43 (2)		
	16:40	35	16:04 (1)	17:40		18:50			20:46	21:39	22:01	21:58	20:63	19:56	18:38	16:34	31	15:41 (1)	08:51		44	11:44 (2)		
19	08:32		15:38 (1)	07:39		18:52			20:48	21:41	22:00	21:60	20:65	19:58	18:40	16:36	31	15:41 (1)	08:52		44	11:45 (2)		
	16:41	27	16:05 (1)	17:42		18:54			20:50	21:43	22:00	21:62	20:67	19:60	18:42	16:38	31	15:41 (1)	08:53		44	11:46 (2)		
20	08:31		15:37 (1)	07:37		18:56			20:52	21:45	22:00	21:64	20:69	19:62	18:44	16:40	31	15:41 (1)	08:54		44	11:47 (2)		
	16:43	28	16:05 (1)	17:44		18:58			20:54	21:47	22:00	21:66	20:71	19:64	18:46	16:42	31	15:41 (1)	08:55		44	11:48 (2)		
21	08:30		15:37 (1)	07:34		18:59			20:56	21:49	22:00	21:68	20:73	19:66	18:48	16:44	31	15:41 (1)	08:56		44	11:49 (2)		
	16:45	29	16:06 (1)	17:46		19:00			20:58	21:51	22:00	21:70	20:75	19:68	18:50	16:46	31	15:41 (1)	08:57		44	11:50 (2)		
22	08:29		15:37 (1)	07:32		19:02			20:59	21:53	22:00	21:72	20:77	19:70	18:52	16:48	31	15:41 (1)	08:58		44	11:51 (2)		
	16:47	29	16:06 (1)	17:48		19:04			21:00	21:53	22:01	21:74	20:79	19:72	18:54	16:50	31	15:41 (1)	08:59		44	11:52 (2)		
23	08:27		15:37 (1)	07:30		19:06			21:01	21:55	22:01	21:76	20:81	19:74	18:56	16:52	31	15:41 (1)	09:00		44	11:53 (2)		
	16:49	30	16:07 (1)	17:50		19:08			21:03	21:57	22:01	21:78	20:83	19:76	18:58	16:54	31	15:41 (1)	09:01		44	11:54 (2)		
24	08:26		15:37 (1)	07:28		19:10			21:04	21:58	22:01	21:79	20:85	19:78	18:60	16:56	31	15:41 (1)	09:02		44	11:55 (2)		
	16:51	30	16:07 (1)	17:52		19:12			21:06	21:59	22:01	21:81	20:87	19:80	18:62	16:58	31	15:41 (1)	09:03		44	11:56 (2)		
25	08:25		15:38 (1)	07:25		19:14			21:07	21:59	22:01	21:83	20:89	19:82	18:64	16:60	31	15:41 (1)	09:04		44	11:57 (2)		
	16:52	30	16:08 (1)	17:54		19:16			21:09	22:01	22:01	21:85	20:91	19:84	18:66	16:62	31	15:41 (1)	09:05		44	11:58 (2)		
26	08:23		15:38 (1)	07:23		19:18			21:10	22:02	22:01	21:87	20:93	19:86	18:68	16:64	31	15:41 (1)	09:06		44	11:59 (2)		
	16:54	30	16:08 (1)	17:56		19:20			21:12	22:04	22:01	21:89	20:95	19:88	18:70	16:66	31	15:41 (1)	09:07		44	12:00 (2)		
27	08:22		15:38 (1)	07:21		19:22			21:13	22:05	22:01	21:91	20:97	19:90	18:72	16:68	31	15:41 (1)	09:08		44	12:01 (2)		
	16:56	30	16:08 (1)	17:58		19:24			21:15	22:07	22:01	21:93	21:00	19:92	18:74	16:70	31	15:41 (1)	09:09		44	12:02 (2)		
28	08:20		15:39 (1)	07:19		19:26			21:16	22:08	22:01	21:95	21:02	19:94	18:76	16:72	31	15:41 (1)	09:10		44	12:03 (2)		
	16:58	30	16:09 (1)	18:00		19:28			21:18	22:10	22:01	21:97	21:04	19:96	18:78	16:74	31	15:41 (1)	09:11		44	12:04 (2)		
29	08:19		15:39 (1)			19:30			21:19	22:11	22:01	21:99	21:06	19:98	18:80	16:76	31	15:41 (1)	09:12		44	12:05 (2)		
	17:00	29	16:08 (1)			19:32			21:21	22:13	22:01	22:01	21:08	19:10	18:82	16:78	31	15:41 (1)	09:13		44	12:06 (2)		
30	08:17		15:39 (1)			19:34			21:22	22:14	22:01	22:02	21:09	19:11	18:84	16:80	31	15:41 (1)	09:14		44	12:07 (2)		
	17:02	29	16:08 (1)			19:36			21:24	22:16	22:01	22:03	21:11	19:13	18:86	16:82	31	15:41 (1)	09:15		44	12:08 (2)		
31	08:15		15:40 (1)			19:38			21:25	22:17	22:01	22:04	21:13	19:15	18:88	16:84	31	15:41 (1)	09:16		44	12:09 (2)		
	17:04	27	16:07 (1)																					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GE - H187

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	09:24 (2)	08:14	09:41 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	15:17 (1)	17:06	10:08 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54
3	08:44	09:25 (2)	08:12	09:43 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26
4	16:16	15:18 (1)	17:08	10:06 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
5	08:44	09:25 (2)	08:10	09:45 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28
6	16:17	15:18 (1)	17:10	10:04 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50
7	08:43	09:25 (2)	08:09	09:48 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30
8	16:18	15:19 (1)	17:12	10:01 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48
9	08:43	09:25 (2)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	07:32
10	16:20	15:19 (1)	17:14	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:46
11	08:43	09:26 (2)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	07:34
12	16:21	15:20 (1)	17:16	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	16:44
13	08:42	09:26 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	07:36
14	16:22	15:20 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:43
15	08:42	09:26 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	07:38
16	16:24	15:20 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:41
17	08:41	09:27 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	07:40
18	16:25	15:21 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:39
19	08:40	09:27 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	07:42
20	16:27	15:21 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:37
21	08:40	09:27 (2)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	07:44
22	16:28	15:22 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:36
23	08:39	09:27 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	07:46
24	16:30	15:22 (1)	17:28	18:23	20:20	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:34
25	08:38	09:28 (2)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47	07:47
26	16:31	15:22 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:32
27	08:37	09:28 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	07:49
28	16:33	15:22 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	16:31
29	08:36	09:29 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	07:51
30	16:34	15:23 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:29
31	08:35	09:29 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	07:53
32	16:36	15:23 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:27
33	08:34	09:29 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	07:55
34	16:38	15:22 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	16:26
35	08:33	09:29 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	07:57
36	16:40	15:22 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:25
37	08:32	09:30 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	07:59
38	16:41	15:23 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:23
39	08:31	09:30 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:01
40	16:43	15:22 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:22
41	08:30	09:31 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:02
42	16:45	15:22 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:20
43	08:29	09:31 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:04
44	16:47	15:21 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:19
45	08:27	09:32 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:06
46	16:49	15:21 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	16:18
47	08:26	09:32 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:08
48	16:51	15:20 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:17
49	08:25	09:34 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	08:09	08:09
50	16:52	15:20 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	17:09	16:16	16:16
51	08:23	09:34 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:11
52	16:54	15:19 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:07	16:15	16:15
53	08:22	09:35 (2)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:13
54	16:56	15:18 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:13
55	08:20	09:36 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14	08:14
56	16:58	15:16 (1)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16:13
57	08:19	09:37 (2)		07:09	05:56	05:06	04:57	05:34	06:28	07:23	07:18	08:16	08:16
58	17:00	15:13 (1)		19:55	20:52	21:42	22:01	21:30	20:25	19:10	17:00	16:12	16:12
59	08:17	09:38 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:18
60	17:02	15:13 (1)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:11
61	08:15	09:39 (2)		07:04		05:04		05:37	06:31		07:22		08:44
62	17:04	15:14 (1)		19:58	21:44			21:27	20:21		16:56		16:56
Potential sun hours	250	273	82	367	420	494	510	512	460	382	259	1435	2427
Total, worst case	2234		82									1435	2427
Sun reduction	0.24		0.23									0.27	0.21
Oper. time red.	1.00		1.00									1.00	1.00
Wind dir. red.	0.62		0.59									0.61	0.62
Total reduction	0.15		0.14									0.16	0.13
Total, real	335	11										234	312

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GF - H188

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	10:59 (2)	08:14	15:37 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	10:55 (2)								
2	08:44	11:01 (2)	08:12	15:47 (1)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	10:54 (2)								
3	08:44	11:01 (2)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	10:52 (2)								
4	08:43	11:02 (2)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	10:52 (2)								
5	08:43	11:03 (2)	08:07		07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	10:51 (2)								
6	08:43	11:05 (2)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	10:51 (2)								
7	08:42	11:06 (2)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	10:50 (2)								
8	08:42	11:07 (2)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	10:50 (2)								
9	08:41	11:09 (2)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	10:50 (2)								
10	08:40	11:11 (2)	07:57		06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32	10:50 (2)								
11	08:40	11:13 (2)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33	10:50 (2)								
12	08:39	11:17 (2)	07:53		06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34	10:49 (2)								
13	08:38	11:20 (2)	07:51		06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	10:51 (2)								
14	08:37	11:22 (2)	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	10:51 (2)								
15	08:36	11:24 (2)	07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37	10:51 (2)								
16	08:35	11:26 (2)	07:45		06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38	10:50 (2)								
17	08:34	11:28 (2)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39	10:51 (2)								
18	08:33	11:30 (2)	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	10:51 (2)								
19	08:32	11:32 (2)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	10:52 (2)								
20	08:31	11:34 (2)	07:37		06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:01	08:41	10:52 (2)								
21	08:30	11:36 (2)	07:35		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	10:53 (2)								
22	08:29	11:38 (2)	07:33		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42	10:53 (2)								
23	08:27	11:40 (2)	07:31		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	10:54 (2)								
24	08:26	11:42 (2)	07:29		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43	10:54 (2)								
25	08:25	11:44 (2)	07:27		06:18	06:05	05:11	04:55	05:27	06:20	07:15	07:11	08:09	08:43	10:54 (2)								
26	08:23	11:46 (2)	07:25		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43	10:56 (2)								
27	08:22	11:48 (2)	07:23		06:13	06:01	05:08	04:56	05:30	06:24	07:19	07:17	08:13	08:44	10:56 (2)								
28	08:20	11:50 (2)	07:21		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:14	08:44	10:57 (2)								
29	08:19	11:52 (2)	07:19		06:09	05:56	05:06	04:57	05:34	06:28	07:22	07:18	08:16	08:44	10:57 (2)								
30	08:17	11:54 (2)	07:17		06:07	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44	10:58 (2)								
31	08:15	11:56 (2)	07:15		06:05	05:52	05:04	04:59	05:37	06:31	07:26	07:22	08:20	08:44	10:58 (2)								
Potential sun hours	250	273	367	420	494	510	512	460	382	259	143	97	184										
Total, worst case	1055	10												554						1433			
Sun reduction	0.24	0.23												0.27					0.21				
Oper. time red.	1.00	1.00												1.00					1.00				
Wind dir. red.	0.64	0.66												0.66					0.62				
Total reduction	0.16	0.15												0.17					0.13				
Total, real	165	2												97					184				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GG - H189

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		11:35 (2)	08:14		15:48 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24		08:19		15:33 (1)					
	16:15	31	12:06 (2)	17:06	25	16:13 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54		16:10	1	15:34 (1)					
2	08:44		11:37 (2)	08:12		15:49 (1)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26		08:21		11:33 (2)					
	16:16	29	12:06 (2)	17:08	24	16:13 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09	10	11:43 (2)					
3	08:44		11:37 (2)	08:10		15:49 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28		08:22		11:30 (2)					
	16:17	28	12:05 (2)	17:10	23	16:12 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50		16:08	15	11:45 (2)					
4	08:43		11:39 (2)	08:09		15:51 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24		11:29 (2)					
	16:18	27	12:06 (2)	17:12	20	16:11 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	8	15:35 (1)	16:08	19	11:48 (2)				
5	08:43		11:39 (2)	08:07		15:52 (1)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32		08:25		11:28 (2)					
	16:19	26	12:05 (2)	17:14	18	16:10 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	14	15:38 (1)	16:07	21	11:49 (2)				
6	08:43		11:41 (2)	08:05		15:54 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:26		11:27 (2)					
	16:21	24	12:05 (2)	17:16	14	16:08 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	17	15:39 (1)	16:07	24	11:51 (2)				
7	08:42		11:42 (2)	08:03		15:58 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36		08:28		11:26 (2)					
	16:22	22	12:04 (2)	17:18	7	16:05 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
8	08:42		11:44 (2)	08:01		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:24	19	12:03 (2)	17:20		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
9	08:41		11:47 (2)	07:59		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:25	15	12:02 (2)	17:22		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
10	08:40		11:49 (2)	07:57		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:26	11	12:00 (2)	17:24		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
11	08:40		15:51 (1)	07:55		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:28	1	15:52 (1)	17:26		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
12	08:39		15:49 (1)	07:53		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:30	5	15:54 (1)	17:28		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
13	08:38		15:48 (1)	07:51		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:31	7	15:55 (1)	17:30		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
14	08:37		15:48 (1)	07:49		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:33	9	15:57 (1)	17:32		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
15	08:36		15:47 (1)	07:47		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:34	12	15:59 (1)	17:34		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
16	08:35		15:47 (1)	07:45		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:36	14	16:01 (1)	17:36		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
17	08:34		15:45 (1)	07:43		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:38	17	16:02 (1)	17:38		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
18	08:33		15:45 (1)	07:41		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:40	20	16:05 (1)	17:40		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
19	08:32		15:45 (1)	07:39		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:41	22	16:07 (1)	17:42		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
20	08:31		15:45 (1)	07:37		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:43	23	16:08 (1)	17:44		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
21	08:30		15:45 (1)	07:34		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:45	26	16:11 (1)	17:46		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
22	08:29		15:44 (1)	07:32		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:47	27	16:11 (1)	17:48		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
23	08:27		15:45 (1)	07:30		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:49	27	16:12 (1)	17:50		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
24	08:26		15:44 (1)	07:28		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:51	28	16:12 (1)	17:52		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
25	08:25		15:45 (1)	07:25		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:52	28	16:13 (1)	17:54		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
26	08:23		15:45 (1)	07:22		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:54	28	16:13 (1)	17:56		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
27	08:22		15:45 (1)	07:21		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)				
	16:56	28	16:13 (1)	17:58		16:07 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	21	15:41 (1)	16:06	26	11:52 (2)		</		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GH - H190

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	16:03 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	16:17 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	16:05 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	16:15 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09
3	08:44	08:10	16:08 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	17:10	16:12 (2)	18:05	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08
4	08:43	08:08		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24
	16:18	17:12		18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	08:07		07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25
	16:19	17:14		18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07
6	08:43	08:05		07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26
	16:21	17:16		18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:06
7	08:42	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28
	16:22	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:42	16:06
8	08:42	08:01		07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29
	16:23	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06
9	08:41	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
	16:25	17:22		18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05
10	08:40	07:57		06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:31
	16:26	17:24		18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	16:05
11	08:40	07:55		06:52	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33
	16:28	17:26		18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05
12	08:39	07:53		06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:45	08:34
	16:29	17:28		18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05
13	08:38	07:51		06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35
	16:31	17:30		18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04
14	08:37	07:49		06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36
	16:33	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04
15	08:36	07:47		06:43	06:28	05:25	04:54	05:13	06:03	06:57	07:52	07:51	08:37
	16:34	17:34		18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04
16	08:35	15:59 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38
	16:36	16:00 (2)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:04
17	08:34	15:59 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:38
	16:38	16:02 (2)	17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05
18	08:33	15:58 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39
	16:39	16:05 (2)	17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05
19	08:32	15:58 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40
	16:41	16:07 (2)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05
20	08:31	15:57 (2)	07:36	06:31	06:16	05:17	04:54	05:20	06:11	07:06	08:01	08:00	08:41
	16:43	16:08 (2)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05
21	08:30	15:57 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41
	16:45	16:11 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06
22	08:29	15:57 (2)	07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42
	16:47	16:12 (2)	17:48	18:41	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06
23	08:27	15:57 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42
	16:49	16:15 (2)	17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07
24	08:26	15:57 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43
	16:50	16:16 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07
25	08:24	15:58 (2)	07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	08:11	08:09	08:43
	16:52	16:18 (2)	17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:15	16:08
26	08:23	15:58 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:43
	16:54	16:18 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14	16:09
27	08:22	15:58 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13	08:44
	16:56	16:18 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	16:10
28	08:20	15:59 (2)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	08:44
	16:58	16:18 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	16:10
29	08:19	15:59 (2)		07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16	08:44
	17:00	16:18 (2)		19:54	20:52	21:41	22:01	21:30	20:25	19:09	18:00	16:11	16:11
30	08:17	16:00 (2)		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	08:44
	17:02	16:17 (2)		19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	16:12
31	08:15	16:01 (2)		07:04		05:04		05:37	06:31		07:22		08:44
	17:04	16:17 (2)		19:58		21:44		21:27	20:21		16:56		16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case	228	28									257		
Sun reduction	0.24	0.23									0.27		
Oper. time red.	1.00	1.00									1.00		
Wind dir. red.	0.66	0.66									0.66		
Total reduction	0.16	0.15									0.18		
Total, real	37	4									45		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** GI - H191

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:00 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:50 (2)										
2	16:15	23	15:23 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	16	15:06 (2)								
	08:44		15:01 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21		14:49 (2)								
3	16:16	23	15:24 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	18	15:07 (2)								
	08:44		15:01 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22		14:49 (2)								
4	16:17	22	15:23 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	19	15:08 (2)								
	08:43		15:02 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24		14:50 (2)								
5	16:18	22	15:24 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	19	15:09 (2)								
	08:43		15:02 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25		14:49 (2)								
6	16:19	22	15:24 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	20	15:09 (2)								
	08:43		15:04 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26		14:50 (2)								
7	16:21	21	15:25 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:07	21	15:11 (2)								
	08:42		15:04 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28		14:49 (2)								
8	16:22	20	15:24 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	22	15:11 (2)								
	08:42		15:05 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29		14:49 (2)								
9	16:23	19	15:24 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	22	15:11 (2)								
	08:41		15:06 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30		14:50 (2)								
10	16:25	19	15:25 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	22	15:12 (2)								
	08:40		15:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32		14:50 (2)								
11	16:26	18	15:25 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	23	15:13 (2)								
	08:40		15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33		14:50 (2)								
12	16:28	16	15:24 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05	23	15:13 (2)								
	08:39		15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34		14:50 (2)								
13	16:29	15	15:24 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	23	15:13 (2)								
	08:38		15:11 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35		14:51 (2)								
14	16:31	12	15:23 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04	23	15:14 (2)								
	08:37		15:13 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36		14:52 (2)								
15	16:33	9	15:22 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04	23	15:15 (2)								
	08:36		15:15 (2)	07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37		14:52 (2)								
16	16:34	5	15:20 (2)	17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	23	15:15 (2)								
	08:35		15:07 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38		14:52 (2)								
17	16:36		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	24	15:16 (2)									
	08:34		15:07 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39		14:53 (2)								
18	16:38		17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05	23	15:16 (2)									
	08:33		15:07 (2)	07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39		14:53 (2)								
19	16:39		17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05	24	15:17 (2)									
	08:32		15:07 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40		14:54 (2)								
20	16:41		17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	24	15:18 (2)									
	08:31		15:06 (2)	07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00	08:41		14:54 (2)								
21	16:43		17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05	24	15:18 (2)									
	08:30		15:04 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41		14:55 (2)								
22	16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	24	15:19 (2)									
	08:29		15:03 (2)	07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42		14:55 (2)								
23	16:47		17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06	23	15:18 (2)									
	08:27		15:00 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42		14:56 (2)								
24	16:49		17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07	24	15:20 (2)									
	08:26		15:00 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43		14:56 (2)								
25	16:50		17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07	24	15:20 (2)									
	08:25		15:02 (2)	07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	08:11	08:09	08:43		14:56 (2)								
26	16:52		17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:15	16:08	24	15:20 (2)									
	08:23		15:03 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:43		14:57 (2)								
27	16:54		17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14	16:09	23	15:20 (2)									
	08:22		15:01 (2)	07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13	08:44		14:58 (2)								
28	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	16:05	23	15:21 (2)									
	08:20		15:00 (2)	07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	08:44		14:58 (2)								
29	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	16:07	24	15:22 (2)									
	08:19		15:00 (2)	07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16	08:44		14:59 (2)									
30	17:00		19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	12	15:03 (2)	16:11	23	15:22 (2)								
	08:17		17:00 (2)	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	14:50 (2)	08:44		14:59 (2)								
31	17:02		19:56	20:54	21:43	22:00	21:28	20:23	19:07	17:00	16:11	15	15:05 (2)	16:12	24	15:23 (2)								
	08:15		17:00 (2)	07:04	05:52	05:04	04:57	05:37	06:31	07:26	08:22	08:20	08:44		14:59 (2)									
Potential sun hours	17:04	250	273	367	420	494	510	512	460	382	328	259	233	23	15:22 (2)									

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GJ - H192

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	15:00 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	14:50 (2)										
2	16:15	22	15:22 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	15	15:05 (2)								
	08:44		15:00 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21		14:49 (2)								
3	16:16	22	15:22 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	16	15:05 (2)								
	08:44		15:01 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22		14:49 (2)								
4	16:17	21	15:22 (2)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	17	15:06 (2)								
	08:43		15:02 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24		14:49 (2)								
5	16:18	21	15:23 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	19	15:08 (2)								
	08:43		15:02 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25		14:49 (2)								
6	16:19	20	15:22 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	19	15:08 (2)								
	08:43		15:03 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26		14:49 (2)								
7	16:21	20	15:23 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:06	20	15:09 (2)								
	08:42		15:04 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28		14:49 (2)								
8	16:22	19	15:23 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:42	16:06	21	15:10 (2)								
	08:42		15:04 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29		14:49 (2)								
9	16:23	19	15:23 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	21	15:10 (2)								
	08:41		15:06 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30		14:50 (2)								
10	16:25	17	15:23 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	21	15:11 (2)								
	08:40		15:07 (2)	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32		14:50 (2)								
11	16:26	16	15:23 (2)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	21	15:11 (2)								
	08:40		15:08 (2)	07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33		14:50 (2)								
12	16:28	14	15:22 (2)	17:26	18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05	22	15:12 (2)								
	08:39		15:09 (2)	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34		14:50 (2)								
13	16:29	13	15:22 (2)	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	22	15:12 (2)								
	08:38		15:11 (2)	07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35		14:50 (2)								
14	16:31	10	15:21 (2)	17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04	23	15:13 (2)								
	08:37		15:14 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36		14:51 (2)								
15	16:33	5	15:19 (2)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04	23	15:14 (2)								
	08:36			07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37		14:51 (2)								
16	16:34			17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	23	15:14 (2)								
	08:35			07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38		14:51 (2)								
17	16:36			17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	23	15:14 (2)								
	08:34			07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39		14:52 (2)								
18	16:38			17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05	23	15:15 (2)								
	08:33			07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39		14:53 (2)								
19	16:39			17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05	23	15:16 (2)								
	08:32			07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40		14:53 (2)								
20	16:41			17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	24	15:17 (2)								
	08:31			07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00	08:41		14:53 (2)								
21	16:43			17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05	23	15:16 (2)								
	08:30			07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41		14:54 (2)								
22	16:45			17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	23	15:17 (2)								
	08:29			07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42		14:54 (2)								
23	16:47			17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06	23	15:17 (2)								
	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42		14:55 (2)								
24	16:49			17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07	23	15:18 (2)								
	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43		14:55 (2)								
25	16:50			17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07	24	15:19 (2)								
	08:25			07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	08:11	08:09	08:43		14:56 (2)								
26	16:52			17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	18:09	16:15	16:08	23	15:19 (2)								
	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:43		14:56 (2)								
27	16:54			17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:06	16:14	16:09	23	15:19 (2)								
	08:22			07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13	08:44		14:57 (2)								
28	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13	16:10	23	15:20 (2)								
	08:20			07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	08:44		14:58 (2)								
29	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:12	16:10	23	15:21 (2)								
	08:19				07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16	14:51 (2)	14:58 (2)									
30	17:00				19:54	20:52	21:41	22:01	21:30	20:25	19:09	18:00	16:11	16:11	23	15:21 (2)								
	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18	14:50 (2)	08:44									
31	17:02				19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11	13	15:03 (2)	16:12	23	15:22 (2)						
	08:15				07:04		05:04		05:37	06:31		07:22	08:18	16:11		08:44								

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GK - H193

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		14:56 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19										
	16:15	17	15:13 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10										
2	08:44		14:57 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21										
	16:16	17	15:14 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09										
3	08:44		14:58 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22									14:50 (2)	
	16:17	15	15:13 (2)	17:10	18:05	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08	4							14:54 (2)		
4	08:43		14:59 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24								14:49 (2)		
	16:18	15	15:14 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	8							14:57 (2)		
5	08:43		14:59 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25								14:47 (2)		
	16:19	14	15:13 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	11							14:58 (2)		
6	08:43		15:01 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26								14:47 (2)		
	16:21	13	15:14 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:06	13							15:00 (2)		
7	08:42		15:02 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28								14:47 (2)		
	16:22	11	15:13 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:42	16:06	13							15:00 (2)		
8	08:42		15:04 (2)	08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29								14:46 (2)		
	16:23	8	15:12 (2)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	15							15:01 (2)		
9	08:41		15:07 (2)	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30								14:47 (2)		
	16:25	4	15:11 (2)	17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	15							15:02 (2)		
10	08:40			07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32								14:46 (2)		
	16:26		17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	15:03 (2)	17							15:03 (2)		
11	08:40		07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33	14:46 (2)										
	16:28		17:26	18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	16:05	15:03 (2)	17							15:03 (2)		
12	08:39		07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	14:46 (2)										
	16:29		17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	15:04 (2)	18							15:04 (2)		
13	08:38		07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	14:48 (2)										
	16:31		17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04	15:06 (2)	18							15:06 (2)		
14	08:37		07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	14:48 (2)										
	16:33		17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04	15:06 (2)	18							15:06 (2)		
15	08:36		07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37	14:47 (2)										
	16:34		17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	15:06 (2)	19							15:06 (2)		
16	08:35		07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	14:48 (2)										
	16:36		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	15:06 (2)	18							15:06 (2)		
17	08:34		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39	14:48 (2)										
	16:38		17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05	15:07 (2)	19							15:07 (2)		
18	08:33		07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	14:49 (2)										
	16:39		17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05	15:08 (2)	19							15:08 (2)		
19	08:32		07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	14:49 (2)										
	16:41		17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	15:09 (2)	20							15:09 (2)		
20	08:31		07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00	08:41	14:49 (2)										
	16:43		17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05	15:09 (2)	20							15:09 (2)		
21	08:30		07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	14:50 (2)										
	16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	15:10 (2)	20							15:10 (2)		
22	08:29		07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42	14:50 (2)										
	16:47		17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06	15:10 (2)	20							15:10 (2)		
23	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	14:51 (2)										
	16:49		17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07	15:11 (2)	20							15:11 (2)		
24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43	14:51 (2)										
	16:50		17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07	15:11 (2)	20							15:11 (2)		
25	08:25		07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	07:11	08:09	08:43	14:52 (2)										
	16:52		17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:15	16:08	15:11 (2)	19							15:11 (2)		
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43	14:53 (2)										
	16:54		17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	16:09	15:12 (2)	19							15:12 (2)		
27	08:22		07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:44	14:53 (2)										
	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:10	15:12 (2)	19							15:12 (2)		
28	08:20		07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	08:44	14:54 (2)										
	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16:10	15:13 (2)	19							15:13 (2)		
29	08:19			07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	08:44	14:54 (2)										
	17:00			19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	16:11	15:13 (2)	19							15:13 (2)		
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44	14:55 (2)										
	17:02																							

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** GL - H194
Assumptions for shadow calculations Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

			January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	14:56 (2)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19		
	16:15	15:11 (2)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	14:57 (2)	08:12	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21		
	16:16	15:11 (2)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:44	14:57 (2)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22		
	16:17	15:10 (2)	17:10	18:05	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08		
4	08:43	14:59 (2)	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24		
	16:18	15:11 (2)	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08		
5	08:43	15:00 (2)	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25		14:49 (2)
	16:19	15:10 (2)	17:14	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	16:07	4	14:53 (2)
6	08:43	15:02 (2)	08:05	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26		14:48 (2)
	16:21	15:10 (2)	17:16	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	16:06	8	14:56 (2)
7	08:42	15:04 (2)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28		14:47 (2)
	16:22	15:08 (2)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:42	16:06	10	14:57 (2)
8	08:42		08:01	07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29		14:46 (2)
	16:23		17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	12	14:58 (2)
9	08:41		07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30		14:47 (2)
	16:25		17:22	18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	16:05	12	14:59 (2)
10	08:40		07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32		14:46 (2)
	16:26		17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43	16:37	16:05	14	15:00 (2)
11	08:40		07:55	06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33		14:46 (2)
	16:28		17:26	18:21	20:19	21:13	21:55	21:54	21:06	19:54	18:40	16:35	16:05	15	15:01 (2)
12	08:39		07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34		14:46 (2)
	16:29		17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05	15	15:01 (2)
13	08:38		07:51	06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35		14:47 (2)
	16:31		17:30	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	16:04	16	15:03 (2)
14	08:37		07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36		14:47 (2)
	16:33		17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:30	16:04	17	15:04 (2)
15	08:36		07:47	06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37		14:46 (2)
	16:34		17:34	18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:04	17	15:03 (2)
16	08:35		07:45	06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38		14:47 (2)
	16:36		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	16:05	17	15:04 (2)
17	08:34		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:39		14:47 (2)
	16:38		17:38	18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	16:05	18	15:05 (2)
18	08:33		07:41	06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39		14:48 (2)
	16:39		17:40	18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	16:05	18	15:06 (2)
19	08:32		07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40		14:49 (2)
	16:41		17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	16:05	17	15:06 (2)
20	08:31		07:36	06:31	06:16	05:17	04:54	05:20	06:12	07:06	08:01	08:00	08:41		14:48 (2)
	16:43		17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	16:05	18	15:06 (2)
21	08:30		07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41		14:49 (2)
	16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	16:06	18	15:07 (2)
22	08:29		07:32	06:26	06:11	05:15	04:54	05:23	06:15	07:10	08:05	08:04	08:42		14:49 (2)
	16:47		17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	16:06	18	15:07 (2)
23	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42		14:50 (2)
	16:49		17:50	18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	16:07	18	15:08 (2)
24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43		14:51 (2)
	16:50		17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	16:07	17	15:08 (2)
25	08:25		07:25	06:18	06:05	05:10	04:55	05:27	06:20	07:15	07:11	08:09	08:43		14:51 (2)
	16:52		17:54	18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:15	16:08	18	15:09 (2)
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:43		14:52 (2)
	16:54		17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	16:09	18	15:10 (2)
27	08:22		07:21	06:13	06:00	05:08	04:56	05:30	06:24	07:19	07:15	08:13	08:44		14:53 (2)
	16:56		17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	16:10	17	15:10 (2)
28	08:20		07:18	06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:16	08:14	08:44		14:53 (2)
	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	16:10	17	15:10 (2)
29	08:19			07:08	05:56	05:06	04:57	05:34	06:27	07:22	07:18	08:16	08:44		14:54 (2)
	17:00			19:54	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	16:11	17	15:11 (2)
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:20	08:18	08:44		14:55 (2)
	17:02			19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	16:12	16	15:11 (2)
31	08:15			07:04		05:04		05:37		06:31		07:22			14:55 (2)
	17:04			19:58		21:44		21:27		20:21		16:56		15	15:10 (2)
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259	233		
Total, worst case		76													417
Sun reduction		0.24													0.21
Oper. time red.		1.00													1.00
Wind dir. red.		0.65													0.65
Total reduction		0.16													0.13
Total, real		12													56

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker (WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker (WTG causing flicker last time)
	Minutes with flicker	
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
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28		
29		
30		
31		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GM - H195

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	6 07:47 (1)	20:00	20:56	21:46	22:00	21:25	20:18	19:05	08:18 (1)	16:54	16:10
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	9 07:48 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	08:12 (1)	16:52	16:09
3	08:44	08:10	07:12	07:36 (1)	06:57	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	12 07:48 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	6 08:18 (1)	16:50	16:09
4	08:44	08:09	07:09	07:34 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:09 (1)	16:48	16:08
	16:18	17:12	18:08	15 07:49 (1)	20:06	21:01	21:49	21:59	21:20	20:11	18:57	12 08:21 (1)	16:48	16:08
5	08:43	08:07	07:07	07:31 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:34	08:07 (1)	16:46	16:07
	16:20	17:14	18:10	17 07:48 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	15 08:22 (1)	16:46	16:07
6	08:43	08:05	07:05	07:29 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:06 (1)	16:44	16:07
	16:21	17:16	18:12	19 07:48 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	17 08:23 (1)	16:45	16:07
7	08:42	08:03	07:02	07:30 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:05 (1)	16:43	16:08
	16:22	17:18	18:13	17 07:47 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	19 08:24 (1)	16:43	16:06
8	08:42	08:01	07:00	07:30 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:06 (1)	16:41	16:06
	16:24	17:20	18:15	16 07:46 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	18 08:24 (1)	16:41	16:06
9	08:41	07:59	06:58	07:31 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:07 (1)	16:40	16:06
	16:25	17:22	18:17	14 07:45 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16 08:23 (1)	16:39	16:06
10	08:41	07:57	06:55	07:32 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:09 (1)	16:42	16:06
	16:27	17:24	18:19	10 07:42 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	13 08:22 (1)	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:39	08:11 (1)	16:44	16:05
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	17:28	11 08:22 (1)	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:40	08:13 (1)	16:46	16:05
	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	17:24	8 08:21 (1)	16:34	16:05
13	08:38	07:51	06:48	06:33	05:29	04:55	05:11	05:59	06:54	07:48	08:42	08:15 (1)	16:48	16:05
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	17:22	5 08:20 (1)	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:44	08:17 (1)	16:50	16:05
	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	17:20	1 08:18 (1)	16:31	16:05
15	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:46	08:19 (1)	16:51	16:05
	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	17:17	08:20 (1)	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:48	08:22 (1)	16:28	16:05
	16:36	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	17:14	08:23 (1)	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:50	08:24 (1)	16:27	16:05
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	17:12	08:25 (1)	16:26	16:05
18	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:52	08:26 (1)	16:25	16:05
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	17:10	08:27 (1)	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:53	08:28 (1)	16:24	16:05
	16:42	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	17:08	08:29 (1)	16:23	16:05
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:55	08:30 (1)	16:22	16:05
	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	17:06	08:31 (1)	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:57	08:32 (1)	16:21	16:06
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	17:04	08:33 (1)	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:59	08:34 (1)	16:20	16:06
	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	17:01	08:35 (1)	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13	04:55	05:24	06:17	07:12	08:07	09:01	08:36 (1)	16:18	16:07
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	17:00	08:37 (1)	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	09:03	08:38 (1)	16:17	16:08
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	17:00	08:39 (1)	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11	04:56	05:28	06:21	07:15	08:11	09:05	08:40 (1)	16:16	16:08
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	18:09	17:00	08:41 (1)	16:16	16:08
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	09:07	08:42 (1)	16:15	16:09
	16:54	17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	18:07	17:00	08:43 (1)	16:15	16:09
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	09:09	08:44 (1)	16:14	16:10
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:05	17:00	08:45 (1)	16:14	16:10
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	09:11	08:46 (1)	16:13	16:11
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	17:00	08:47 (1)	16:13	16:11
29	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	09:13	08:48 (1)	16:12	16:12
	17:00		17:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	17:00	08:49 (1)	16:12	16:12
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	09:14	08:50 (1)	16:11	16:13
	17:02		17:57	20:54	21:43	22:01	21:28	20:23	19:07	18:00	17:00	08:51 (1)	16:11	16:13
31	08:16		07:04		05:04		05:37	06:31		07:23		08:52 (1)	16:11	16:13
	17:04		17:58		21:44		21:27	20:21		16:56		08:53 (1)	16:11	16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case		3	135							141				
Sun reduction		0.23	0.27							0.29				
Oper. time red.		1.00	1.00							1.00				
Wind dir. red.		0.65	0.65							0.65				
Total reduction		0.15	0.18							0.19				
Total, real		0	24							27				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GN - H196

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September	October		November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	3	07:41 (1) 07:44 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18		08:10 (1) 08:20 (1)	07:24 16:54
2	08:44 16:16	08:12 17:08	07:14 18:04	7	07:39 (1) 07:46 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	10	08:07 (1) 08:21 (1)	07:26 16:52
3	08:44 16:16	08:10 17:10	07:12 18:06	11	07:36 (1) 07:47 (1)	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	14	07:30 08:22 (1)	16:09 16:52
4	08:43 16:18	08:09 17:12	07:09 18:08	14	07:34 (1) 07:48 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	17	07:32 08:23 (1)	16:50 16:58
5	08:43 16:20	08:07 17:14	07:07 18:10	16	07:31 (1) 07:47 (1)	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	19	07:33 08:03 (1)	16:57 16:46
6	08:43 16:21	08:05 17:16	07:05 18:12	19	07:29 (1) 07:48 (1)	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	21	07:35 08:03 (1)	16:57 16:45
7	08:42 16:22	08:03 17:18	07:02 18:13	21	07:27 (1) 07:48 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	20	07:37 08:04 (1)	16:58 16:43
8	08:42 16:24	08:01 17:20	07:00 18:15	21	07:26 (1) 07:47 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	17	07:39 08:23 (1)	16:58 16:41
9	08:41 16:25	07:59 17:22	06:58 18:17	19	07:27 (1) 07:46 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	15	07:41 08:22 (1)	16:58 16:39
10	08:41 16:27	07:57 17:24	06:55 18:19	18	07:27 (1) 07:45 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	06:49 21:08	07:43 19:57	12	07:43 08:21 (1)	16:58 16:37
11	08:40 16:28	07:55 17:26	06:53 18:21	16	07:28 (1) 07:44 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	9	07:45 08:20 (1)	16:59 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	12	07:29 (1) 07:41 (1)	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	6	07:46 08:13 (1)	16:59 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	4	07:33 (1) 07:37 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	2	07:48 08:15 (1)	16:59 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27			06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47		07:50 08:17 (1)	16:59 16:31
15	08:37 16:35	07:47 17:34	06:43 18:29			06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44		07:52 08:13	16:59 16:29
16	08:36 16:36	07:45 17:36	06:41 18:31			06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42		07:54 08:29	16:59 16:28
17	08:35 16:38	07:43 17:38	06:38 18:32			06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39		07:56 08:27	16:59 16:26
18	08:34 16:40	07:41 17:40	06:36 18:34			06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37		07:58 08:24	16:59 16:25
19	08:32 16:42	07:39 17:42	06:33 18:36			06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34		07:59 08:22	16:59 16:23
20	08:31 16:43	07:37 17:44	06:31 18:38			06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32		08:01 08:20	16:59 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40			06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29		08:03 08:18	16:59 16:21
22	08:29 16:47	07:32 17:48	06:26 18:42			06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27		08:05 08:15	16:59 16:19
23	08:27 16:49	07:30 17:50	06:23 18:44			06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24		08:07 08:13	16:59 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45			06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22		08:09 08:11	16:59 16:17
25	08:25 16:53	07:26 17:54	06:19 18:47			06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20		08:10 08:12	16:59 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49			06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17		08:11 08:19	16:59 16:15
27	08:22 16:56	07:21 17:58	06:14 18:51			06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15		08:13 08:15	16:59 16:14
28	08:20 16:58	07:19 18:00	06:11 18:53			05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12		08:15 08:16	16:59 16:11
29	08:19 17:00		07:09 19:55			05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10		08:16 08:17	16:59 16:12
30	08:17 17:02		07:06 19:57			05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07		08:18 08:19	16:59 16:11
31	08:16 17:04		07:04 19:58			05:53 21:44	05:04 21:44	04:57 21:27	05:37 21:27	06:31 20:21	07:25 16:56		08:19 08:20	16:59 16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328		259	233
Total, worst case			181								183			
Sun reduction			0.27								0.29			
Oper. time red.			1.00								1.00			
Wind dir. red.			0.65								0.65			
Total reduction			0.18								0.19			
Total, real			32								35			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GO - H197

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	19 08:00 (1)	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	07:40 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20 08:00 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	07:39 (1)	06:57	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	20 07:59 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:09	
4	08:44	08:09	07:09	07:40 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	18 07:58 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	07:40 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	17 07:57 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07	
6	08:43	08:05	07:05	07:42 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:23 (1)	07:34	08:27
	16:21	17:16	18:12	13 07:55 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	4 08:27 (1)	16:45	16:07
7	08:42	08:03	07:02	07:44 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:19 (1)	16:45	16:07
	16:22	17:18	18:13	9 07:53 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	11 08:30 (1)	16:43	16:06
8	08:42	08:01	07:00		06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:17 (1)	16:43	16:08
	16:24	17:20	18:15		20:13	21:08	21:53	21:56	21:12	20:02	18:48	15 08:32 (1)	16:41	16:06
9	08:41	07:59	06:58		06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:15 (1)	16:40	16:06
	16:25	17:22	18:17		20:15	21:10	21:54	21:56	21:10	19:59	18:45	17 08:32 (1)	16:39	16:06
10	08:41	07:57	06:55		06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:14 (1)	16:42	16:06
	16:27	17:24	18:19		20:17	21:12	21:55	21:55	21:08	19:57	18:43	19 08:33 (1)	16:37	16:05
11	08:40	07:55	06:53		06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:13 (1)	16:44	16:05
	16:28	17:26	18:21		20:19	21:13	21:56	21:54	21:06	19:54	18:41	20 08:33 (1)	16:36	16:05
12	08:39	07:53	06:50		06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:13 (1)	16:46	16:05
	16:30	17:28	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	20 08:33 (1)	16:34	16:05
13	08:38	07:51	06:48		06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:15 (1)	16:48	16:05
	16:31	17:30	18:25		20:22	21:17	21:57	21:52	21:02	19:49	18:36	18 08:33 (1)	16:32	16:05
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:17 (1)	16:50	16:06
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16 08:33 (1)	16:31	16:06
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:19 (1)	16:51	16:07
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	13 08:32 (1)	16:29	16:05
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	07:00	07:54	08:21 (1)	16:53	16:08
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	10 08:31 (1)	16:28	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:23 (1)	16:55	16:09
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	7 08:30 (1)	16:26	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:25 (1)	16:57	16:09
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	3 08:28 (1)	16:25	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59		16:59	16:08
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22		16:23	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01		16:23	16:05
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20		16:22	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03		16:22	16:06
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18		16:21	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05		16:21	16:06
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15		16:19	16:07
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07		16:19	16:07
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13		16:18	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09		16:18	16:08
	16:51	17:52	4 07:53 (1)		20:43	21:35	22:01	21:38	20:37	19:22	18:11		16:17	16:08
25	08:25	07:26	07:51 (1)		06:19	06:05	05:11	04:56	05:27	06:21	07:15		16:17	16:08
	16:53	17:54	8 07:59 (1)		18:47	20:45	21:36	22:01	21:37	20:35	19:20		16:16	16:08
26	08:23	07:23	07:48 (1)		06:16	06:03	05:09	04:56	05:29	06:22	07:17		16:16	16:08
	16:54	17:56	11 07:59 (1)		18:49	20:46	21:38	22:01	21:35	20:33	19:17		16:15	16:09
27	08:22	07:21	07:46 (1)		06:14	06:01	05:08	04:57	05:31	06:24	07:19		16:15	16:09
	16:56	17:58	14 08:00 (1)		18:51	20:48	21:39	22:01	21:33	20:30	19:15		16:14	16:10
28	08:20	07:19	07:43 (1)		06:11	05:59	05:07	04:57	05:32	06:26	07:21		16:14	16:10
	16:58	18:00	17 08:00 (1)		18:53	20:50	21:40	22:01	21:32	20:28	19:12		16:13	16:11
29	08:19				07:09	05:56	05:06	04:58	05:34	06:28	07:23		16:13	16:11
	17:00				19:55	20:52	21:42	22:01	21:30	20:26	19:10		16:12	16:12
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24		16:12	16:12
	17:02				19:57	20:54	21:43	22:01	21:28	20:23	19:07		16:11	16:13
31	08:16				07:04		05:04		05:37	06:31	07:23		16:11	16:13
	17:04				19:58		21:44		21:27	20:21	16:56		16:14	16:14
Potential sun hours	250	273	367		420	494	510	512	460	382	328	259	233	
Total, worst case														
Sun reduction		54	116									173		
Oper. time red.		0.23	0.27									0.29		
Wind dir. red.		1.00	1.00									1.00		
Total reduction		0.65	0.65									0.65		
Total, real		0.15	0.18									0.19		
		8	20									33		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** GP - H198

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (1)	08:19
2	16:15	17:06	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54	16:55 (1)	16:10
3	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26		08:21
4	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52		16:09
5	08:44	08:10	07:12	06:57	05:48	05:01	05:00	05:42	06:37	07:30	07:28		08:22
6	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50		16:09
7	08:44	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30		08:24
8	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:48		16:08
9	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32		08:25
10	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46		16:07
11	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34		08:27
12	16:21	17:16	18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45		16:07
13	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36		08:28
14	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43		16:06
15	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38		08:29
16	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:41		16:06
17	08:41	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40		08:31
18	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39		16:06
19	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42		08:32
20	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37		16:05
21	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45	07:44		08:33
22	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36		16:05
23	08:39	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46		08:34
24	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34		16:05
25	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48		08:35
26	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32		16:05
27	08:38	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50		08:36
28	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31		16:05
29	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51		08:37
30	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29		16:05
31	08:36	07:45	06:41	06:25	05:24	04:55	05:14	06:05	07:00	07:54	07:53		08:38
32	16:36	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28		16:05
33	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55		08:39
34	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26		16:05
35	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57		08:39
36	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25		16:05
37	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59		08:40
38	16:42	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23		16:05
39	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01	08:46 (1)	08:41
40	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	08:55 (1)	16:06
41	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:03	08:44 (1)	08:41
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	08:57 (1)	16:06
43	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:05	08:43 (1)	08:42
44	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	08:58 (1)	16:07
45	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:07	08:41 (1)	08:43
46	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	08:59 (1)	16:07
47	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:09	08:41 (1)	08:43
48	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	08:59 (1)	16:08
49	08:25	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:10	07:40 (1)	08:43
50	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16	07:59 (1)	16:08
51	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:13	07:41 (1)	08:44
52	16:54	17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15	07:59 (1)	16:09
53	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:15	07:43 (1)	08:44
54	16:56	17:58	18:51	20:48	21:39	22:01	21:34	20:30	19:15	17:05	16:14	07:59 (1)	16:10
55	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:17	07:45 (1)	08:44
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	07:59 (1)	16:11
57	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:19	07:48 (1)	08:44
58	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	07:59 (1)	16:12
59	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:20	07:50 (1)	08:44
60	17:02		19:57	20:54	21:43	22:01	21:29	20:23	19:07	18:00	16:11	07:58 (1)	16:13
61	08:16		07:04		05:04		05:37	06:31		07:23	07:23	07:52 (1)	08:44
62	17:04		19:58		21:44		21:27	20:21		16:56	16:56	07:57 (1)	16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259		233
Total, worst case		167								164	1		
Sun reduction		0.23								0.29	0.27		
Oper. time red.		1.00								1.00	1.00		
Wind dir. red.		0.63								0.63	0.63		
Total reduction		0.15								0.19	0.17		
Total, real		25								30	0		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: GQ - H199

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:18 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24									08:19	08:54 (1)	
	16:15	10	09:28 (1)	17:06	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54									16:10	21 09:15 (1)	
2	08:44		09:18 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26									08:21	08:56 (1)	
	16:16	11	09:29 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52									16:09	20 09:16 (1)	
3	08:44		09:18 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28									08:22	08:57 (1)	
	16:17	11	09:29 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50									16:08	18 09:15 (1)	
4	08:44		09:17 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30									08:24	08:59 (1)	
	16:18	13	09:30 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:48									16:08	17 09:16 (1)	
5	08:43		09:17 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32									08:25	09:00 (1)	
	16:20	14	09:31 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46									16:07	16 09:16 (1)	
6	08:43		09:16 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34									08:27	09:02 (1)	
	16:21	15	09:31 (1)	17:16	18:11	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45									16:07	15 09:17 (1)	
7	08:42		09:15 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36									08:28	09:03 (1)	
	16:22	16	09:31 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43									16:06	14 09:17 (1)	
8	08:42		09:15 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38									08:29	09:05 (1)	
	16:24	17	09:32 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:41									16:06	13 09:18 (1)	
9	08:41		09:14 (1)	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40									08:31	09:06 (1)	
	16:25	18	09:32 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39									16:05	12 09:18 (1)	
10	08:41		09:13 (1)	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42									08:32	09:07 (1)	
	16:27	19	09:32 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37									16:05	11 09:18 (1)	
11	08:40		09:12 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44									08:33	09:08 (1)	
	16:28	21	09:33 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36									16:05	10 09:18 (1)	
12	08:39		09:13 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46									08:34	09:10 (1)	
	16:30	20	09:33 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34									16:05	9 09:19 (1)	
13	08:38		09:13 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48									08:35	09:11 (1)	
	16:31	20	09:33 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32									16:05	8 09:19 (1)	
14	08:38		09:14 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50									08:36	09:12 (1)	
	16:33	19	09:33 (1)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31									16:05	7 09:19 (1)	
15	08:37		09:15 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51									08:37	09:13 (1)	
	16:35	18	09:33 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29									16:05	7 09:20 (1)	
16	08:36		09:16 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53									08:38	09:14 (1)	
	16:36	18	09:34 (1)	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28									16:05	6 09:20 (1)	
17	08:35		09:16 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55									08:39	09:14 (1)	
	16:38	17	09:33 (1)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26									16:05	6 09:20 (1)	
18	08:34		09:17 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57									08:40	09:15 (1)	
	16:40	15	09:32 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25									16:05	5 09:20 (1)	
19	08:32		09:19 (1)	07:39	06:33	06:18	05:19	04:54	05:19	06:10	07:05	07:59	07:59									08:40	09:16 (1)	
	16:41	13	09:32 (1)	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23									16:05	5 09:21 (1)	
20	08:31		09:20 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01									08:41	09:16 (1)	
	16:43	11	09:31 (1)	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22									16:06	5 09:21 (1)	
21	08:30		09:22 (1)	07:34	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:03									08:58 (1)	08:42	
	16:45	7	09:29 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	7								09:05 (1)	16:06	
22	08:29			07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04									08:57 (1)	08:42	
	16:47			17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	11								09:08 (1)	16:07	
23	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06									08:55 (1)	08:43	
	16:49			17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	13								09:08 (1)	16:07	
24	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08									08:54 (1)	08:43	
	16:51			17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	15								09:09 (1)	16:08	
25	08:25			07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:10									08:54 (1)	08:43	
	16:53			17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16	17								09:11 (1)	16:08	
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11									08:54 (1)	08:44	
	16:54			17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15	18								09:12 (1)	16:09	
27	08:22			07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13									08:54 (1)	08:44	
	16:56			17:58	18:51	20:48	21:39	22:01	21:34	20:30	19:15	17:05	16:14	18								09:12 (1)	16:10	
28	08:20			07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:15									08:54 (1)	08:44	
	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	19								09:13 (1)	16:11	
29	08:19				07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16									08:55 (1)	08:44	
	17:00				19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	19								09:14 (1)	16:12	
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:18									08:54 (1)	08:44	
	17:02				19:57	20:54	21:43	22:01	21:29	20:23	19:07	16:58	16:11	20								09:14 (1)	16:12	
31	08:16				07:04		05:04		05:37	06:31		07:23											08:44	
	17:04				19:58		21:44		21:27	20:21		16:56										16:13	9 09:28 (1)	
Potential sun hours	250			273	367		420	494	510		460	382	328	259								233		
Total, worst case		323																						

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** GR - H200

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (1)
2	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	22 08:16 (1)
3	08:44	08:12	08:41 (1)	18:04	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:56 (1)
4	16:16	17:08	1	08:42 (1)	18:06	20:04	20:59	21:48	21:23	20:16	19:02	16:52
5	08:44	08:10	08:38 (1)	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:58 (1)
6	16:17	17:10	4	08:42 (1)	18:06	20:04	20:59	21:48	21:21	20:14	19:00	16:50
7	08:43	08:09	08:36 (1)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:00 (1)
8	16:18	17:12	7	08:43 (1)	18:08	20:06	21:01	21:49	21:19	20:11	18:57	16:48
9	08:43	08:07	08:34 (1)	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:02 (1)
10	16:20	17:14	10	08:44 (1)	18:10	20:08	21:03	21:50	21:18	20:09	18:55	16:46
11	08:43	08:05	08:32 (1)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:04 (1)
12	16:21	17:16	13	08:45 (1)	18:12	20:10	21:05	21:51	21:16	20:06	18:53	16:45
13	08:42	08:03	08:30 (1)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:06 (1)
14	16:22	17:18	16	08:46 (1)	18:13	20:11	21:06	21:52	21:14	20:04	18:50	16:43
15	08:42	08:01	08:28 (1)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:09 (1)
16	16:24	17:20	18	08:46 (1)	18:15	20:13	21:08	21:53	21:12	20:02	18:48	16:41
17	08:41	07:59	08:26 (1)	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:13 (1)
18	16:25	17:22	21	08:47 (1)	18:17	20:15	21:10	21:54	21:10	19:59	18:45	16:39
19	08:41	07:57	08:24 (1)	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:13
20	16:27	17:24	23	08:47 (1)	18:19	20:17	21:12	21:55	21:08	19:57	18:43	16:37
21	08:40	07:55	08:23 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:13
22	16:28	17:26	24	08:47 (1)	18:21	20:19	21:13	21:56	21:04	19:54	18:41	16:36
23	08:39	07:53	08:24 (1)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:13
24	16:30	17:28	23	08:47 (1)	18:23	20:21	21:15	21:56	21:04	19:52	18:38	16:34
25	08:38	07:51	08:24 (1)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:13
26	16:31	17:30	22	08:46 (1)	18:25	20:22	21:17	21:57	21:02	19:49	18:36	16:32
27	08:37	07:49	08:24 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:13
28	16:33	17:32	21	08:45 (1)	18:27	20:24	21:19	21:58	21:01	19:47	18:34	16:31
29	08:37	07:47	08:25 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:13
30	16:35	17:34	19	08:44 (1)	18:29	20:26	21:20	21:58	21:00	19:44	18:31	16:29
31	08:36	07:45	08:26 (1)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:13
32	16:36	17:36	17	08:43 (1)	18:31	20:28	21:22	21:59	21:01	19:42	18:29	16:28
33	08:35	07:43	08:28 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:13
34	16:38	17:38	14	08:42 (1)	18:32	20:30	21:24	21:59	21:01	19:39	18:27	16:26
35	08:34	07:41	08:31 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:13
36	16:40	17:40	8	08:39 (1)	18:34	20:32	21:25	22:00	21:01	19:37	18:24	16:25
37	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59	08:13
38	16:41	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23	16:05
39	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01	08:13
40	16:43	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	16:06
41	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:02	08:13
42	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	16:06
43	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:13
44	16:47	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	16:07
45	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:13
46	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	16:07
47	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:13
48	16:51	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	16:08
49	08:25	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:10	08:13
50	16:53	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16	16:08
51	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:13
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16:15	16:09
53	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:13	08:13
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	16:14	16:10
55	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:15	08:13
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16:11
57	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16	08:13
58	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	16:12
59	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:18	08:13
60	17:02		19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	16:13
61	08:16		07:04		05:04		05:37	06:31		07:22	07:53 (1)	08:13
62	17:04		19:58		21:44		21:27	20:21		16:56	23 08:16 (1)	16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		261								151	109	
Sun reduction		0.23								0.29	0.27	
Oper. time red.		1.00								1.00	1.00	
Wind dir. red.		0.62								0.62	0.62	
Total reduction		0.14								0.18	0.16	
Total, real		38								27	18	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GS - H201

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GT - H202

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GU - H203

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GV - H204

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GW - H205

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GX - H206

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GY - H207

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: GZ - H208

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HA - H209

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HB - H210

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HC - H211

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HD - H212

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HE - H213

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HF - H214

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HG - H215

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
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Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HH - H216

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HI - H217

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HJ - H218

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HK - H219

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HL - H220

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:22 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HM - H221

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HN - H222

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HO - H223

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	05:40 20:16	06:35 19:02	07:28 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HP - H224

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HQ - H225

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HR - H226

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	05:03	05:33 (5)	04:59	05:32 (5)	05:39	06:33	07:26	07:24	08:19		
2	16:15	17:06	18:02	20:00	20:55	21:45	19	05:52 (5)	22:00	28	06:00 (5)	21:25	20:18	19:05	16:54	16:10
	08:44	08:12	07:14	06:59	05:50	05:02	05:33 (5)	05:00	05:33 (5)	05:40	06:35	07:28	07:26	08:21		
3	16:16	17:08	18:04	20:02	20:57	21:46	20	05:53 (5)	22:00	28	06:01 (5)	21:23	20:16	19:02	16:52	16:09
	08:44	08:10	07:12	06:56	05:48	05:01	05:32 (5)	05:00	05:33 (5)	05:42	06:36	07:30	07:28	08:22		
4	16:17	17:10	18:06	20:04	20:59	21:48	21	05:53 (5)	21:59	27	06:00 (5)	21:21	20:14	19:00	16:50	16:09
	08:43	08:08	07:09	06:54	05:46	05:00	05:31 (5)	05:01	05:34 (5)	05:44	06:38	07:32	07:30	08:24		
5	16:18	17:12	18:08	20:06	21:01	21:49	22	05:53 (5)	21:59	26	06:00 (5)	21:19	20:11	18:57	16:48	16:08
	08:43	08:07	07:07	06:52	05:44	04:59	05:31 (5)	05:02	05:35 (5)	05:46	06:40	07:33	07:32	08:25		
6	16:20	17:14	18:10	20:08	21:03	21:50	23	05:54 (5)	21:58	25	06:00 (5)	21:17	20:09	18:55	16:46	16:07
	08:43	08:05	07:05	06:49	05:42	04:59	05:30 (5)	05:03	05:36 (5)	05:47	06:42	07:35	07:34	08:26		
7	16:21	17:16	18:11	20:09	21:04	21:51	24	05:54 (5)	21:58	25	06:01 (5)	21:15	20:06	18:53	16:45	16:07
	08:42	08:03	07:02	06:47	05:40	04:58	05:30 (5)	05:04	05:37 (5)	05:49	06:44	07:37	07:36	08:28		
8	16:22	17:18	18:13	20:11	21:06	21:52	25	05:55 (5)	21:57	24	06:01 (5)	21:14	20:04	18:50	16:43	16:06
	08:42	08:01	07:00	06:44	05:38	04:57	05:29 (5)	05:05	05:38 (5)	05:51	06:45	07:39	07:38	08:29		
9	16:24	17:20	18:15	20:13	21:08	21:53	26	05:55 (5)	21:56	23	06:01 (5)	21:12	20:01	18:48	16:41	16:06
	08:41	07:59	06:57	06:42	05:36	04:57	05:29 (5)	05:06	05:39 (5)	05:52	06:47	07:41	07:40	08:30		
10	16:25	17:22	18:17	20:15	21:10	21:54	27	05:56 (5)	21:55	22	06:01 (5)	21:10	19:59	18:45	16:39	16:06
	08:40	07:57	06:55	06:40	05:35	04:56	05:28 (5)	05:07	05:40 (5)	05:54	06:49	07:43	07:42	08:31		
11	16:27	17:24	18:19	20:17	21:11	21:55	27	05:55 (5)	21:55	20	06:00 (5)	21:08	19:56	18:43	16:37	16:05
	08:40	07:55	06:53	06:37	05:33	04:56	05:28 (5)	05:08	05:41 (5)	05:56	06:51	07:44	07:44	08:33		
12	16:28	17:26	18:21	20:19	21:13	21:55	28	05:56 (5)	21:54	19	06:00 (5)	21:06	19:54	18:41	16:36	16:05
	08:39	07:53	06:50	06:35	05:31	04:56	05:28 (5)	05:09	05:42 (5)	05:58	06:52	07:46	07:46	08:34		
13	16:30	17:28	18:23	20:20	21:15	21:56	29	05:57 (5)	21:53	18	06:00 (5)	21:03	19:52	18:38	16:34	16:05
	08:38	07:51	06:48	06:32	05:29	04:55	05:27 (5)	05:11	05:43 (5)	05:59	06:54	07:48	07:47	08:35		
14	16:31	17:30	18:25	20:22	21:17	21:57	29	05:56 (5)	21:52	17	06:00 (5)	21:01	19:49	18:36	16:32	16:05
	08:37	07:49	06:45	06:30	05:27	04:55	05:27 (5)	05:12	05:44 (5)	06:01	06:56	07:50	07:49	08:36		
15	16:33	17:32	18:27	20:24	21:18	21:58	30	05:57 (5)	21:51	15	05:59 (5)	20:59	19:47	18:34	16:31	16:05
	08:36	07:47	06:43	06:28	05:26	04:55	05:27 (5)	05:13	05:45 (5)	06:03	06:58	07:52	07:51	08:37		
16	16:35	17:34	18:29	20:26	21:20	21:58	30	05:57 (5)	21:50	14	05:59 (5)	20:57	19:44	18:31	16:29	16:05
	08:35	07:45	06:40	06:25	05:24	04:55	05:27 (5)	05:14	05:47 (5)	06:05	06:59	07:54	07:53	08:38		
17	16:36	17:36	18:30	20:28	21:22	21:59	30	05:57 (5)	21:49	12	05:59 (5)	20:55	19:42	18:29	16:28	16:05
	08:34	07:43	06:38	06:23	05:22	04:54	05:27 (5)	05:16	05:48 (5)	06:06	07:01	07:56	07:55	08:38		
18	16:38	17:38	18:32	20:30	21:23	21:59	31	05:58 (5)	21:47	10	05:58 (5)	20:53	19:39	18:27	16:26	16:05
	08:33	07:41	06:36	06:21	05:21	04:54	05:27 (5)	05:17	05:49 (5)	06:08	07:03	07:57	07:57	08:39		
19	16:40	17:40	18:34	20:32	21:25	22:00	31	05:58 (5)	21:46	8	05:57 (5)	20:51	19:37	18:24	16:25	16:05
	08:32	07:39	06:33	06:18	05:19	04:54	05:27 (5)	05:19	05:50 (5)	06:10	07:05	07:59	07:59	08:40		
20	16:41	17:42	18:36	20:33	21:27	22:00	31	05:58 (5)	21:45	6	05:56 (5)	20:48	19:34	18:22	16:23	16:05
	08:31	07:37	06:31	06:16	05:18	04:54	05:27 (5)	05:20	05:52 (5)	06:12	07:06	08:01	08:00	08:41		
21	16:43	17:44	18:38	20:35	21:28	22:00	31	05:58 (5)	21:44	4	05:56 (5)	20:46	19:32	18:20	16:22	16:06
	08:30	07:34	06:28	06:14	05:16	04:55	05:27 (5)	05:21	05:53 (5)	06:13	07:08	08:03	08:02	08:41		
22	16:45	17:46	18:40	20:37	21:30	22:01	31	05:58 (5)	21:42	2	05:55 (5)	20:44	19:29	18:18	16:21	16:06
	08:29	07:32	06:26	06:12	05:15	04:55	05:28 (5)	05:23	05:56 (5)	06:15	07:10	08:05	08:04	08:42		
23	16:47	17:48	18:42	20:39	21:31	1	05:45 (5)	22:01	31	05:59 (5)	21:41	20:42	19:27	18:15	16:19	16:07
	08:27	07:30	06:23	06:09	05:13	05:43 (5)	05:28 (5)	05:24	05:58 (5)	06:17	07:12	08:07	08:06	08:42		
24	16:49	17:50	18:43	20:41	21:33	3	05:46 (5)	22:01	31	05:59 (5)	21:39	20:39	19:24	18:13	16:18	16:07
	08:26	07:28	06:21	06:07	05:12	05:41 (5)	05:28 (5)	05:26	05:58 (5)	06:19	07:14	08:09	08:08	08:43		
25	16:51	17:52	18:45	20:43	21:34	5	05:46 (5)	22:01	31	05:59 (5)	21:38	20:37	19:22	18:11	16:17	16:08
	08:25	07:25	06:18	06:05	05:11	05:40 (5)	05:29 (5)	05:27	05:59 (5)	06:21	07:15	08:11	08:09	08:43		
26	16:53	17:54	18:47	20:44	21:36	7	05:47 (5)	22:01	31	06:00 (5)	21:36	20:35	19:19	17:09	16:16	16:08
	08:23	07:23	06:16	06:03	05:09	05:39 (5)	05:29 (5)	05:29	05:59 (5)	06:22	07:17	08:13	08:11	08:43		
27	16:54	17:56	18:49	20:46	21:37	9	05:48 (5)	22:01	30	05:59 (5)	21:35	20:32	19:17	17:07	16:15	16:09
	08:22	07:21	06:14	06:01	05:08	05:38 (5)	05:30 (5)	05:31	06:00 (5)	06:24	07:19	08:15	08:13	08:44		
28	16:56	17:58	18:51	20:48	21:39	11	05:49 (5)	22:01	30	06:00 (5)	21:33	20:30	19:14	17:04	16:14	16:10
	08:20	07:19	06:11	05:59	05:07	05:37 (5)	05:30 (5)	05:32	06:02 (5)	06:26	07:21	08:17	08:14	08:44		
29	16:58	18:00		20:50	21:40	13	05:50 (5)	22:01	30	06:00 (5)	21:32	20:28	19:12	17:02	16:13	16:11
	08:19		07:09	05:56	05:06	05:36 (5)	05:31 (5)	05:34	06:03 (5)	06:28	07:23	08:18	08:16	08:44		
30	17:00		19:55	20:52	21:41	14	05:50 (5)	22:01	29	06:00 (5)	21:30	20:25	19:10	17:00	16:12	16:12
	08:17		07:06	05:54	05:05	05:35 (5)	05:31 (5)	05:35	06:04 (5)	06:29	07:24	08:20	08:18	08:44		
31	17:02		19:56	20:54	21:43	16	05:51 (5)	22:00	29	06:00 (5)	21:28	20:23	19:07	16:58	16:11	16:13
	08:15		07:04	05:04	05:04	05:34 (5)		05:37		06:31		07:22		08:44		
Potential sun hours	17:04		19:58	21:44	21:44	17	05:51 (5)			20:21		16:56		16:14		
Total, worst case	250	273	367	420	494	510		512		460		382		328		233
Total, sun reduction					96	837		373								
Oper. time red.					0.38	0.32		0.32								
Wind dir. red.					1.00	1.00		1.00								
Total reduction					0.66	0.66		0.66								
Total, real					0.25	0.21		0.21								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HS - H227

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June	
1	08:44	08:14	07:16		07:01	07:41 (5)	05:52		06:18 (4)	05:03		
	16:15	17:06	18:02		20:00	22 08:03 (5)	20:55	13	06:31 (4)	21:45		
2	08:44	08:12	07:14		06:59	07:43 (5)	05:50		06:16 (4)	05:02		
	16:16	17:08	18:04		20:02	18 08:01 (5)	20:57	14	06:30 (4)	21:47		
3	08:44	08:10	07:12		06:56	07:45 (5)	05:48		06:14 (4)	05:01		
	16:17	17:10	18:06		20:04	12 07:57 (5)	20:59	15	06:29 (4)	21:48		
4	08:43	08:09	07:09		06:54		05:46		06:12 (4)	05:00		
	16:18	17:12	18:08		20:06		21:01	16	06:28 (4)	21:49		
5	08:43	08:07	07:07		06:52		05:44		06:12 (4)	04:59		05:31 (3)
	16:20	17:14	18:10		20:08		21:03	14	06:26 (4)	21:50	1	05:32 (3)
6	08:43	08:05	07:05		06:49		05:42		06:15 (4)	04:59		05:30 (3)
	16:21	17:16	18:11		20:09		21:04	10	06:25 (4)	21:51	2	05:32 (3)
7	08:42	08:03	07:02		06:47		05:40			04:58		05:30 (3)
	16:22	17:18	18:13		20:11		21:06			21:52	3	05:33 (3)
8	08:42	08:01	07:00		06:44		05:38			04:57		05:29 (3)
	16:24	17:20	18:15		20:13		21:08			21:53	4	05:33 (3)
9	08:41	07:59	06:57		06:42		05:36			04:57		05:29 (3)
	16:25	17:22	18:17		20:15		21:10			21:54	5	05:34 (3)
10	08:40	07:57	06:55		06:40		05:35			04:56		05:28 (3)
	16:27	17:24	18:19		20:17		21:12			21:55	6	05:34 (3)
11	08:40	07:55	06:53		06:37		05:33			04:56		05:28 (3)
	16:28	17:26	18:21		20:19		21:13			21:55	7	05:35 (3)
12	08:39	07:53	06:50		06:35		05:31			04:56		05:28 (3)
	16:30	17:28	18:23		20:20		21:15			21:56	7	05:35 (3)
13	08:38	07:51	06:48		06:32		05:29			04:55		05:27 (3)
	16:31	17:30	18:25		20:22		21:17			21:57	8	05:35 (3)
14	08:37	07:49	06:45		06:30		05:27			04:55		05:27 (3)
	16:33	17:32	18:27		20:24		21:18			21:58	8	05:35 (3)
15	08:36	07:47	06:43		07:07 (5)	06:28	05:26			04:55		05:27 (3)
	16:35	17:34	18:29	1	07:08 (5)	20:26	21:20			21:58	9	05:36 (3)
16	08:35	07:45	06:40		07:04 (5)	06:25	05:24			04:55		05:27 (3)
	16:36	17:36	18:30	5	07:09 (5)	20:28	21:22			21:59	9	05:36 (3)
17	08:34	07:43	06:38		07:02 (5)	06:23	05:22			04:54		05:27 (3)
	16:38	17:38	18:32	8	07:10 (5)	20:30	21:23			21:59	10	05:37 (3)
18	08:33	07:41	06:36		06:59 (5)	06:21	05:21			04:54		05:27 (3)
	16:40	17:40	18:34	11	07:10 (5)	20:32	21:25			22:00	10	05:37 (3)
19	08:32	07:39	06:33		06:57 (5)	06:18	05:19			04:54		05:27 (3)
	16:41	17:42	18:36	15	07:12 (5)	20:33	21:27			22:00	10	05:37 (3)
20	08:31	07:37	06:31		06:54 (5)	06:16	05:18			04:54		05:27 (3)
	16:43	17:44	18:38	17	07:11 (5)	20:35	21:28			22:00	10	05:37 (3)
21	08:30	07:34	06:28		06:52 (5)	06:14	05:16			04:55		05:27 (3)
	16:45	17:46	18:40	20	07:12 (5)	20:37	21:30			22:01	10	05:37 (3)
22	08:29	07:32	06:26		06:50 (5)	06:12	05:15			04:55		05:28 (3)
	16:47	17:48	18:42	23	07:13 (5)	20:39	21:31			22:01	10	05:38 (3)
23	08:27	07:30	06:23		06:47 (5)	06:09	05:13			04:55		05:28 (3)
	16:49	17:50	18:43	25	07:12 (5)	20:41	21:33			22:01	10	05:38 (3)
24	08:26	07:28	06:21		06:45 (5)	06:07	05:12			04:55		05:28 (3)
	16:51	17:52	18:45	27	07:12 (5)	20:43	21:34			22:01	10	05:38 (3)
25	08:25	07:25	06:18		06:42 (5)	06:05	05:11			04:56		05:29 (3)
	16:53	17:54	18:47	29	07:11 (5)	20:44	3 06:33 (4)	21:36		22:01	10	05:39 (3)
26	08:23	07:23	06:16		06:40 (5)	06:03	06:28 (4)	05:09		04:56		05:29 (3)
	16:54	17:56	18:49	31	07:11 (5)	20:46	5 06:33 (4)	21:37		22:01	9	05:38 (3)
27	08:22	07:21	06:14		06:37 (5)	06:01	06:26 (4)	05:08		04:57		05:30 (3)
	16:56	17:58	18:51	33	07:10 (5)	20:48	7 06:33 (4)	21:39		22:01	9	05:39 (3)
28	08:20	07:19	06:11		06:38 (5)	05:59	06:24 (4)	05:07		04:57		05:30 (3)
	16:58	18:00	18:53	31	07:09 (5)	20:50	9 06:33 (4)	21:40		22:01	9	05:39 (3)
29	08:19		07:09		07:38 (5)	05:56	06:22 (4)	05:06		04:58		05:31 (3)
	17:00		19:55	29	08:07 (5)	20:52	10 06:32 (4)	21:41		22:01	8	05:39 (3)
30	08:17		07:06		07:39 (5)	05:54	06:20 (4)	05:05		04:58		05:31 (3)
	17:02		19:56	28	08:07 (5)	20:54	12 06:32 (4)	21:43		22:00	8	05:39 (3)
31	08:15		07:04		07:39 (5)			05:04				
	17:04		19:58	25	08:04 (5)			21:44				
Potential sun hours	250	273	367		420			494		510		
Total, worst case				358		98		82			202	
Sun reduction				0.27		0.35		0.38			0.32	
Oper. time red.				1.00		1.00		1.00			1.00	
Wind dir. red.				0.67		0.67		0.68			0.66	
Total reduction				0.18		0.24		0.26			0.21	
Total, real				65		23		21			43	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HS - H227

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33		07:26		07:24		08:19	
	22:00	7 05:39 (3)	21:25	20:18		19:05		16:54		16:10	
2	05:00	05:33 (3)	05:40	06:35		07:28		07:26		08:21	
	22:00	6 05:39 (3)	21:23	20:16		19:02		16:52		16:09	
3	05:00	05:33 (3)	05:42	06:36		07:30		07:28		08:22	
	21:59	6 05:39 (3)	21:21	20:14		19:00		16:50		16:09	
4	05:01	05:34 (3)	05:44	06:38		07:32		07:30		08:24	
	21:59	5 05:39 (3)	21:19	20:11		18:57		16:48		16:08	
5	05:02	05:35 (3)	05:46	06:40		07:33		07:32		08:25	
	21:58	4 05:39 (3)	21:17	20:09		18:55		16:46		16:07	
6	05:03	05:36 (3)	05:47	06:42		07:35		07:34		08:26	
	21:58	3 05:39 (3)	21:16	6 06:32 (4)	20:06	18:53		16:45		16:07	
7	05:04	05:37 (3)	05:49	06:23 (4)	06:44	07:37		07:36		08:28	
	21:57	2 05:39 (3)	21:14	12 06:35 (4)	20:04	18:50		16:43		16:06	
8	05:05	05:38 (3)	05:51	06:21 (4)	06:45	07:39		07:38		08:29	
	21:56	1 05:39 (3)	21:12	15 06:36 (4)	20:01	18:48		16:41		16:06	
9	05:06		05:52	06:22 (4)	06:47	07:40 (5)		07:40		08:30	
	21:55		21:10	16 06:38 (4)	19:59	10 07:50 (5)		18:45		16:06	
10	05:07		05:54	06:24 (4)	06:49	07:36 (5)		07:43		08:32	
	21:55		21:08	15 06:39 (4)	19:57	18 07:54 (5)		18:43		16:05	
11	05:08		05:56	06:25 (4)	06:51	07:33 (5)		07:44		08:33	
	21:54		21:06	14 06:39 (4)	19:54	22 07:55 (5)		18:41		16:05	
12	05:09		05:58	06:27 (4)	06:52	07:32 (5)		07:46		08:34	
	21:53		21:03	13 06:40 (4)	19:52	24 07:56 (5)		18:38		16:05	
13	05:11		05:59	06:28 (4)	06:54	07:30 (5)		07:48		08:35	
	21:52		21:01	11 06:39 (4)	19:49	28 07:58 (5)		18:36		16:05	
14	05:12		06:01	06:30 (4)	06:56	07:28 (5)		07:50		08:36	
	21:51		20:59	10 06:40 (4)	19:47	30 07:58 (5)		18:34		16:05	
15	05:13		06:03	06:32 (4)	06:58	07:27 (5)		07:52		08:37	
	21:50		20:57	8 06:40 (4)	19:44	31 07:58 (5)		18:31		16:05	
16	05:14		06:05	06:33 (4)	06:59	07:27 (5)		07:54		08:38	
	21:49		20:55	6 06:39 (4)	19:42	32 07:59 (5)		18:29		16:05	
17	05:16		06:06	06:35 (4)	07:01	07:28 (5)		07:56		08:39	
	21:47		20:53	4 06:39 (4)	19:39	31 07:59 (5)		18:27		16:05	
18	05:17		06:08	06:37 (4)	07:03	07:29 (5)		07:57		08:39	
	21:46		20:51	2 06:39 (4)	19:37	29 07:58 (5)		18:24		16:05	
19	05:19		06:10		07:05	07:31 (5)		07:59		08:40	
	21:45		20:48		19:34	28 07:59 (5)		18:22		16:05	
20	05:20		06:12		07:06	07:33 (5)		08:01		08:41	
	21:44		20:46		19:32	25 07:58 (5)		18:20		16:06	
21	05:21		06:13		07:08	07:35 (5)		08:03		08:41	
	21:42		20:44		19:29	23 07:58 (5)		18:18		16:06	
22	05:23		06:15		07:10	07:36 (5)		08:05		08:42	
	21:41		20:42		19:27	21 07:57 (5)		18:15		16:07	
23	05:24		06:17		07:12	07:38 (5)		08:07		08:42	
	21:39		20:39		19:24	18 07:56 (5)		18:13		16:07	
24	05:26		06:19		07:14	07:40 (5)		08:09		08:43	
	21:38		20:37		19:22	15 07:55 (5)		18:11		16:08	
25	05:27		06:21		07:15	07:42 (5)		07:11		08:43	
	21:36		20:35		19:19	13 07:55 (5)		17:09		16:08	
26	05:29		06:22		07:17	07:43 (5)		07:13		08:43	
	21:35		20:32		19:17	9 07:52 (5)		17:07		16:09	
27	05:31		06:24		07:19	07:45 (5)		07:15		08:44	
	21:33		20:30		19:15	6 07:51 (5)		17:05		16:10	
28	05:32		06:26		07:21	07:47 (5)		07:17		08:44	
	21:32		20:28		19:12	2 07:49 (5)		17:02		16:11	
29	05:34		06:28		07:23			07:18		08:44	
	21:30		20:25		19:10			17:00		16:12	
30	05:35		06:29		07:24			07:20		08:44	
	21:28		20:23		19:07			16:58		16:13	
31	05:37		06:31					07:22		08:44	
	21:27		20:21					16:56		16:14	
Potential sun hours	512		460		382			328		259	
Total, worst case		34		132		415					
Sun reduction		0.32		0.34		0.32					
Oper. time red.		1.00		1.00		1.00					
Wind dir. red.		0.66		0.68		0.67					
Total reduction		0.21		0.23		0.21					
Total, real		7		30		89					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HT - H228

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 05:34 (3)
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	07:23 (5) 20:57	05:02 05:40 (3)
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	07:20 (5) 20:59	05:01 05:32 (3)
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	07:18 (5) 21:01	05:00 05:31 (3)
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	07:15 (5) 21:03	04:59 05:41 (3)
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	07:13 (5) 21:04	04:59 05:41 (3)
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	07:11 (5) 21:06	04:58 05:41 (3)
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	07:08 (5) 21:08	04:57 05:41 (3)
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	07:06 (5) 21:10	04:57 05:41 (3)
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	07:03 (5) 21:12	04:56 05:41 (3)
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	07:01 (5) 21:13	04:56 05:41 (3)
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	07:02 (5) 21:15	04:56 05:42 (3)
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	07:04 (5) 21:17	04:55 05:41 (3)
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	07:06 (5) 21:18	04:55 05:41 (3)
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 05:42 (3)
16	08:35 16:36	07:45 17:36	06:41 18:30	06:25 20:28	05:24 21:22	04:55 05:42 (3)
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 05:42 (3)
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 05:42 (3)
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 05:42 (3)
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 05:42 (3)
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 05:43 (3)
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 05:43 (3)
23	08:27 16:49	07:30 17:50	06:23 18:44	06:09 20:41	05:13 21:33	04:55 05:43 (3)
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 05:43 (3)
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 05:44 (3)
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 05:44 (3)
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 05:45 (3)
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 05:45 (3)
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 05:45 (3)
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 05:45 (3)
31	08:15 17:04		07:04 19:58		05:04 21:44	05:34 (3) 05:39 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case				151	13	392
Sun reduction				0.35	0.38	0.32
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.66	0.66
Total reduction				0.24	0.25	0.21
Total, real				36	3	83

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HT - H228

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33	07:00 (5)	07:26	07:24	08:19			
	22:00	14 05:46 (3)	21:25	20:18	19 07:19 (5)	19:05	16:54	16:10			
2	05:00	05:33 (3)	05:40	06:35	07:02 (5)	07:28	07:26	08:21			
	22:00	13 05:46 (3)	21:23	20:16	18 07:20 (5)	19:02	16:52	16:09			
3	05:00	05:33 (3)	05:42	06:37	07:04 (5)	07:30	07:28	08:22			
	21:59	13 05:46 (3)	21:21	20:14	17 07:21 (5)	19:00	16:50	16:09			
4	05:01	05:34 (3)	05:44	06:38	07:05 (5)	07:32	07:30	08:24			
	21:59	12 05:46 (3)	21:19	20:11	15 07:20 (5)	18:57	16:48	16:08			
5	05:02	05:35 (3)	05:46	06:40	07:07 (5)	07:33	07:32	08:25			
	21:58	11 05:46 (3)	21:17	20:09	13 07:20 (5)	18:55	16:46	16:07			
6	05:03	05:36 (3)	05:47	06:42	07:09 (5)	07:35	07:34	08:26			
	21:58	11 05:47 (3)	21:16	20:06	11 07:20 (5)	18:53	16:45	16:07			
7	05:04	05:37 (3)	05:49	06:44	07:10 (5)	07:37	07:36	08:28			
	21:57	10 05:47 (3)	21:14	20:04	9 07:19 (5)	18:50	16:43	16:06			
8	05:05	05:38 (3)	05:51	06:45	07:12 (5)	07:39	07:38	08:29			
	21:56	9 05:47 (3)	21:12	20:01	7 07:19 (5)	18:48	16:41	16:06			
9	05:06	05:39 (3)	05:52	06:47	07:14 (5)	07:41	07:40	08:30			
	21:55	9 05:48 (3)	21:10	19:59	4 07:18 (5)	18:45	16:39	16:06			
10	05:07	05:40 (3)	05:54	06:49	07:16 (5)	07:43	07:42	08:32			
	21:55	8 05:48 (3)	21:08	19:57	1 07:17 (5)	18:43	16:37	16:05			
11	05:08	05:41 (3)	05:56	06:51		07:44	07:44	08:33			
	21:54	7 05:48 (3)	21:06	19:54		18:41	16:36	16:05			
12	05:10	05:42 (3)	05:58	06:52		07:46	07:46	08:34			
	21:53	6 05:48 (3)	21:03	19:52		18:38	16:34	16:05			
13	05:11	05:43 (3)	05:59	06:54		07:48	07:47	08:35			
	21:52	5 05:48 (3)	21:01	19:49		18:36	16:32	16:05			
14	05:12	05:44 (3)	06:01	06:56		07:50	07:49	08:36			
	21:51	3 05:47 (3)	20:59	19:47		18:34	16:31	16:05			
15	05:13	05:45 (3)	06:03	06:58		07:52	07:51	08:37			
	21:50	2 05:47 (3)	20:57	19:44		18:31	16:29	16:05			
16	05:15	05:47 (3)	06:05	06:59		07:54	07:53	08:38			
	21:49	1 05:48 (3)	20:55	19:42		18:29	16:28	16:05			
17	05:16		06:06	07:01		07:56	07:55	08:39			
	21:47		20:53	19:39		18:27	16:26	16:05			
18	05:17		06:08	07:03		07:57	07:57	08:39			
	21:46		20:51	19:37		18:24	16:25	16:05			
19	05:19		06:10	07:05		07:59	07:59	08:40			
	21:45		20:48	19:34		18:22	16:23	16:05			
20	05:20		06:12	07:07		08:01	08:01	08:41			
	21:44		20:46	19:32		18:20	16:22	16:06			
21	05:21		06:14	07:08		08:03	08:02	08:41			
	21:42		20:44	19:29		18:18	16:21	16:06			
22	05:23		06:15	07:10		08:05	08:04	08:42			
	21:41		20:42	19:27		18:15	16:19	16:07			
23	05:24		06:17	07:12		08:07	08:06	08:42			
	21:39		20:39	19:24		18:13	16:18	16:07			
24	05:26		06:19	07:14		08:09	08:08	08:43			
	21:38		20:37	19:22		18:11	16:17	16:08			
25	05:28		06:21	07:15		07:11	08:09	08:43			
	21:36		20:35	19:19		17:09	16:16	16:08			
26	05:29		06:22	07:17		07:13	08:11	08:43			
	21:35		20:33	19:17		17:07	16:15	16:09			
27	05:31		06:24	07:19		07:15	08:13	08:44			
	21:33		20:30	19:15		17:05	16:14	16:10			
28	05:32		06:26	07:21		07:17	08:14	08:44			
	21:32		20:28	19:12		17:02	16:13	16:11			
29	05:34		06:28	07:23		07:19	08:16	08:44			
	21:30		20:25	9 07:15 (5)		17:00	16:12	16:12			
30	05:35		06:29	07:24		07:20	08:18	08:44			
	21:28		20:23	13 07:17 (5)		16:58	16:11	16:13			
31	05:37		06:31	07:25		07:22		08:44			
	21:27		20:21	17 07:19 (5)		16:56		16:14			
Potential sun hours	512		460	382		328	259	233			
Total, worst case		134	39	114							
Sun reduction		0.32	0.34	0.32							
Oper. time red.		1.00	1.00	1.00							
Wind dir. red.		0.66	0.67	0.67							
Total reduction		0.21	0.23	0.22							
Total, real		29	9	25							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HU - H229

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	06:18 (1) 06:35 (1)	05:03 21:45	04:59 22:00	05:39 21:25	06:26 (1) 06:39 (1)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	06:16 (1) 06:35 (1)	05:02 21:47	05:00 22:00	05:40 21:23	06:25 (1) 06:40 (1)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	06:14 (1) 06:35 (1)	05:01 21:48	05:00 21:59	05:42 21:21	06:23 (1) 06:41 (1)	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	06:12 (1) 06:35 (1)	05:00 21:49	05:01 21:59	05:44 21:19	06:23 (1) 06:42 (1)	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	06:11 (1) 06:34 (1)	04:59 21:50	05:02 21:58	05:46 21:18	06:23 (1) 06:43 (1)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	06:12 (1) 06:34 (1)	04:59 21:51	05:03 21:58	05:47 21:16	06:21 (1) 06:43 (1)	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	06:12 (1) 06:34 (1)	04:58 21:52	05:04 21:57	05:49 21:14	06:21 (1) 06:44 (1)	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	06:12 (1) 06:33 (1)	04:57 21:53	05:05 21:56	05:51 21:12	06:20 (1) 06:44 (1)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	06:13 (1) 06:32 (1)	04:57 21:54	05:06 21:56	05:52 21:10	06:22 (1) 06:44 (1)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	06:14 (1) 06:31 (1)	04:56 21:55	05:07 21:55	05:54 21:08	06:24 (1) 06:44 (1)	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	06:15 (1) 06:30 (1)	04:56 21:56	05:08 21:54	05:56 21:06	06:25 (1) 06:44 (1)	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	06:17 (1) 06:27 (1)	04:56 21:56	05:10 21:53	05:58 21:04	06:27 (1) 06:44 (1)	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	06:20 (1) 06:25 (1)	04:55 21:57	05:11 21:52	05:59 21:01	06:29 (1) 06:43 (1)	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	05:12 21:51	06:01 20:59	06:30 (1) 06:42 (1)	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	05:13 21:50	06:03 20:57	06:32 (1) 06:42 (1)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	05:15 21:49	06:05 20:55	06:34 (1) 06:41 (1)	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	05:16 21:48	06:06 20:53	06:35 (1) 06:39 (1)	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 1 06:31 (1)	04:56 21:36	05:28 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	05:10 4 06:32 (1)	04:56 21:37	05:29 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 7 06:33 (1)	04:57 21:39	05:31 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 10 06:34 (1)	04:57 21:40	05:32 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:15 16:13	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 13 06:35 (1)	04:58 21:42	05:34 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 15 06:35 (1)	04:58 21:43	05:36 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	05:37 21:27	06:31 8 06:37 (1)	07:22 20:21	07:22 16:56	08:11 16:14	08:11 16:14	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case				50	234		8	279						
Sun reduction				0.35	0.38		0.32	0.34						
Oper. time red.				1.00	1.00		1.00	1.00						
Wind dir. red.				0.68	0.68		0.68	0.68						
Total reduction				0.24	0.26		0.22	0.23						
Total, real				12	60		2	64						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** HV - H230**Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August		September		October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02		07:01 20:00	07:25 (1) 07:31 (1)	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	21	07:08 (1) 07:29 (1)	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04		06:59 20:02	07:23 (1) 07:32 (1)	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	21	07:08 (1) 07:29 (1)	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06		06:57 20:04	07:20 (1) 07:33 (1)	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	23	07:07 (1) 07:30 (1)	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08		06:54 20:06	07:18 (1) 07:33 (1)	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	23	07:06 (1) 07:29 (1)	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10		06:52 20:08	07:15 (1) 07:33 (1)	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	22	07:07 (1) 07:29 (1)	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12		06:49 20:10	07:13 (1) 07:33 (1)	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	20	07:09 (1) 07:29 (1)	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13		06:47 20:11	07:11 (1) 07:33 (1)	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	18	07:10 (1) 07:28 (1)	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15		06:44 20:13	07:09 (1) 07:32 (1)	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	16	07:12 (1) 07:28 (1)	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17		06:42 20:15	07:09 (1) 07:32 (1)	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	13	07:14 (1) 07:27 (1)	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19		06:40 20:17	07:10 (1) 07:31 (1)	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	10	07:16 (1) 07:26 (1)	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21		06:37 20:19	07:09 (1) 07:30 (1)	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	6	07:17 (1) 07:23 (1)	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23		06:35 20:21	07:11 (1) 07:29 (1)	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	2	07:19 (1) 07:21 (1)	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25		06:33 20:22	07:12 (1) 07:27 (1)	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49			07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27		06:30 20:24	07:14 (1) 07:24 (1)	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47			06:01 18:34	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29		06:28 20:26		05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44			07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31		06:25 20:28		05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42			07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32		06:23 20:30		05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39			07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34		06:21 20:32		05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37			07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34		05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34			07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35		05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32			08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37		05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29			08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39		05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27			08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44		06:10 20:41		05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24			08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43		05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22			08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45		05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20			07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49		06:03 20:46		05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17			07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51		06:01 20:48		05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15			07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53		05:59 20:50		05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12			07:17 17:02	08:15 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55		05:56 20:52		05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26		07:14 (1) 07:25 (1)	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57		05:54 20:54		05:05 21:43	04:58 22:01	05:36 21:28	06:29 20:23		07:12 (1) 07:27 (1)	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	07:27 (1) 07:29 (1)		05:04 21:44		05:37 21:27	06:31 20:21		07:10 (1) 07:28 (1)		07:22 16:56	07:22 16:56	08:44 16:14	
Potential sun hours	250	273	367		420		494	510	512	460	382		328	259	233	
Total, worst case																
Sun reduction				2		234					44		195			
Oper. time red.				0.27		0.35					0.34		0.32			
Wind dir. red.				1.00		1.00					1.00		1.00			
Total reduction				0.68		0.68					0.68		0.68			
				0.18		0.24					0.23		0.22			
Total, real				0		56					10		42			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: HW - H231

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19	
	16:15	17:06	18:02	19	08:00 (1)	20:00	20:56	21:45	22:00	21:25	20:18	19:05	
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	08:21	
	16:16	17:08	18:04	22	08:01 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	
3	08:44	08:10	07:12	07:37 (1)	06:56	05:48	05:01	05:00	05:42	06:37	07:30	08:22	
	16:17	17:10	18:06	23	08:00 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	
4	08:43	08:09	07:09	07:37 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:24	
	16:18	17:12	18:08	23	08:00 (1)	20:06	21:01	21:49	21:59	21:19	20:11	18:57	
5	08:43	08:07	07:07	07:36 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33	08:25	
	16:20	17:14	18:10	24	08:00 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	
6	08:43	08:05	07:05	07:36 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:27	
	16:21	17:16	18:12	24	08:00 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	
7	08:42	08:03	07:02	07:37 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:28	
	16:22	17:18	18:13	22	07:59 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	
8	08:42	08:01	07:00	07:37 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:29	
	16:24	17:20	18:15	21	07:58 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	
9	08:41	07:59	06:58	07:38 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:30	
	16:25	17:22	18:17	19	07:57 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	
10	08:41	07:57	06:55	07:39 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:32	
	16:27	17:24	18:19	15	07:54 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	
11	08:40	07:55	06:53	07:42 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:44	08:33	
	16:28	17:26	18:21	10	07:52 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41	
12	08:39	07:53	06:50		06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:34	
	16:30	17:28	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:05	
13	08:38	07:51	06:48		06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35	
	16:31	17:30	18:25		20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:05	
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36	
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:05	
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37	
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:05	
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	06:59	07:54	08:38	
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:05	
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39	
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:05	
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:39	
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:05	
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40	
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:05	
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:41	
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:06	
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:41	
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:06	
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42	
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:07	
23	08:27	07:30	06:23		06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42	
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:07	
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43	
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:08	
25	08:25	07:26	06:19	07:51 (1)	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:43	
	16:53	17:54	18:47	4	07:55 (1)	20:45	21:36	22:01	21:37	20:35	19:20	16:08	
26	08:23	07:23	06:16	07:48 (1)	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:44	
	16:54	17:56	18:49	8	07:56 (1)	20:46	21:37	22:01	21:35	20:33	19:17	16:09	
27	08:22	07:21	06:14	07:46 (1)	06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:44	
	16:56	17:58	18:51	12	07:58 (1)	20:48	21:39	22:01	21:33	20:30	19:15	16:10	
28	08:20	07:19	06:11	07:43 (1)	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:44	
	16:58	18:00	18:53	16	07:59 (1)	20:50	21:40	22:01	21:32	20:28	19:12	16:11	
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:44	
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:12	
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:44	
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	18:00	16:13	
31	08:16		07:04			05:04		05:37	06:31		07:22	08:44	
	17:04		19:58			21:44		21:27	20:21		16:56	16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382	328	259	233
Total, worst case												265	
Sun reduction		0.23			0.27							0.29	
Oper. time red.		1.00			1.00							1.00	
Wind dir. red.		0.65			0.65							0.65	
Total reduction		0.15			0.18							0.19	
Total, real		6			39							50	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HX - H232

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	08:14			07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33		07:26					08:21 (1)	07:24	08:19			
	16:15	17:06			18:02	20	08:01 (1)	20:00	20:56	21:45	22:00	21:25	20:18		19:05			13	08:34 (1)	16:54	16:10			
2	08:44	08:12			07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35		07:28					08:17 (1)	07:26	08:21			
	16:16	17:08			18:04	23	08:02 (1)	20:02	20:57	21:47	22:00	21:23	20:16		19:02			18	08:35 (1)	16:52	16:09			
3	08:44	08:10			07:12	07:37 (1)	06:56	05:48	05:01	05:00	05:42	06:37		07:30					08:16 (1)	07:28	08:22			
	16:17	17:10			18:06	25	08:02 (1)	20:04	20:59	21:48	21:59	21:21	20:14		19:00			20	08:36 (1)	16:50	16:09			
4	08:43	08:09			07:09	07:37 (1)	06:54	05:46	05:00	05:01	05:44	06:38		07:32					08:15 (1)	07:30	08:24			
	16:18	17:12			18:08	26	08:03 (1)	20:06	21:01	21:49	21:59	21:19	20:11		18:57			22	08:37 (1)	16:48	16:08			
5	08:43	08:07			07:07	07:36 (1)	06:52	05:44	04:59	05:02	05:46	06:40		07:33					08:14 (1)	07:32	08:25			
	16:20	17:14			18:10	26	08:02 (1)	20:08	21:03	21:50	21:58	21:18	20:09		18:55			24	08:38 (1)	16:46	16:07			
6	08:43	08:05			07:05	07:36 (1)	06:49	05:42	04:59	05:03	05:47	06:42		07:35					08:13 (1)	07:34	08:27			
	16:21	17:16			18:12	26	08:02 (1)	20:09	21:05	21:51	21:58	21:16	20:06		18:53			25	08:38 (1)	16:45	16:07			
7	08:42	08:03			07:02	07:37 (1)	06:47	05:40	04:58	05:04	05:49	06:44		07:37					08:12 (1)	07:36	08:28			
	16:22	17:18			18:13	25	08:02 (1)	20:11	21:06	21:52	21:57	21:14	20:04		18:50			26	08:38 (1)	16:43	16:06			
8	08:42	08:01			07:00	07:36 (1)	06:44	05:38	04:57	05:05	05:51	06:45		07:39					08:12 (1)	07:38	08:29			
	16:24	17:20			18:15	25	08:01 (1)	20:13	21:08	21:53	21:56	21:12	20:01		18:48			26	08:38 (1)	16:41	16:06			
9	08:41	07:59			06:58	07:37 (1)	06:42	05:36	04:57	05:06	05:52	06:47		07:41					08:11 (1)	07:40	08:30			
	16:25	17:22			18:17	23	08:00 (1)	20:15	21:10	21:54	21:56	21:10	19:59		18:45			26	08:37 (1)	16:39	16:06			
10	08:41	07:57			06:55	07:37 (1)	06:40	05:35	04:56	05:07	05:54	06:49		07:43					08:11 (1)	07:42	08:32			
	16:27	17:24			18:19	22	07:59 (1)	20:17	21:12	21:55	21:55	21:08	19:57		18:43			26	08:37 (1)	16:37	16:05			
11	08:40	07:55			06:53	07:39 (1)	06:37	05:33	04:56	05:08	05:56	06:51		07:44					08:11 (1)	07:44	08:33			
	16:28	17:26			18:21	19	07:58 (1)	20:19	21:13	21:56	21:54	21:06	19:54		18:41			25	08:36 (1)	16:36	16:05			
12	08:39	07:53			06:50	07:40 (1)	06:35	05:31	04:56	05:09	05:58	06:52		07:46					08:13 (1)	07:46	08:34			
	16:30	17:28			18:23	15	07:55 (1)	20:21	21:15	21:56	21:53	21:04	19:52		18:38			22	08:35 (1)	16:34	16:05			
13	08:38	07:51			06:48	07:43 (1)	06:32	05:29	04:55	05:11	05:59	06:54		07:48					08:15 (1)	07:48	08:35			
	16:31	17:30			18:25	9	07:52 (1)	20:22	21:17	21:57	21:52	21:02	19:49		18:36			19	08:34 (1)	16:32	16:05			
14	08:37	07:49			06:45		06:30	05:27	04:55	05:12	06:01	06:56		07:50					08:17 (1)	07:49	08:36			
	16:33	17:32			18:27		20:24	21:19	21:58	21:51	20:59	19:47		18:34				16	08:33 (1)	16:31	16:05			
15	08:37	07:47			06:43		06:28	05:26	04:55	05:13	06:03	06:58		07:52					08:19 (1)	07:51	08:37			
	16:35	17:34			18:29		20:26	21:20	21:58	21:50	20:57	19:44		18:31				12	08:31 (1)	16:29	16:05			
16	08:36	07:45			06:41		06:25	05:24	04:55	05:14	06:05	06:59		07:54					08:21 (1)	07:53	08:38			
	16:36	17:36			18:31		20:28	21:22	21:59	21:49	20:55	19:42		18:29				7	08:28 (1)	16:28	16:05			
17	08:35	07:43			06:38		06:23	05:22	04:54	05:16	06:06	07:01		07:56						07:55	08:39			
	16:38	17:38			18:32		20:30	21:24	21:59	21:48	20:53	19:39		18:27						16:26	16:05			
18	08:34	07:41			06:36		06:21	05:21	04:54	05:17	06:08	07:03		07:58						07:57	08:39			
	16:40	17:40			18:34		20:32	21:25	22:00	21:46	20:51	19:37		18:24						16:25	16:05			
19	08:32	07:39			06:33		06:19	05:19	04:54	05:19	06:10	07:05		07:59						07:59	08:40			
	16:42	17:42			18:36		20:34	21:27	22:00	21:45	20:49	19:34		18:22						16:23	16:05			
20	08:31	07:37			06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01						08:01	08:41			
	16:43	17:44			18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20						16:22	16:06			
21	08:30	07:34			06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03						08:02	08:41			
	16:45	17:46			18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18						16:21	16:06			
22	08:29	07:32			06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05						08:04	08:42			
	16:47	17:48			18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15						16:19	16:07			
23	08:27	07:30			06:23		06:09	05:13	04:55	05:24	06:17	07:12		08:07						08:06	08:42			
	16:49	17:50			18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13						16:18	16:07			
24	08:26	07:28			06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09						08:08	08:43			
	16:51	17:52			18:45		20:43	21:35	22:01	21:38	20:37	19:22		18:11						16:17	16:08			
25	08:25	07:26			06:19		06:05	05:11	04:56	05:27	06:21	07:15		07:11						08:10	08:43			
	16:53	17:54			18:47		20:45	21:36	22:01	21:37	20:35	19:20		17:09						16:16	16:08			
26	08:23	07:23			06:16		06:03	05:09	04:56	05:29	06:22	07:17		07:13						08:11	08:44			
	16:54	17:56			18:49		20:46	21:37	22:01	21:35	20:33	19:17		17:07						16:15	16:09			
27	08:22	07:21			06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:15						08:13	08:44			
	16:56	17:58			18:51		20:48	21:39	22:01	21:33	20:30	19:15		17:05						16:14	16:10			
28	08:20	07:19			06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:17						08:15	08:44			
	16:58	18:00			18:53		20:50	21:40	22:01	21:32	20:28	19:12		17:02						16:13	16:11			
29	08:19				07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:19						08:16	08:44			
	17:00				19:55		20:52	21:42	22:01	21:30	20:26	19:10		17:00						16:12	16:12			
30	08:17				07:06		05:54	05:05	04:58	05:35	06:29	07:24		08:25 (1)						08:18	08:44			
	17:02				19:57		20:54	21:43	22:01	21:28	20:23	19:07		5						16:11	16:13			
31	08:15				07:04			05:04		05:37	06:31			07:22							08:44			
	17:04				19:58			21:44		21:27	20:21			16:56							16:14			
Potential sun hours	250	273			367			420	494	510		460		382					323					

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HY - H233

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	08:42 (3)	07:16	08:36 (1)	07:01	05:52	05:03			
	16:15	17:06	22 09:04 (1)	18:02	32 09:08 (1)	20:00	20:56	21:45			
2	08:44	08:12	08:40 (3)	07:14		08:38 (1)	06:59	05:50			
	16:16	17:08	26 09:06 (1)	18:04	28 09:06 (1)	20:02	20:57	21:47			
3	08:44	08:10	08:38 (3)	07:12		08:40 (1)	06:56	05:48			
	16:17	17:10	30 09:08 (1)	18:06	23 09:03 (1)	20:04	20:59	21:48			
4	08:43	08:09	08:36 (3)	07:09		08:43 (1)	06:54	05:50			
	16:18	17:12	33 09:09 (1)	18:08	17 09:00 (1)	20:06	21:01	21:49			
5	08:43	08:07	08:34 (3)	07:07		06:52	05:44	04:59			
	16:20	17:14	37 09:11 (1)	18:10		20:08	21:03	21:50			
6	08:43	08:05	08:33 (3)	07:05		06:49	05:42	04:59			
	16:21	17:16	39 09:12 (1)	18:11		20:09	21:05	21:51			
7	08:42	08:03	08:33 (3)	07:02		06:47	05:40	04:58			
	16:22	17:18	40 09:13 (1)	18:13		20:11	21:06	21:52			
8	08:42	08:01	08:34 (3)	07:00		07:24 (2)	06:44	05:38			
	16:24	17:20	40 09:14 (1)	18:15	4 07:28 (2)	20:13	21:08	21:53			
9	08:41	07:59	08:33 (1)	06:57		07:22 (2)	06:42	05:36			
	16:25	17:22	42 09:15 (1)	18:17	7 07:29 (2)	20:15	21:10	21:54			
10	08:41	07:57	08:32 (1)	06:55		07:19 (2)	06:40	05:35			
	16:27	17:24	44 09:16 (1)	18:19	10 07:29 (2)	20:17	21:12	21:55			
11	08:40	07:55	08:32 (1)	06:53		07:17 (2)	06:37	05:33			
	16:28	17:26	44 09:16 (1)	18:21	12 07:29 (2)	20:19	21:13	21:56			
12	08:39	07:53	08:32 (1)	06:50		07:14 (2)	06:35	05:31			
	16:30	17:28	45 09:17 (1)	18:23	15 07:29 (2)	20:21	21:15	21:56			
13	08:38	07:51	08:31 (1)	06:48		07:12 (2)	06:32	05:29			
	16:31	17:30	47 09:18 (1)	18:25	17 07:29 (2)	20:22	21:17	21:57			
14	08:37	07:49	08:30 (1)	06:45		07:09 (2)	06:30	05:27			
	16:33	17:32	47 09:17 (1)	18:27	18 07:27 (2)	20:24	21:19	21:58			
15	08:37	07:47	08:30 (1)	06:43		07:09 (2)	06:28	05:26			
	16:35	17:34	48 09:18 (1)	18:29	18 07:27 (2)	20:26	21:20	21:58			
16	08:36	07:45	08:30 (1)	06:41		07:09 (2)	06:25	05:24			
	16:36	17:36	48 09:18 (1)	18:30	16 07:25 (2)	20:28	21:22	21:59			
17	08:35	07:43	08:30 (1)	06:38		07:11 (2)	06:23	05:22			
	16:38	17:38	48 09:18 (1)	18:32	12 07:23 (2)	20:30	21:24	21:59			
18	08:33	07:41	08:31 (1)	06:36		07:14 (2)	06:21	05:21			
	16:40	17:40	47 09:18 (1)	18:34	5 07:19 (2)	20:32	21:25	22:00			
19	08:32	07:39	08:30 (1)	06:33		06:18	05:19	04:54			
	16:41	17:42	47 09:17 (1)	18:36		20:33	21:27	22:00			
20	08:31	07:37	08:30 (1)	06:31		06:16	05:18	04:54			
	16:43	17:44	47 09:17 (1)	18:38		20:35	21:28	22:00			
21	08:30	07:34	08:31 (1)	06:28		06:14	05:16	04:55			
	16:45	17:46	46 09:17 (1)	18:40		20:37	21:30	22:01			
22	08:29	07:32	08:30 (1)	06:26		06:12	05:15	04:55			
	16:47	17:48	46 09:16 (1)	18:42		20:39	21:31	22:01			
23	08:27	07:30	08:31 (1)	06:23		06:09	05:13	04:55			
	16:49	17:50	45 09:16 (1)	18:44		20:41	21:33	22:01			
24	08:26	07:28	08:32 (1)	06:21		06:07	05:12	04:55			
	16:51	17:52	43 09:15 (1)	18:45		20:43	21:35	22:01			
25	08:25	07:26	08:32 (1)	06:18		06:05	05:11	04:56			
	16:53	17:54	42 09:14 (1)	18:47		20:45	21:36	22:01			
26	08:23	07:23	08:33 (1)	06:16		06:03	05:09	04:56			
	16:54	17:56	40 09:13 (1)	18:49		20:46	21:37	22:01			
27	08:22	07:21	08:34 (1)	06:14		06:01	05:08	04:56			
	16:56	17:58	38 09:12 (1)	18:51		20:48	21:39	22:01			
28	08:20	08:49 (3)	07:19	08:35 (1)	06:11	05:59	05:07	04:57			
	16:58	3 08:52 (3)	18:00	35 09:10 (1)	18:53	20:50	21:40	22:01			
29	08:19	08:47 (3)		07:09		05:56	05:06	04:58			
	17:00	5 08:52 (3)		19:55		20:52	21:42	22:01			
30	08:17	08:45 (3)		07:06		05:54	05:05	04:58			
	17:02	9 08:54 (1)		19:57		20:54	21:43	22:01			
31	08:15	08:44 (3)		07:04			05:04				
	17:04	17 09:01 (1)		19:58			21:44				
Potential sun hours	250		273	367		420	494	510			
Total, worst case	34		1156	234							
Sun reduction	0.24		0.23	0.27							
Oper. time red.	1.00		1.00	1.00							
Wind dir. red.	0.61		0.61	0.64							
Total reduction	0.15		0.14	0.17							
Total, real	5		165	40							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: HY - H233

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (2) 16:54	08:02 (1) 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (2) 16:52	08:03 (1) 16:09
3	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:56 (2) 16:50	08:03 (1) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:58 (2) 16:48	08:03 (3) 16:08
5	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	08:00 (2) 16:46	08:02 (3) 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:02 (2) 16:45	08:04 (3) 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:06 (3) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:09 (3) 16:06
9	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	09:20 (1) 16:39	08:11 (3) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	09:16 (1) 16:37	08:13 (3) 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	09:13 (1) 16:36	08:15 (3) 16:05
12	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	09:11 (1) 16:34	08:17 (3) 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	09:09 (1) 16:32	08:19 (3) 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	09:07 (1) 16:31	08:21 (3) 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	09:06 (1) 16:29	08:24 (3) 16:05
16	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	09:05 (1) 16:28	08:25 (3) 16:05
17	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	09:04 (1) 16:26	08:26 (3) 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	09:03 (1) 16:25	08:27 (3) 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	09:02 (1) 16:23	08:28 (3) 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	09:01 (1) 16:22	08:29 (3) 16:05
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	09:01 (1) 16:21	08:30 (3) 16:05
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	09:01 (1) 16:19	08:31 (3) 16:05
23	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	09:00 (1) 16:18	08:32 (3) 16:05
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	09:00 (1) 16:17	08:33 (3) 16:05
25	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	08:00 (1) 16:16	08:34 (3) 16:05
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 08:04 (2)	08:00 (1) 16:15	08:35 (3) 16:05
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 08:06 (2)	08:00 (1) 16:14	08:36 (3) 16:05
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 08:07 (2)	08:00 (1) 16:13	08:37 (3) 16:05
29	05:34 21:30	06:28 20:26	07:23 19:10	07:19 08:08 (2)	08:00 (1) 16:12	08:38 (3) 16:05
30	05:35 21:28	06:29 20:23	07:24 19:07	07:20 08:08 (2)	08:01 (1) 16:11	08:39 (3) 16:05
31	05:37 21:27	06:31 20:21		07:22 16:56	08:02 (1) 08:46 (1)	08:40 (3) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case			77	978	382	
Sun reduction			0.32	0.29	0.27	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.66	0.61	0.61	
Total reduction			0.21	0.18	0.16	
Total, real			16	176	62	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn.Feeney@jodireland.com Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Assumptions for shadow calculations

Shadow receptor: HZ - H234

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	12:17 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	08:19
2	16:15	33 12:50 (1)	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	18:19
3	08:44	12:18 (1)	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28
4	16:16	32 12:50 (1)	17:08	2 08:42 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
5	08:44	12:18 (1)	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
6	16:17	32 12:50 (1)	17:10	6 08:44 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
7	08:43	12:20 (1)	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32
8	16:18	30 12:50 (1)	17:12	9 08:45 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
9	08:43	12:21 (1)	08:07	08:34 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33
10	16:20	28 12:49 (1)	17:14	12 08:46 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55
11	08:43	12:23 (1)	08:05	08:32 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35
12	16:21	26 12:49 (1)	17:16	15 08:47 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53
13	08:42	12:24 (1)	08:03	08:30 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37
14	16:22	24 12:48 (1)	17:18	18 08:48 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
15	08:42	12:25 (1)	08:01	08:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
16	16:24	22 12:47 (1)	17:20	21 08:49 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48
17	08:41	12:28 (1)	07:59	08:26 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
18	16:25	19 12:47 (1)	17:22	23 08:49 (2)	18:17	20:15	21:10	21:54	21:56	21:10	20:00	18:45
19	08:40	12:30 (1)	07:57	08:24 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43
20	16:27	15 12:45 (1)	17:24	26 08:50 (2)	18:19	20:17	21:12	21:55	21:58	21:08	20:00	18:43
21	08:40	12:33 (1)	07:55	08:22 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
22	16:28	10 12:43 (1)	17:26	28 08:50 (2)	18:21	20:19	21:13	21:56	21:54	21:06	20:00	18:41
23	08:39	07:53	08:21 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:40
24	16:30	17:28	29 08:50 (2)	18:23	20:21	21:15	21:56	21:53	21:04	20:00	18:38	17:34
25	08:38	07:51	08:21 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:42
26	16:31	17:30	29 08:50 (2)	18:25	20:22	21:17	21:57	21:52	21:01	20:00	18:36	17:32
27	08:37	07:49	08:21 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:44
28	16:33	17:32	28 08:49 (2)	18:27	20:24	21:18	21:58	21:51	20:59	20:00	18:33	17:31
29	08:36	07:47	08:21 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:46
30	16:34	17:34	28 08:49 (2)	18:29	20:26	21:20	21:58	21:50	20:57	20:00	18:31	17:30
31	08:36	07:45	08:22 (2)	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:48
32	16:36	17:36	26 08:48 (2)	18:30	20:28	21:22	21:59	21:49	20:55	20:00	18:29	17:28
33	08:35	07:43	08:23 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:50
34	16:38	17:38	25 08:48 (2)	18:32	20:30	21:24	21:59	21:48	20:53	20:00	18:27	17:26
35	08:33	07:41	08:23 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:51
36	16:40	17:40	23 08:46 (2)	18:34	20:32	21:25	22:00	21:46	20:51	20:00	18:24	17:25
37	08:32	07:39	08:25 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:53
38	16:41	17:42	20 08:45 (2)	18:36	20:33	21:27	22:00	21:45	20:48	20:00	18:22	17:23
39	08:31	07:37	08:27 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:55
40	16:43	17:44	16 08:43 (2)	18:38	20:35	21:28	22:00	21:44	20:46	20:00	18:20	17:22
41	08:30	07:34	08:29 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:57
42	16:45	17:46	12 08:41 (2)	18:40	20:37	21:30	22:01	21:42	20:44	20:00	18:18	17:20
43	08:29	07:32	08:27 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:59
44	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42	20:00	18:15	17:19	16:19
45	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:55	09:50
46	16:49	17:50	18:43	20:41	21:33	22:01	21:40	20:39	20:00	18:13	17:17	16:18
47	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:53	09:48
48	16:51	17:52	18:45	20:43	21:34	22:01	21:38	20:37	20:00	18:11	17:15	16:17
49	08:25	07:25	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:54	09:49
50	16:52	17:54	18:47	20:44	21:36	22:01	21:37	20:35	20:00	18:19	17:19	16:16
51	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:12	08:56	09:51
52	16:54	17:56	18:49	20:46	21:37	22:01	21:35	20:33	20:00	18:17	17:17	16:15
53	08:22	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:14	08:58	09:53
54	16:56	17:58	18:51	20:48	21:39	22:01	21:33	20:30	20:00	18:14	17:14	16:14
55	08:20	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	09:01	09:56
56	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	20:00	18:12	17:12	16:13
57	08:19	07:17	07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:18	09:03	09:58
58	17:00	19:55	19:55	20:52	21:42	22:01	21:30	20:25	20:00	18:10	17:10	16:12
59	08:17	07:06	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:19	09:04	09:59
60	17:02	19:56	19:56	20:54	21:43	22:00	21:28	20:23	20:00	18:09	17:09	16:11
61	08:15	07:04	07:04	05:04	05:04	05:04	05:37	06:31	07:22	08:17	09:02	09:57
62	17:04	19:58	19:58	21:44	21:44	21:44	21:27	20:21	20:00	18:09	17:09	16:11
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	271	396										
Sun reduction	0.24	0.23										
Oper. time red.	1.00	1.00										
Wind dir. red.	0.62	0.62										
Total reduction	0.15	0.14										
Total, real	41	57										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IA - H235

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:25 (4)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24			08:12 (2)	08:19					13:10 (1)	
	16:15	48	13:42 (1)	17:06	30	09:12 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	28	08:40 (2)	16:10	6				13:16 (1)	
2	08:44		09:26 (4)	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26			08:11 (2)	08:21					13:07 (1)	
	16:16	46	13:42 (1)	17:08	32	09:12 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	30	08:41 (2)	16:09	13				13:20 (1)	
3	08:44		09:27 (4)	08:10	08:40 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28			08:11 (2)	08:22					13:04 (1)	
	16:17	43	13:41 (1)	17:10	32	09:12 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	30	08:41 (2)	16:08	18				13:22 (1)	
4	08:43		09:28 (4)	08:09	08:40 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30			08:10 (2)	08:24					09:19 (4)	
	16:18	41	13:41 (1)	17:12	32	09:12 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	32	08:42 (2)	16:08	23				13:24 (1)	
5	08:43		09:29 (4)	08:07	08:40 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32			08:10 (2)	08:25					09:17 (4)	
	16:20	38	13:41 (1)	17:14	32	09:12 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	32	08:42 (2)	16:07	30				13:25 (1)	
6	08:43		09:30 (4)	08:05	08:40 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34			08:10 (2)	08:27					09:17 (4)	
	16:21	35	13:41 (1)	17:16	32	09:12 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:44	32	08:42 (2)	16:07	34				13:27 (1)	
7	08:42		09:32 (4)	08:03	08:41 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36			08:10 (2)	08:28					09:16 (4)	
	16:22	30	13:40 (1)	17:18	31	09:12 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	32	08:42 (2)	16:06	38				13:28 (1)	
8	08:42		09:34 (4)	08:01	08:41 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38			08:11 (2)	08:29					09:16 (4)	
	16:24	24	13:39 (1)	17:20	31	09:12 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	32	08:43 (2)	16:06	41				13:30 (1)	
9	08:41		13:21 (1)	07:59	08:42 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			08:11 (2)	08:30					09:16 (4)	
	16:25	18	13:39 (1)	17:22	29	09:11 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	32	08:43 (2)	16:05	43				13:30 (1)	
10	08:40		13:23 (1)	07:57	08:43 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42			08:13 (2)	08:32					09:15 (4)	
	16:27	14	13:37 (1)	17:24	27	09:10 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	30	08:43 (2)	16:05	45				13:31 (1)	
11	08:40		13:27 (1)	07:55	08:44 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44			08:15 (2)	08:33					09:15 (4)	
	16:28	7	13:34 (1)	17:26	26	09:10 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	27	08:42 (2)	16:05	48				13:32 (1)	
12	08:39		07:53	08:45 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	13:33 (1)	07:46			08:17 (2)	08:34					09:15 (4)	
	16:30		17:28	24	09:09 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	25	08:42 (2)	16:05	49					13:32 (1)	
13	08:38		07:51	08:46 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	13:33 (1)	07:48			08:19 (2)	08:35					09:16 (4)	
	16:31		17:30	20	09:06 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	22	08:41 (2)	16:05	50					13:34 (1)	
14	08:37		07:49	08:48 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	13:35 (1)	07:49			08:21 (2)	08:36					09:17 (4)	
	16:33		17:32	17	09:05 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	20	08:41 (2)	16:05	51					13:35 (1)	
15	08:36		07:47	08:51 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	13:36 (1)	07:51			08:23 (2)	08:37					09:17 (4)	
	16:34		17:34	11	09:02 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	17	08:40 (2)	16:05	52					13:35 (1)	
16	08:36		07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	13:36 (1)	07:53			08:25 (2)	08:38					09:16 (4)		
	16:36		17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	17:15	16:28	15	08:40 (2)	16:05	52						13:35 (1)	
17	08:34		07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	13:37 (1)	07:55			08:27 (2)	08:39					09:17 (4)		
	16:38		17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	17:12	16:26	12	08:39 (2)	16:05	53						13:36 (1)	
18	08:33		07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	13:38 (1)	07:57			08:29 (2)	08:39					09:17 (4)		
	16:40		17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	17:10	16:25	9	08:38 (2)	16:05	54						13:37 (1)	
19	08:32		07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	13:39 (1)	07:59			08:31 (2)	08:40					09:18 (4)		
	16:41		17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	17:08	16:23	6	08:37 (2)	16:05	55						13:38 (1)	
20	08:31		07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	13:39 (1)	08:01			08:33 (2)	08:41					09:18 (4)		
	16:43		17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	17:06	16:22	3	08:36 (2)	16:06	55						13:38 (1)	
21	08:30		07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	13:40 (1)	08:02			08:32 (2)	08:41					09:19 (4)		
	16:45		17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	17:02	16:20			08:30 (2)	16:06	54					13:39 (1)	
22	08:29		07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	13:40 (1)	08:04			08:32 (2)	08:42					09:19 (4)		
	16:47	3	09:01 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19			08:31 (2)	16:07	54					13:39 (1)	
23	08:27		07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	13:41 (1)	08:06			08:33 (2)	08:42					09:20 (4)		
	16:49	6	09:03 (2)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18			08:34 (2)	16:07	54					13:40 (1)	
24	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	13:42 (1)	08:08			08:35 (2)	08:43					09:20 (4)		
	16:51	9	09:04 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17			08:36 (2)	16:08	55					13:40 (1)	
25	08:25		07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:10	13:43 (1)	08:09			08:37 (2)	08:43					09:20 (4)		
	16:52	12	09:06 (2)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09	16:16			08:38 (2)	16:09	54					13:40 (1)	
26	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:12	13:44 (1)	08:11			08:39 (2)	08:44					09:22 (4)		
	16:54	15	09:07 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:13			08:40 (2)	16:09	53					13:41 (1)	
27	08:22		07:21	06:14	06:01	05:08	04:54	05:28	06:21	07:16	08:11	13:45 (1)	08:08			08:41 (2)	08:46					09:23 (4)		
	16:56	17	09:08 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:10			08:42 (2)	16:14	52					13:41 (1)	
28	08:20		07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	13:46 (1)	08:12			08:43 (2)	08:44					09:23 (4)		
	16:58	20	09:09 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:11			08:44 (2)	16:13	51					13:41 (1)	
29	08:19		07:18	06:09	05:56	05:06	04:58	05:34	06:28	07:23	08:17	13:47 (1)	08:15			08:45 (2)	08:16					09:23 (4)		
	17:00	23	09:10 (2)	17:00	19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:11			08:46 (2)	16:12	52					13:42 (1)	
30	08:17		07:17	06:08	05:54	05:05	04:58	05:35	06:29	07:24	08:19	13:48 (1)	08:13			08:47 (2)	08:18					09:24 (4)		
	17:02	25	09:10 (2)	17:02	19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:12			08:48 (2)	16:11	50					13:42 (1)	
31	08:15		07:15	06:06																				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IB - H236
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	09:26 (4)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	13:11 (1)
2	16:15	13:44 (1)	17:06	09:13 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	13:19 (1)
3	08:44	09:28 (4)	08:12	08:41 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	13:09 (1)
4	16:16	13:44 (1)	17:08	09:13 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	13:23 (1)
5	08:44	09:28 (4)	08:10	08:41 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	13:06 (1)
6	16:17	13:44 (1)	17:10	09:14 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	13:24 (1)
7	08:43	09:29 (4)	08:09	08:41 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	13:06 (1)
8	16:18	13:44 (1)	17:12	09:14 (2)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	13:27 (1)
9	08:43	09:30 (4)	08:07	08:41 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	13:19 (1)
10	16:20	13:43 (1)	17:14	09:13 (2)	18:09	20:08	21:03	21:50	21:58	21:18	20:09	18:55	13:28 (1)
11	08:43	09:32 (4)	08:05	08:42 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	13:18 (1)
12	16:21	13:43 (1)	17:16	09:13 (2)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	13:30 (1)
13	08:42	09:34 (4)	08:03	08:42 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	13:17 (1)
14	16:22	13:43 (1)	17:18	09:13 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	13:30 (1)
15	08:42	13:20 (1)	08:01	08:43 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	13:18 (1)
16	16:24	13:42 (1)	17:20	09:13 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	13:32 (1)
17	08:41	13:23 (1)	07:59	08:43 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	13:17 (1)
18	16:25	13:41 (1)	17:22	09:12 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	13:33 (1)
19	08:40	13:25 (1)	07:57	08:44 (2)	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	13:17 (1)
20	16:27	13:40 (1)	17:24	09:12 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	13:33 (1)
21	08:40	13:29 (1)	07:55	08:45 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	13:17 (1)
22	16:28	13:37 (1)	17:26	09:11 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	13:34 (1)
23	08:39	07:53	08:47 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:40	13:17 (1)
24	16:30	17:28	23	09:10 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	13:35 (1)
25	08:38	07:51	08:47 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:42	13:18 (1)
26	16:31	17:30	20	09:07 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	13:36 (1)
27	08:37	07:49	08:50 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:44	13:18 (1)
28	16:33	17:32	15	09:05 (2)	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	13:37 (1)
29	08:36	07:47	08:53 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:46	13:18 (1)
30	16:34	17:34	9	09:02 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	13:38 (1)
31	08:36	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:48	09:42	13:18 (1)
32	16:36	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	17:16	16:03	13:38 (1)
33	08:34	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:51	09:45	13:18 (1)
34	16:38	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	17:14	16:01	13:39 (1)
35	08:33	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:52	09:46	13:19 (1)
36	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	17:11	16:00	13:39 (1)
37	08:32	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:54	09:48	13:19 (1)
38	16:41	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	17:09	16:00	13:40 (1)
39	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:56	09:50	13:19 (1)
40	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	17:07	16:00	13:40 (1)
41	08:30	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:58	09:52	13:20 (1)
42	16:45	2	09:02 (2)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	13:41 (1)
43	08:29	08:58 (2)	07:32	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:59	09:53	13:20 (1)
44	16:47	5	09:03 (2)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	13:41 (1)
45	08:27	08:57 (2)	07:30	06:09	05:13	04:55	05:24	06:17	07:12	08:07	09:02	09:56	13:21 (1)
46	16:49	8	09:05 (2)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	13:42 (1)
47	08:26	08:55 (2)	07:28	06:07	05:12	04:55	05:26	06:19	07:14	08:09	09:04	09:58	13:21 (1)
48	16:51	11	09:06 (2)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	13:42 (1)
49	08:25	08:54 (2)	07:25	06:05	05:11	04:56	05:27	06:20	07:15	08:10	09:05	09:59	13:22 (1)
50	16:52	14	09:08 (2)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09	13:42 (1)
51	08:23	08:52 (2)	07:23	06:03	05:09	04:56	05:29	06:22	07:17	08:12	09:07	09:59	13:23 (1)
52	16:54	17	09:09 (2)	17:56	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	13:43 (1)
53	08:22	08:51 (2)	07:21	06:01	05:08	04:56	05:31	06:24	07:19	08:14	09:09	09:59	13:23 (1)
54	16:56	19	09:10 (2)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	13:44 (1)
55	08:20	08:49 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	09:11	13:24 (1)
56	16:58	22	09:11 (2)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	13:44 (1)
57	08:19	08:47 (2)	07:18	07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:18	09:13	13:25 (1)
58	17:00	24	09:11 (2)	19:00	19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	13:44 (1)
59	08:17	08:45 (2)	07:17	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:19	09:14	13:25 (1)
60	17:02	27	09:12 (2)	19:01	19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	13:44 (1)
61	08:15	08:44 (2)	07:16	07:04	05:04	05:04	05:04	05:04	05:04	05:04	05:04	05:04	13:25 (1)
62	17:04	29	09:13 (2)	19:02	19:58	21:44	21:44	21:27	20:21	19:16	18:11	17:06	13:44 (1)
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	1374
Total, worst case	518	403											1374
Sun reduction	0.24	0.23											0.21
Oper. time red.	1.00	1.00											1.00
Wind dir. red.	0.62	0.61											0.62
Total reduction	0.15	0.14											0.13
Total, real	78	57											176

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: IC - H237

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: ID - H238

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	[January	[February	[March	[April	[May		[June		[July		[August	[September	[October	[November	[December		
1	08:44	08:14	07:16	07:01	05:52		05:03		20:28 (5)	04:59	20:32 (5)	05:39	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:55		21:45	42	21:10 (5)	22:00	21:23 (5)	21:25	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50		05:02		20:28 (5)	05:00	20:33 (5)	05:40	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57		21:46	44	21:12 (5)	22:00	21:23 (5)	21:23	20:16	19:02	16:52	16:09	
3	08:43	08:10	07:12	06:56	05:48		05:01		20:28 (5)	05:00	20:32 (5)	05:42	06:36	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59		21:48	45	21:13 (5)	21:59	21:22 (5)	21:21	20:13	19:00	16:50	16:08	
4	08:43	08:08	07:09	06:54	05:46		05:00		20:27 (5)	05:01	20:33 (5)	05:44	06:38	07:31	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01		21:49	47	21:14 (5)	21:59	21:23 (5)	21:19	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:51	05:44		04:59		20:28 (5)	05:02	20:33 (5)	05:45	06:40	07:33	07:32	08:25	
	16:20	17:14	18:09	20:07	21:03		21:50	47	21:15 (5)	21:58	21:23 (5)	21:17	20:09	18:55	16:46	16:07	
6	08:42	08:05	07:04	06:49	05:42		04:59		20:27 (5)	05:03	20:34 (5)	05:47	06:42	07:35	07:34	08:26	
	16:21	17:16	18:11	20:09	21:04		21:51	49	21:16 (5)	21:57	21:22 (5)	21:15	20:06	18:52	16:44	16:07	
7	08:42	08:03	07:02	06:47	05:40		04:58		20:27 (5)	05:04	20:34 (5)	05:49	06:43	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06		21:52	49	21:16 (5)	21:57	21:22 (5)	21:13	20:04	18:50	16:43	16:06	
8	08:41	08:01	07:00	06:44	05:38		04:57		20:28 (5)	05:05	20:35 (5)	05:51	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08		21:53	49	21:17 (5)	21:56	21:21 (5)	21:11	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:57	06:42	05:36		04:57		20:28 (5)	05:06	20:35 (5)	05:52	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10		21:54	50	21:18 (5)	21:55	21:21 (5)	21:10	19:59	18:45	16:39	16:05	
10	08:40	07:57	06:55	06:39	05:34		04:56		20:27 (5)	05:07	20:35 (5)	05:54	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11		21:55	51	21:18 (5)	21:55	21:20 (5)	21:07	19:56	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33		04:56		20:28 (5)	05:08	20:36 (5)	05:56	06:51	07:44	07:44	08:33	
	16:28	17:26	18:21	20:19	21:13		21:55	50	21:18 (5)	21:54	21:19 (5)	21:05	19:54	18:40	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		04:55		20:28 (5)	05:09	20:36 (5)	05:58	06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15		21:56	51	21:19 (5)	21:53	21:18 (5)	21:03	19:51	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:32	05:29		04:55		20:28 (5)	05:11	20:37 (5)	05:59	06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17		21:57	50	21:18 (5)	21:52	21:17 (5)	21:01	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55		20:28 (5)	05:12	20:37 (5)	06:01	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18		21:57	51	21:19 (5)	21:51	21:16 (5)	20:59	19:47	18:33	16:31	16:05	
15	08:36	07:47	06:43	06:28	05:26		20:47 (5)	04:55		20:28 (5)	05:13	20:37 (5)	06:03	06:58	07:52	07:51	08:37
	16:35	17:34	18:28	20:26	21:20	1	20:48 (5)	21:58	51	21:19 (5)	21:50	21:15 (5)	20:57	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24		20:42 (5)	04:54		20:28 (5)	05:14	20:39 (5)	06:05	06:59	07:54	07:53	08:38
	16:36	17:36	18:30	20:28	21:22	8	20:50 (5)	21:59	52	21:20 (5)	21:49	21:15 (5)	20:55	19:42	18:29	16:28	16:05
17	08:34	07:43	06:38	06:23	05:22		20:39 (5)	04:54		20:29 (5)	05:16	20:39 (5)	06:06	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30	21:23	12	20:51 (5)	21:59	51	21:20 (5)	21:47	21:14 (5)	20:53	19:39	18:26	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21		20:38 (5)	04:54		20:29 (5)	05:17	20:40 (5)	06:08	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31	21:25	14	20:52 (5)	22:00	51	21:20 (5)	21:46	21:12 (5)	20:51	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	05:19		20:36 (5)	04:54		20:29 (5)	05:18	20:40 (5)	06:10	07:05	07:59	07:59	08:40
	16:41	17:42	18:36	20:33	21:27	18	20:54 (5)	22:00	51	21:20 (5)	21:45	21:11 (5)	20:48	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	05:18		20:34 (5)	04:54		20:29 (5)	05:20	20:42 (5)	06:12	07:06	08:01	08:00	08:41
	16:43	17:44	18:38	20:35	21:28	21	20:55 (5)	22:00	51	21:20 (5)	21:44	21:10 (5)	20:46	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16		20:34 (5)	04:55		20:29 (5)	05:21	20:42 (5)	06:13	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30	23	20:57 (5)	22:00	51	21:20 (5)	21:42	21:09 (5)	20:44	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	05:15		20:33 (5)	04:55		20:30 (5)	05:23	20:43 (5)	06:15	07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	21:31	25	20:58 (5)	22:01	51	21:21 (5)	21:41	21:07 (5)	20:42	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	05:13		20:31 (5)	04:55		20:30 (5)	05:24	20:44 (5)	06:17	07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	21:33	28	20:59 (5)	22:01	51	21:21 (5)	21:39	21:07 (5)	20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12		20:31 (5)	04:55		20:30 (5)	05:26	20:45 (5)	06:19	07:13	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	21:34	30	21:01 (5)	22:01	51	21:21 (5)	21:38	21:05 (5)	20:37	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	05:11		20:30 (5)	04:56		20:31 (5)	05:27	20:47 (5)	06:20	07:15	08:11	08:09	08:43
	16:52	17:54	18:47	20:44	21:36	32	21:02 (5)	22:01	51	21:22 (5)	21:36	21:04 (5)	20:35	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:09		20:30 (5)	04:56		20:31 (5)	05:29	20:49 (5)	06:22	07:17	08:13	08:11	08:43
	16:54	17:56	18:49	20:46	21:37	33	21:03 (5)	22:01	51	21:22 (5)	21:35	21:02 (5)	20:32	19:17	17:07	16:15	16:09
27	08:22	07:21	06:13	06:01	05:08		20:29 (5)	04:56		20:31 (5)	05:31	20:51 (5)	06:24	07:19	08:15	08:13	08:44
	16:56	17:58	18:51	20:48	21:39	36	21:05 (5)	22:01	51	21:22 (5)	21:33	21:01 (5)	20:30	19:14	17:04	16:14	16:10
28	08:20	07:18	06:11	05:58	05:07		20:29 (5)	04:57		20:31 (5)	05:32	20:54 (5)	06:26	07:21	08:16	08:14	08:44
	16:58	18:00	18:53	20:50	21:40	37	21:06 (5)	22:01	51	21:22 (5)	21:32	20:59 (5)	20:28	19:12	17:02	16:13	16:11
29	08:18		07:09	05:56	05:06		20:29 (5)	04:58		20:32 (5)	05:34		06:28	07:22	08:17	08:16	08:44
	17:00		19:55	20:52	21:41	38	21:07 (5)	22:01	51	21:23 (5)	21:30		20:25	19:09	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05		20:28 (5)	04:58		20:31 (5)	05:35		06:29	07:24	08:18	08:18	08:44
	17:02		19:56	20:53	21:43	40	21:08 (5)	22:00	51	21:22 (5)	21:28		20:23	19:07	16:58	16:11	16:12
31	08:15		07:04	05:04			20:28 (5)				05:37		06:31		07:22		08:44
	17:04		19:58	21:44		41	21:09 (5)				21:26		20:21		16:56		16:13
Potential sun hours	250	273	367	420	494		510		512		460	382	328	259	233		
Total, worst case					437		1492		987								
Sun reduction					0.38		0.32		0.32								
Oper. time red.					1.00		1.00		1.00								
Wind dir. red.					0.62		0.62		0.62								
Total reduction					0.24		0.20		0.20								
Total, real					103		296		198								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: IE - H239

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	20:28 (5) 04:59	20:35 (5) 05:39	06:33	07:26	07:24	08:19
2	16:15	17:06	18:02	20:00	20:55	21:45	35 21:03 (5) 22:00	34 21:09 (5) 21:25	20:18	19:05	16:54	16:10
	08:44	08:12	07:14	06:59	05:50	05:02	20:29 (5) 05:00	20:36 (5) 05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:46	35 21:04 (5) 22:00	34 21:10 (5) 21:23	20:16	19:02	16:52	16:09
3	08:43	08:10	07:12	06:56	05:48	05:01	20:29 (5) 05:00	20:35 (5) 05:42	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48	35 21:04 (5) 21:59	35 21:10 (5) 21:21	20:13	19:00	16:50	16:08
	08:43	08:08	07:09	06:54	05:46	05:00	20:29 (5) 05:01	20:36 (5) 05:44	06:38	07:31	07:30	08:24
4	16:18	17:12	18:07	20:06	21:01	21:49	35 21:04 (5) 21:59	34 21:10 (5) 21:19	20:11	18:57	16:48	16:08
	08:43	08:07	07:07	06:51	05:44	04:59	20:30 (5) 05:02	20:36 (5) 05:45	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07	21:03	21:50	35 21:05 (5) 21:58	34 21:10 (5) 21:17	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	04:59	20:30 (5) 05:03	20:36 (5) 05:47	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	21:51	35 21:05 (5) 21:57	35 21:11 (5) 21:15	20:06	18:52	16:44	16:07
	08:42	08:03	07:02	06:47	05:40	04:58	20:30 (5) 05:04	20:36 (5) 05:49	06:43	07:37	07:36	08:28
7	16:22	17:18	18:13	20:11	21:06	21:52	34 21:04 (5) 21:57	35 21:11 (5) 21:13	20:04	18:50	16:43	16:06
	08:41	08:01	07:00	06:44	05:38	04:57	20:30 (5) 05:05	20:36 (5) 05:51	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	35 21:05 (5) 21:56	35 21:11 (5) 21:11	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	04:57	20:31 (5) 05:06	20:37 (5) 05:52	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	34 21:05 (5) 21:55	35 21:12 (5) 21:09	19:59	18:45	16:39	16:05
	08:40	07:57	06:55	06:39	05:34	04:56	20:31 (5) 05:07	20:37 (5) 05:54	06:49	07:42	07:42	08:31
10	16:27	17:24	18:19	20:17	21:11	21:55	34 21:05 (5) 21:54	35 21:12 (5) 21:07	19:56	18:43	16:37	16:05
	08:40	07:55	06:52	06:37	05:33	04:56	20:31 (5) 05:08	20:37 (5) 05:56	06:50	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13	21:55	34 21:05 (5) 21:54	35 21:12 (5) 21:05	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	04:55	20:32 (5) 05:09	20:37 (5) 05:58	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15	3 20:43 (5) 21:56	34 21:06 (5) 21:53	35 21:12 (5) 21:03	19:51	18:38	16:34	16:05
	08:38	07:51	06:48	06:32	05:29	20:37 (5) 04:55	20:31 (5) 05:11	20:37 (5) 05:59	06:54	07:48	07:47	08:35
13	16:31	17:30	18:25	20:22	21:17	7 20:44 (5) 21:57	34 21:05 (5) 21:52	35 21:12 (5) 21:01	19:49	18:36	16:32	16:05
	08:37	07:49	06:45	06:30	05:27	20:36 (5) 04:55	20:32 (5) 05:12	20:37 (5) 06:01	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:18	11 20:47 (5) 21:57	33 21:05 (5) 21:51	35 21:12 (5) 20:59	19:47	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26	20:34 (5) 04:55	20:32 (5) 05:13	20:37 (5) 06:03	06:58	07:52	07:51	08:37
	16:34	17:34	18:28	20:26	21:20	14 20:48 (5) 21:58	34 21:06 (5) 21:50	35 21:12 (5) 20:57	19:44	18:31	16:29	16:05
	08:35	07:45	06:40	06:25	05:24	20:33 (5) 04:54	20:32 (5) 05:14	20:38 (5) 06:05	06:59	07:54	07:53	08:38
16	16:36	17:36	18:30	20:28	21:22	17 20:50 (5) 21:59	34 21:06 (5) 21:48	34 21:12 (5) 20:55	19:42	18:29	16:28	16:05
	08:34	07:43	06:38	06:23	05:22	20:32 (5) 04:54	20:33 (5) 05:16	20:38 (5) 06:06	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30	21:23	19 20:51 (5) 21:59	33 21:06 (5) 21:47	34 21:12 (5) 20:53	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	05:21	20:31 (5) 04:54	20:33 (5) 05:17	20:38 (5) 06:08	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31	21:25	21 20:52 (5) 21:59	33 21:06 (5) 21:46	34 21:12 (5) 20:50	19:37	18:24	16:25	16:05
	08:32	07:39	06:33	06:18	05:19	20:31 (5) 04:54	20:33 (5) 05:18	20:38 (5) 06:10	07:05	07:59	07:59	08:40
19	16:41	17:42	18:36	20:33	21:27	23 20:54 (5) 22:00	33 21:06 (5) 21:45	33 21:11 (5) 20:48	19:34	18:22	16:23	16:05
	08:31	07:36	06:31	06:16	05:18	20:30 (5) 04:54	20:33 (5) 05:20	20:39 (5) 06:12	07:06	08:01	08:00	08:41
	16:43	17:44	18:38	20:35	21:28	25 20:55 (5) 22:00	33 21:06 (5) 21:44	31 21:10 (5) 20:46	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	20:30 (5) 04:55	20:33 (5) 05:21	20:39 (5) 06:13	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30	27 20:57 (5) 22:00	33 21:06 (5) 21:42	30 21:09 (5) 20:44	19:29	18:17	16:20	16:06
	08:28	07:32	06:26	06:12	05:15	20:30 (5) 04:55	20:34 (5) 05:23	20:39 (5) 06:15	07:10	08:05	08:04	08:42
22	16:47	17:48	18:42	20:39	21:31	28 20:58 (5) 22:01	33 21:07 (5) 21:41	28 21:07 (5) 20:42	19:27	18:15	16:19	16:07
	08:27	07:30	06:23	06:09	05:13	20:29 (5) 04:55	20:34 (5) 05:24	20:40 (5) 06:17	07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	21:33	30 20:59 (5) 22:01	33 21:07 (5) 21:39	27 21:07 (5) 20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	20:28 (5) 04:55	20:34 (5) 05:26	20:41 (5) 06:19	07:13	08:09	08:07	08:43
	16:51	17:52	18:45	20:42	21:34	33 21:01 (5) 22:01	33 21:07 (5) 21:38	24 21:05 (5) 20:37	19:22	18:11	16:17	16:08
	08:24	07:25	06:18	06:05	05:11	20:28 (5) 04:56	20:35 (5) 05:27	20:42 (5) 06:20	07:15	07:11	08:09	08:43
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	16:54	17:56	18:49	20:46	21:37	35 21:03 (5) 22:01	33 21:08 (5) 21:35	20 21:02 (5) 20:32	19:17	17:07	16:15	16:09
27	08:22	07:21	06:13	06:01	05:08	20:28 (5) 04:56	20:35 (5) 05:31	20:43 (5) 06:24	07:19	07:14	08:13	08:44
	16:56	17:58	18:51	20:48	21:39	35 21:03 (5) 22:01	34 21:09 (5) 21:33	18 21:01 (5) 20:30	19:14	17:04	16:14	16:10
	08:20	07:18	06:11	05:58	05:07	20:28 (5) 04:57	20:35 (5) 05:32	20:44 (5) 06:26	07:21	07:16	08:14	08:44
28	16:58	18:00	18:53	20:50	21:40	35 21:03 (5) 22:01	33 21:08 (5) 21:32	15 20:59 (5) 20:28	19:12	17:02	16:13	16:11
	08:18		07:09	05:56	05:06	20:28 (5) 04:58	20:35 (5) 05:34	20:46 (5) 06:28	07:22	07:18	08:16	08:44
	17:00		19:54	20:52	21:41	35 21:03 (5) 22:00	34 21:09 (5) 21:30	12 20:58 (5) 20:25	19:09	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05	20:28 (5) 04:58	20:35 (5) 05:35	20:47 (5) 06:29	07:24	07:20	08:17	08:44
	17:02		19:56	20:53	21:43	35 21:03 (5) 22:00	34 21:09 (5) 21:28	9 20:56 (5) 20:23	19:07	16:58	16:11	16:12
	08:15		07:04	05:04	05:04	20:28 (5) 5		20:49 (5) 06:31	07:22	07:22	08:17	08:44
31	17:04		19:58	21:44	35 21:03 (5) 5		21:26	6 20:55 (5) 5	20:21	16:56	16:13	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					502	1015	898					
Sun reduction					0.38	0.32	0.32					
Oper. time red.					1.00	1.00	1.00					
Wind dir. red.					0.63	0.63	0.63					
Total reduction					0.24	0.20	0.20					
Total, real					120	204	182					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: IF - H240

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: IG - H241

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IH - H242

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14		16:30 (5)	07:16	17:23 (4)	07:01	05:52		20:06 (2)	05:03
	16:15	17:06	4	16:34 (5)	18:02	11	17:34 (4)	20:00	20	20:26 (2)	21:45
2	08:44	08:12		16:30 (5)	07:14		17:21 (4)	06:59		20:05 (2)	05:02
	16:16	17:08	7	16:37 (5)	18:04	15	17:36 (4)	20:02		20:27 (2)	21:46
3	08:43	08:10		16:29 (5)	07:11		17:20 (4)	06:56		20:05 (2)	05:01
	16:17	17:10	10	16:39 (5)	18:06	18	17:38 (4)	20:04	24	20:29 (2)	21:48
4	08:43	08:08		16:29 (5)	07:09		17:19 (4)	06:54		20:04 (2)	05:00
	16:18	17:12	12	16:41 (5)	18:07	22	17:41 (4)	20:06	26	20:30 (2)	21:49
5	08:43	08:07		16:28 (5)	07:07		17:17 (4)	06:51		20:04 (2)	04:59
	16:19	17:14	15	16:43 (5)	18:09	25	17:42 (4)	20:07	28	20:32 (2)	21:50
6	08:42	08:05		16:28 (5)	07:04		17:17 (4)	06:49		20:03 (2)	04:59
	16:21	17:16	17	16:45 (5)	18:11	28	17:45 (4)	20:09	30	20:33 (2)	21:51
7	08:42	08:03		16:28 (5)	07:02		17:16 (4)	06:47		20:04 (2)	04:58
	16:22	17:18	19	16:47 (5)	18:13	30	17:46 (4)	20:11	30	20:34 (2)	21:52
8	08:42	08:01		16:28 (5)	07:00		17:16 (4)	06:44		20:04 (2)	04:57
	16:24	17:20	22	16:50 (5)	18:15	32	17:48 (4)	20:13	29	20:33 (2)	21:53
9	08:41	07:59		16:28 (5)	06:57		17:15 (4)	06:42		20:04 (2)	04:57
	16:25	17:22	23	16:51 (5)	18:17	35	17:50 (4)	20:15	29	20:33 (2)	21:54
10	08:40	07:57		16:29 (5)	06:55		17:15 (4)	06:39		20:04 (2)	04:56
	16:26	17:24	22	16:51 (5)	18:19	36	17:51 (4)	20:17	28	20:32 (2)	21:55
11	08:40	07:55		16:29 (5)	06:52		17:15 (4)	06:37		20:05 (2)	04:56
	16:28	17:26	22	16:51 (5)	18:21	36	17:51 (4)	20:19	27	20:32 (2)	21:55
12	08:39	07:53		16:29 (5)	06:50		17:15 (4)	06:35		20:05 (2)	04:55
	16:30	17:28	20	16:49 (5)	18:23	35	17:50 (4)	20:20	26	20:31 (2)	21:56
13	08:38	07:51		16:30 (5)	06:48		17:16 (4)	06:32		20:05 (2)	04:55
	16:31	17:30	19	16:49 (5)	18:25	34	17:50 (4)	20:22	25	20:30 (2)	21:57
14	08:37	07:49		16:32 (5)	06:45		17:15 (4)	06:30		20:07 (2)	04:55
	16:33	17:32	16	16:48 (5)	18:27	33	17:48 (4)	20:24	23	20:30 (2)	21:57
15	08:36	07:47		16:34 (5)	06:43		17:16 (4)	06:28		20:07 (2)	04:54
	16:34	17:34	12	16:46 (5)	18:28	32	17:48 (4)	20:26	22	20:29 (2)	21:58
16	08:35	07:45		16:38 (5)	06:40		17:17 (4)	06:25		20:09 (2)	04:54
	16:36	17:36	5	16:43 (5)	18:30	32	18:04 (3)	20:28	19	20:28 (2)	21:59
17	08:34	07:43			06:38		17:18 (4)	06:23		20:09 (2)	04:54
	16:38	17:38			18:32	34	18:06 (3)	20:30	17	20:26 (2)	21:59
18	08:33	07:41			06:35		17:19 (4)	06:21		20:11 (2)	04:54
	16:40	17:40			18:34	33	18:07 (3)	20:31	14	20:25 (2)	22:00
19	08:32	07:39			06:33		17:21 (4)	06:18		20:14 (2)	04:54
	16:41	17:42			18:36	33	18:10 (3)	20:33	10	20:24 (2)	22:00
20	08:31	07:36			06:31		17:23 (4)	06:16		20:18 (2)	04:54
	16:43	17:44			18:38	29	18:11 (3)	20:35	1	20:19 (2)	22:00
21	08:30	07:34			06:28		17:56 (3)	06:14			04:54
	16:45	17:46			18:40	17	18:13 (3)	20:37			22:01
22	08:28	07:32			06:26		17:56 (3)	06:12			04:55
	16:47	17:48			18:41	19	18:15 (3)	20:39			22:01
23	08:27	07:30			06:23		17:56 (3)	06:09			04:55
	16:49	17:50			18:43	21	18:17 (3)	20:41			22:01
24	08:26	07:28			06:21		17:56 (3)	06:07			04:55
	16:50	17:52			18:45	20	18:16 (3)	20:42			22:01
25	08:24	07:25			06:18		17:57 (3)	06:05			04:55
	16:52	17:54			18:47	18	18:15 (3)	20:44			22:01
26	08:23	07:23			06:16		17:58 (3)	06:03			04:56
	16:54	17:56			18:49	15	18:13 (3)	20:46	5	20:17 (2)	22:01
27	08:22	07:21		17:28 (4)	06:13		18:00 (3)	06:01		20:10 (2)	04:56
	16:56	17:58	3	17:31 (4)	18:51	11	18:11 (3)	20:48	9	20:19 (2)	22:01
28	08:20	07:18		17:24 (4)	06:11			05:58		20:09 (2)	04:57
	16:58	18:00	8	17:32 (4)	18:53			20:50	12	20:21 (2)	22:01
29	08:18				07:08			05:56		20:08 (2)	04:57
	17:00				19:54			20:52	14	20:22 (2)	22:01
30	08:17				07:06			05:54		20:07 (2)	04:58
	17:02				19:56			20:53	17	20:24 (2)	22:00
31	08:15				07:04						
	17:04				19:58						
Potential sun hours	250	273		367		420		494		510	
Total, worst case			256		704		57		450		
Sun reduction			0.23		0.27		0.35		0.38		
Oper. time red.			1.00		1.00		1.00		1.00		
Wind dir. red.			0.66		0.68		0.65		0.65		
Total reduction			0.15		0.18		0.23		0.25		
Total, real			39		129		13		111		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** IH - H242

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:15 (2) 20:42 (2)	06:33 20:18	07:26 19:05	17:54 (4) 16:54
2	04:59 22:00	05:40 21:23	20:15 (2) 20:43 (2)	06:35 20:16	07:28 19:02	17:53 (4) 16:52
3	05:00 21:59	05:42 21:21	20:14 (2) 20:42 (2)	06:36 20:13	07:30 19:00	17:53 (4) 16:50
4	05:01 21:59	05:44 21:19	20:14 (2) 20:43 (2)	06:38 20:11	07:31 18:57	17:53 (4) 16:48
5	05:02 21:58	05:45 21:17	20:13 (2) 20:43 (2)	06:40 20:09	07:33 18:55	17:53 (4) 16:46
6	05:03 21:58	05:47 21:15	20:14 (2) 20:43 (2)	06:42 20:06	07:35 18:52	17:53 (4) 16:44
7	05:04 21:57	05:49 21:13	20:14 (2) 20:43 (2)	06:43 20:04	07:37 18:50	17:52 (4) 16:43
8	05:05 21:56	05:50 21:11	20:13 (2) 20:41 (2)	06:45 20:01	07:39 18:48	17:52 (4) 16:41
9	05:06 21:55	05:52 21:10	20:14 (2) 20:39 (2)	06:47 19:59	07:41 18:45	17:53 (4) 16:39
10	05:07 21:55	05:54 21:07	20:13 (2) 20:37 (2)	06:49 19:56	07:42 18:43	17:53 (4) 16:37
11	05:08 21:54	05:56 21:05	20:14 (2) 20:35 (2)	06:50 19:54	07:44 18:40	17:54 (4) 16:35
12	05:09 21:53	05:57 21:03	20:15 (2) 20:34 (2)	06:52 19:51	07:46 18:38	17:55 (4) 16:34
13	05:10 21:52	05:59 21:01	20:14 (2) 20:31 (2)	06:54 19:49	07:48 18:36	17:57 (4) 16:32
14	05:12 21:51	06:01 20:59	20:15 (2) 20:29 (2)	06:56 19:47	07:50 18:33	17:58 (4) 16:31
15	05:13 21:50	06:03 20:57	20:17 (2) 20:28 (2)	06:58 19:44	07:52 18:31	18:01 (4) 16:29
16	05:14 21:49	06:04 20:55	20:17 (2) 20:25 (2)	06:59 19:42	07:54 18:29	18:02 (4) 16:27
17	05:16 21:47	06:06 20:53	20:19 (2) 20:23 (2)	07:01 19:39	07:55 18:26	18:04 (4) 16:26
18	05:17 21:46	06:08 20:50	07:03 19:37	18:45 (3) 19:03 (3)	07:57 18:24	16:26 16:24
19	05:18 21:45	06:10 20:48	07:05 19:34	18:44 (3) 19:04 (3)	07:59 18:22	16:26 16:23
20	05:20 21:44	06:12 20:46	07:06 19:32	18:43 (3) 19:04 (3)	08:01 18:20	16:23 16:22
21	05:21 21:42	06:13 20:44	07:08 19:29	18:41 (3) 19:01 (3)	08:03 18:17	16:22 16:20
22	05:23 21:41	06:15 20:42	07:10 19:27	18:41 (3) 18:58 (3)	08:05 18:15	16:20 16:19
23	05:24 21:39	06:17 20:39	07:12 19:24	18:09 (4) 18:56 (3)	08:07 18:13	16:19 16:18
24	05:26 21:38	20:25 (2) 20:32 (2)	06:19 20:37	07:13 19:22	18:06 (4) 18:54 (3)	16:18 16:17
25	05:27 21:36	20:23 (2) 20:35 (2)	06:20 20:35	07:15 19:19	18:02 (4) 18:51 (3)	16:17 16:16
26	05:29 21:35	20:21 (2) 20:32 (2)	06:22 20:32	07:17 19:17	18:00 (4) 18:48 (3)	16:16 (5) 16:14
27	05:30 21:33	20:19 (2) 20:37 (2)	06:24 20:30	07:19 19:14	17:59 (4) 18:46 (3)	16:13 (5) 16:13
28	05:32 21:32	20:19 (2) 20:39 (2)	06:26 20:28	07:21 19:12	17:58 (4) 18:44 (3)	16:01 (5) 16:17 (5)
29	05:34 21:30	20:17 (2) 20:39 (2)	06:27 20:25	07:22 19:09	17:56 (4) 18:29 (4)	16:00 (5) 16:18 (5)
30	05:35 21:28	20:17 (2) 20:41 (2)	06:29 20:23	07:24 19:07	17:55 (4) 18:28 (4)	15:59 (5) 16:19 (5)
31	05:37 21:26	20:17 (2) 20:42 (2)	06:31 20:21		07:22 16:56	15:58 (5) 16:20 (5)
Potential sun hours	512	460	382	328	259	233
Total, worst case	144	371	373	450	146	
Sun reduction	0.32	0.34	0.32	0.29	0.27	
Oper. time red.	1.00	1.00	1.00	1.00	1.00	
Wind dir. red.	0.65	0.65	0.68	0.67	0.66	
Total reduction	0.21	0.22	0.22	0.20	0.17	
Total, real	30	82	81	89	25	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: II - H243

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:09 (3) 21:45
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	20:50 20:57	20:08 (3) 21:46
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	20:58 20:59	20:08 (3) 21:48
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	20:56 21:01	20:08 (3) 21:49
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	20:54 21:03	20:08 (3) 21:50
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	20:52 21:04	20:08 (3) 21:51
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	20:50 21:06	20:09 (3) 21:52
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	20:48 21:08	20:10 (3) 21:53
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	20:46 21:10	20:10 (3) 21:54
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	20:44 21:11	20:11 (3) 21:55
11	08:40 16:28	07:55 17:26	06:52 18:21	17:50 (5) 20:19	20:42 21:13	20:13 (3) 21:56
12	08:39 16:30	07:53 17:28	06:50 18:23	17:46 (5) 20:20	20:40 21:15	20:14 (3) 21:56
13	08:38 16:31	07:51 17:30	06:48 18:25	17:44 (5) 20:22	20:38 21:17	20:16 (3) 21:57
14	08:37 16:33	07:49 17:32	06:45 18:27	17:42 (5) 20:24	20:36 21:18	20:17 (4) 21:57
15	08:36 16:34	07:47 17:34	06:43 18:28	17:41 (5) 20:26	20:34 21:20	20:18 (4) 21:58
16	08:35 16:36	07:45 17:36	06:40 18:30	17:39 (5) 20:28	20:32 21:22	20:19 (4) 21:59
17	08:34 16:38	07:43 17:38	06:38 18:32	17:39 (5) 20:30	20:30 21:23	20:18 (4) 21:59
18	08:33 16:40	07:41 17:40	06:35 18:34	17:38 (5) 20:31	20:28 21:25	20:18 (4) 22:00
19	08:32 16:41	07:39 17:42	06:33 18:36	17:38 (5) 20:33	20:26 21:27	20:18 (4) 22:00
20	08:31 16:43	07:36 17:44	06:31 18:38	17:37 (5) 20:35	20:24 21:28	20:17 (4) 22:00
21	08:30 16:45	07:34 17:46	06:28 18:40	17:37 (5) 20:37	20:22 21:30	20:17 (4) 22:00
22	08:28 16:47	07:32 17:48	06:26 18:42	17:37 (5) 20:39	20:20 21:31	20:17 (4) 22:01
23	08:27 16:49	07:30 17:50	06:23 18:43	17:37 (5) 20:41	20:18 21:33	20:16 (4) 22:01
24	08:26 16:51	07:28 17:52	06:21 18:45	17:37 (5) 20:42	20:16 21:34	20:16 (4) 22:01
25	08:24 16:52	07:25 17:54	06:18 18:47	17:38 (5) 20:44	20:14 21:36	20:17 (4) 22:01
26	08:23 16:54	07:23 17:56	06:16 18:49	17:40 (5) 20:46	20:13 (3) 21:37	20:17 (4) 22:01
27	08:22 16:56	07:21 17:58	06:13 18:51	17:41 (5) 20:48	20:12 (3) 21:39	20:17 (4) 22:01
28	08:20 16:58	07:18 18:00	06:11 18:53	17:43 (5) 20:50	20:11 (3) 21:40	20:17 (4) 22:01
29	08:18 17:00		07:08 19:54	18:47 (5) 20:52	20:10 (3) 21:41	20:17 (4) 22:01
30	08:17 17:02		07:06 19:56	18:52 (5) 20:54	20:09 (3) 21:43	20:17 (4) 22:01
31	08:15 17:04		07:04 19:58		20:09 (3) 21:44	20:17 (4) 22:01
Potential sun hours	250	273	367	420	494	510
Total, worst case			402	48	1009	1157
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.65	0.64	0.63
Total reduction			0.18	0.23	0.24	0.20
Total, real			73	11	245	234

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: II - H243

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:25 (4)	05:39	20:23 (3)	06:33	07:26	18:24 (5)	07:24	08:19		
	22:00	39	21:04 (4)	21:25	30	20:53 (4)	20:18	19:05	12	18:36 (5)	16:54
2	05:00	20:26 (4)	05:40	20:22 (3)	06:35	07:28	18:26 (5)	07:26	08:21		
	22:00	38	21:04 (4)	21:23	30	20:52 (4)	20:16	19:02	7	18:33 (5)	16:52
3	05:00	20:25 (4)	05:42	20:21 (3)	06:36	07:30		07:28	08:22		
	21:59	39	21:04 (4)	21:21	29	20:50 (4)	20:13	19:00		16:50	16:08
4	05:01	20:25 (4)	05:44	20:20 (3)	06:38	07:31		07:30	08:24		
	21:59	40	21:05 (4)	21:19	28	20:48 (4)	20:11	18:57		16:48	16:08
5	05:02	20:25 (4)	05:45	20:19 (3)	06:40	07:33		07:32	08:25		
	21:58	40	21:05 (4)	21:17	27	20:46 (4)	20:09	18:55		16:46	16:07
6	05:03	20:26 (4)	05:47	20:18 (3)	06:42	07:35		07:34	08:26		
	21:57	39	21:05 (4)	21:15	27	20:45 (4)	20:06	18:52		16:44	16:07
7	05:04	20:26 (4)	05:49	20:18 (3)	06:43	07:37		07:36	08:28		
	21:57	40	21:06 (4)	21:13	23	20:41 (3)	20:04	18:50		16:43	16:06
8	05:05	20:26 (4)	05:51	20:17 (3)	06:45	07:39		07:38	08:29		
	21:56	40	21:06 (4)	21:11	24	20:41 (3)	20:01	18:48		16:41	16:06
9	05:06	20:26 (4)	05:52	20:17 (3)	06:47	07:41		07:40	08:30		
	21:55	40	21:06 (4)	21:09	22	20:39 (3)	19:59	18:45		16:39	16:05
10	05:07	20:26 (4)	05:54	20:17 (3)	06:49	07:42		07:42	08:31		
	21:55	41	21:07 (4)	21:07	20	20:37 (3)	19:56	18:43		16:37	16:05
11	05:08	20:26 (4)	05:56	20:17 (3)	06:50	07:44		07:44	08:33		
	21:54	41	21:07 (4)	21:05	18	20:35 (3)	19:54	18:40		16:36	16:05
12	05:09	20:26 (4)	05:57	20:17 (3)	06:52	07:46		07:45	08:34		
	21:53	41	21:07 (4)	21:03	17	20:34 (3)	19:51	18:38		16:34	16:05
13	05:11	20:26 (4)	05:59	20:17 (3)	06:54	07:48		07:47	08:35		
	21:52	41	21:07 (4)	21:01	14	20:31 (3)	19:49	18:36		16:32	16:05
14	05:12	20:26 (4)	06:01	20:17 (3)	06:56	07:50		07:49	08:36		
	21:51	41	21:07 (4)	20:59	12	20:29 (3)	19:47	18:33		16:31	16:05
15	05:13	20:26 (4)	06:03	20:18 (3)	06:58	18:33 (5)	07:52	07:51	08:37		
	21:50	41	21:07 (4)	20:57	10	20:28 (3)	19:44	18:46 (5)	18:31	16:29	16:05
16	05:14	20:26 (4)	06:05	20:18 (3)	06:59	18:30 (5)	07:54	07:53	08:38		
	21:49	42	21:08 (4)	20:55	7	20:25 (3)	19:42	18:48 (5)	18:29	16:27	16:05
17	05:16	20:26 (4)	06:06	20:20 (3)	07:01	18:27 (5)	07:55	07:55	08:38		
	21:47	42	21:08 (4)	20:53	3	20:23 (3)	19:39	18:49 (5)	18:26	16:26	16:05
18	05:17	20:26 (4)	06:08		07:03	18:26 (5)	07:57	07:57	08:39		
	21:46	42	21:08 (4)	20:50		19:37	24	18:50 (5)	18:24	16:25	16:05
19	05:18	20:26 (4)	06:10		07:05	18:25 (5)	07:59	07:59	08:40		
	21:45	41	21:07 (4)	20:48		19:34	26	18:51 (5)	18:22	16:23	16:05
20	05:20	20:27 (4)	06:12		07:06	18:24 (5)	08:01	08:00	08:41		
	21:44	41	21:08 (4)	20:46		19:32	27	18:51 (5)	18:20	16:22	16:06
21	05:21	20:27 (4)	06:13		07:08	18:22 (5)	08:03	08:02	08:41		
	21:42	41	21:08 (4)	20:44		19:29	29	18:51 (5)	18:17	16:20	16:06
22	05:23	20:27 (4)	06:15		07:10	18:22 (5)	08:05	08:04	08:42		
	21:41	40	21:07 (4)	20:42		19:27	29	18:51 (5)	18:15	16:19	16:06
23	05:24	20:27 (4)	06:17		07:12	18:21 (5)	08:07	08:06	08:42		
	21:39	40	21:07 (4)	20:39		19:24	30	18:51 (5)	18:13	16:18	16:07
24	05:26	20:27 (4)	06:19		07:13	18:21 (5)	08:09	08:08	08:43		
	21:38	38	21:05 (4)	20:37		19:22	30	18:51 (5)	18:11	16:17	16:08
25	05:27	20:28 (4)	06:20		07:15	18:20 (5)	07:11	08:09	08:43		
	21:36	36	21:04 (4)	20:35		19:19	30	18:50 (5)	17:09	16:16	16:08
26	05:29	20:28 (4)	06:22		07:17	18:21 (5)	07:13	08:11	08:43		
	21:35	34	21:02 (4)	20:32		19:17	27	18:48 (5)	17:06	16:15	16:09
27	05:30	20:29 (4)	06:24		07:19	18:21 (5)	07:14	08:13	08:44		
	21:33	32	21:01 (4)	20:30		19:14	25	18:46 (5)	17:04	16:13	16:10
28	05:32	20:29 (4)	06:26		07:21	18:22 (5)	07:16	08:14	08:44		
	21:32	30	20:59 (4)	20:28		19:12	22	18:44 (5)	17:02	16:12	16:11
29	05:34	20:30 (4)	06:28		07:22	18:22 (5)	07:18	08:16	08:44		
	21:30	28	20:58 (4)	20:25		19:09	19	18:41 (5)	17:00	16:12	16:11
30	05:35	20:30 (4)	06:29		07:24	18:22 (5)	07:20	08:17	08:44		
	21:28	26	20:56 (4)	20:23		19:07	16	18:38 (5)	16:58	16:11	16:12
31	05:37	20:26 (3)	06:31					07:22	08:44		
	21:26	29	20:55 (4)	20:21				16:56	16:13		
Potential sun hours	512		460		382		328		259		233
Total, worst case	1183		341		387		19				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.63		0.64		0.67		0.67				
Total reduction	0.20		0.22		0.22		0.20				
Total, real	242		75		83		4				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IJ - H244

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		19:07 (5)	05:52			05:03		20:42 (3)
	16:15	17:06	18:02						20:00	26	19:33 (5)	20:55			21:45	16	20:58 (3)
2	08:44	08:12	07:14						06:59		19:05 (5)	05:50			05:02		20:43 (3)
	16:16	17:08	18:04						20:02	30	19:35 (5)	20:57			21:46	15	20:58 (3)
3	08:43	08:10	07:12						06:56		19:05 (5)	05:48			05:01		20:44 (3)
	16:17	17:10	18:06						20:04	31	19:36 (5)	20:59			21:48	13	20:57 (3)
4	08:43	08:08	07:09						06:54		19:05 (5)	05:46			05:00		20:45 (3)
	16:18	17:12	18:07						20:06	32	19:37 (5)	21:01			21:49	11	20:56 (3)
5	08:43	08:07	07:07						06:51		19:04 (5)	05:44			04:59		20:47 (3)
	16:20	17:14	18:09						20:07	32	19:36 (5)	21:03			21:50	9	20:56 (3)
6	08:42	08:05	07:04						06:49		19:04 (5)	05:42			04:59		20:48 (3)
	16:21	17:16	18:11						20:09	32	19:36 (5)	21:04			21:51	6	20:54 (3)
7	08:42	08:03	07:02						06:47		19:04 (5)	05:40			04:58		20:50 (3)
	16:22	17:18	18:13						20:11	30	19:34 (5)	21:06			21:52	2	20:52 (3)
8	08:41	08:01	07:00						06:44		19:04 (5)	05:38			04:57		
	16:24	17:20	18:15						20:13	30	19:34 (5)	21:08			21:53		
9	08:41	07:59	06:57						06:42		19:05 (5)	05:36			04:57		
	16:25	17:22	18:17						20:15	29	19:34 (5)	21:10			21:54		
10	08:40	07:57	06:55						06:39		19:05 (5)	05:34			04:56		
	16:27	17:24	18:19						20:17	27	19:32 (5)	21:11			21:55		
11	08:40	07:55	06:52						06:37		19:06 (5)	05:33			20:41 (3)		04:56
	16:28	17:26	18:21						20:19	25	19:31 (5)	21:13	1		20:42 (3)		21:55
12	08:39	07:53	06:50						06:35		19:07 (5)	05:31			20:39 (3)		04:55
	16:30	17:28	18:23						20:20	23	19:30 (5)	21:15	4		20:43 (3)		21:56
13	08:38	07:51	06:48						06:32		19:08 (5)	05:29			20:38 (3)		04:55
	16:31	17:30	18:25						20:22	19	19:27 (5)	21:17	6		20:44 (3)		21:57
14	08:37	07:49	06:45						06:30		19:11 (5)	05:27			20:38 (3)		04:55
	16:33	17:32	18:27						20:24	14	19:25 (5)	21:18	9		20:47 (3)		21:57
15	08:36	07:47	06:43						06:28		19:15 (5)	05:26			20:37 (3)		04:55
	16:34	17:34	18:28						20:26	5	19:20 (5)	21:20	11		20:48 (3)		21:58
16	08:35	07:45	06:40						06:25			05:24			20:37 (3)		04:54
	16:36	17:36	18:30						20:28			21:22	13		20:50 (3)		21:59
17	08:34	07:43	06:38						06:23			05:22			20:36 (3)		04:54
	16:38	17:38	18:32						20:30			21:23	15		20:51 (3)		21:59
18	08:33	07:41	06:35						06:21			05:21			20:37 (3)		04:54
	16:40	17:40	18:34						20:31			21:25	16		20:53 (3)	1	21:24 (4)
19	08:32	07:39	06:33						06:18			05:19			20:37 (3)		04:54
	16:41	17:42	18:36						20:33			21:27	17		20:54 (3)	1	21:24 (4)
20	08:31	07:36	06:31						06:16			05:18			20:36 (3)		04:54
	16:43	17:44	18:38						20:35			21:28	19		20:55 (3)	1	21:24 (4)
21	08:30	07:34	06:28						06:14			05:16			20:37 (3)		04:54
	16:45	17:46	18:40						20:37			21:30	20		20:57 (3)	1	21:24 (4)
22	08:28	07:32	06:26						06:12			05:15			20:37 (3)		04:55
	16:47	17:48	18:42						20:39			21:31	22		20:59 (3)	1	21:25 (4)
23	08:27	07:30	06:23						06:09			05:13			20:37 (3)		04:55
	16:49	17:50	18:43						20:41			21:33	22		20:59 (3)	1	21:25 (4)
24	08:26	07:28	06:21						06:07			05:12			20:37 (3)		04:55
	16:51	17:52	18:45						20:42			21:34	23		21:00 (3)	1	21:25 (4)
25	08:24	07:25	06:18						06:05			05:11			20:38 (3)		04:56
	16:52	17:54	18:47						20:44			21:36	22		21:00 (3)		22:01
26	08:23	07:23	06:16					18:18 (5)	06:03			05:09			20:38 (3)		04:56
	16:54	17:56	18:49	5				18:23 (5)	20:46			21:37	22		21:00 (3)		22:01
27	08:22	07:21	06:13					18:14 (5)	06:01			05:08			20:39 (3)		04:56
	16:56	17:58	18:51	10				18:24 (5)	20:48			21:39	21		21:00 (3)		22:01
28	08:20	07:18	06:11					18:12 (5)	05:58			05:07			20:39 (3)		04:57
	16:58	18:00	18:53	14				18:26 (5)	20:50			21:40	21		21:00 (3)		22:01
29	08:18		07:09					19:10 (5)	05:56			05:06			20:40 (3)		04:58
	17:00		19:54	18				19:28 (5)	20:52			21:41	19		20:59 (3)		22:01
30	08:17		07:06					19:09 (5)	05:54			05:05			20:40 (3)		04:58
	17:02		19:56	21				19:30 (5)	20:53			21:43	19		20:59 (3)		22:00
31	08:15		07:04					19:07 (5)				05:04			20:41 (3)		
	17:04		19:58	24				19:31 (5)				21:44	17		20:58 (3)		
Potential sun hours	250	273	367					420				494			510		
Total, worst case				92				385				339			79		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.67				0.67				0.63			0.63		
Total reduction				0.18				0.24				0.24			0.20		
Total, real				17				91				81			16		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IJ - H244

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59		05:39	20:50 (3)	06:33	19:05 (5)	07:26	07:24	08:19		
	22:00		21:25	20:53 (3)	20:18	19:30 (5)	19:05	16:54	16:10		
2	05:00		05:40	20:51 (3)	06:35	19:04 (5)	07:28	07:26	08:21		
	22:00		21:23	20:52 (3)	20:16	19:31 (5)	19:02	16:52	16:09		
3	05:00		05:42		06:36	19:03 (5)	07:30	07:28	08:22		
	21:59		21:21		20:13	19:32 (5)	19:00	16:50	16:08		
4	05:01		05:44		06:38	19:01 (5)	07:31	07:30	08:24		
	21:59		21:19		20:11	19:31 (5)	18:57	16:48	16:08		
5	05:02		05:45		06:40	19:01 (5)	07:33	07:32	08:25		
	21:58		21:17		20:09	19:32 (5)	18:55	16:46	16:07		
6	05:03	20:55 (3)	05:47		06:42	19:00 (5)	07:35	07:34	08:26		
	21:57	5 21:00 (3)	21:15		20:06	19:32 (5)	18:52	16:44	16:07		
7	05:04		20:53 (3)	05:49	06:43	18:59 (5)	07:37	07:36	08:28		
	21:57	9 21:02 (3)	21:13		20:04	19:31 (5)	18:50	16:43	16:06		
8	05:05		20:53 (3)	05:51	06:45	18:59 (5)	07:39	07:38	08:29		
	21:56	10 21:03 (3)	21:11		20:01	19:31 (5)	18:48	16:41	16:06		
9	05:06		20:52 (3)	05:52	06:47	18:59 (5)	07:41	07:40	08:30		
	21:55	12 21:04 (3)	21:09		19:59	19:31 (5)	18:45	16:39	16:05		
10	05:07		20:51 (3)	05:54	06:49	18:58 (5)	07:42	07:42	08:31		
	21:55	14 21:05 (3)	21:07		19:56	19:28 (5)	18:43	16:37	16:05		
11	05:08		20:50 (3)	05:56	06:50	18:59 (5)	07:44	07:44	08:33		
	21:54	16 21:06 (3)	21:05		19:54	19:26 (5)	18:40	16:36	16:05		
12	05:09		20:50 (3)	05:58	06:52	18:59 (5)	07:46	07:45	08:34		
	21:53	17 21:07 (3)	21:03		19:51	19:24 (5)	18:38	16:34	16:05		
13	05:11		20:49 (3)	05:59	06:54	19:00 (5)	07:48	07:47	08:35		
	21:52	18 21:07 (3)	21:01		19:49	19:22 (5)	18:36	16:32	16:05		
14	05:12		20:49 (3)	06:01	06:56	19:00 (5)	07:50	07:49	08:36		
	21:51	19 21:08 (3)	20:59		19:47	19:18 (5)	18:33	16:31	16:05		
15	05:13		20:48 (3)	06:03	06:58	19:01 (5)	07:52	07:51	08:37		
	21:50	20 21:08 (3)	20:57		19:44	19:16 (5)	18:31	16:29	16:05		
16	05:14		20:49 (3)	06:05	06:59	19:03 (5)	07:54	07:53	08:38		
	21:48	20 21:09 (3)	20:55		19:42	19:14 (5)	18:29	16:27	16:05		
17	05:16		20:48 (3)	06:06	07:01	19:05 (5)	07:55	07:55	08:38		
	21:47	22 21:10 (3)	20:53		19:39	19:11 (5)	18:26	16:26	16:05		
18	05:17		20:48 (3)	06:08	07:03		07:57	07:57	08:39		
	21:46	22 21:10 (3)	20:50		19:37		18:24	16:25	16:05		
19	05:18		20:47 (3)	06:10	07:05		07:59	07:59	08:40		
	21:45	23 21:10 (3)	20:48		19:34		18:22	16:23	16:05		
20	05:20		20:48 (3)	06:12	07:06		08:01	08:00	08:41		
	21:44	22 21:10 (3)	20:46		19:32		18:20	16:22	16:06		
21	05:21		20:47 (3)	06:13	07:08		08:03	08:02	08:41		
	21:42	22 21:09 (3)	20:44		19:29		18:17	16:20	16:06		
22	05:23		20:47 (3)	06:15	07:10		08:05	08:04	08:42		
	21:41	20 21:07 (3)	20:42		19:27		18:15	16:19	16:07		
23	05:24		20:47 (3)	06:17	07:12		08:07	08:06	08:42		
	21:39	20 21:07 (3)	20:39		19:24		18:13	16:18	16:07		
24	05:26		20:47 (3)	06:19	07:13		08:09	08:08	08:43		
	21:38	18 21:05 (3)	20:37		19:22		18:11	16:17	16:08		
25	05:27		20:47 (3)	06:20	07:15		07:11	08:09	08:43		
	21:36	17 21:04 (3)	20:35		19:19		17:09	16:16	16:08		
26	05:29		20:47 (3)	06:22	07:17		07:13	08:11	08:43		
	21:35	15 21:02 (3)	20:32		19:17		17:06	16:15	16:09		
27	05:30		20:48 (3)	06:24	07:19		07:14	08:13	08:44		
	21:33	13 21:01 (3)	20:30		19:14		17:04	16:13	16:10		
28	05:32		20:48 (3)	06:26	19:15 (5)	07:21	07:16	08:14	08:44		
	21:32	11 20:59 (3)	20:28	7	19:22 (5)	19:12	17:02	16:13	16:11		
29	05:34		20:49 (3)	06:28	19:11 (5)	07:22	07:18	08:16	08:44		
	21:30	9 20:58 (3)	20:25	15	19:26 (5)	19:09	17:00	16:12	16:11		
30	05:35		20:49 (3)	06:29	19:09 (5)	07:24	07:20	08:17	08:44		
	21:28	7 20:56 (3)	20:23	19	19:28 (5)	19:07	16:58	16:11	16:12		
31	05:37		20:50 (3)	06:31	19:06 (5)		07:22		08:44		
	21:26	5 20:55 (3)	20:21	23	19:29 (5)		16:56		16:13		
Potential sun hours	512		460		382		328	259	233		
Total, worst case	406		68		424						
Sun reduction	0.32		0.34		0.32						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.63		0.67		0.67						
Total reduction	0.20		0.23		0.22						
Total, real	83		16		91						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IK - H245

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		19:13 (5)	05:52			05:03		20:43 (3)
	16:15	17:06	18:02						20:00	20	19:33 (5)	20:55			21:45	21	21:04 (3)
2	08:44	08:12	07:14						06:59		19:11 (5)	05:50			05:02		20:45 (3)
	16:16	17:08	18:04						20:02	24	19:35 (5)	20:57			21:46	20	21:05 (3)
3	08:43	08:10	07:12						06:56		19:11 (5)	05:48			05:01		20:45 (3)
	16:17	17:10	18:06						20:04	26	19:37 (5)	20:59			21:48	19	21:04 (3)
4	08:43	08:08	07:09						06:54		19:10 (5)	05:46			05:00		20:45 (3)
	16:18	17:12	18:07						20:06	29	19:39 (5)	21:01			21:49	19	21:04 (3)
5	08:43	08:07	07:07						06:51		19:09 (5)	05:44			04:59		20:47 (3)
	16:20	17:14	18:09						20:07	31	19:40 (5)	21:03			21:50	17	21:04 (3)
6	08:42	08:05	07:04						06:49		19:09 (5)	05:42			04:59		20:47 (3)
	16:21	17:16	18:11						20:09	32	19:41 (5)	21:04			21:51	16	21:03 (3)
7	08:42	08:03	07:02						06:47		19:08 (5)	05:40			04:58		20:47 (3)
	16:22	17:18	18:13						20:11	32	19:40 (5)	21:06			21:52	15	21:02 (3)
8	08:41	08:01	07:00						06:44		19:08 (5)	05:38			04:57		20:48 (3)
	16:24	17:20	18:15						20:13	32	19:40 (5)	21:08			21:53	15	21:03 (3)
9	08:41	07:59	06:57						06:42		19:08 (5)	05:36			04:57		20:50 (3)
	16:25	17:22	18:17						20:15	32	19:40 (5)	21:10			21:54	13	21:03 (3)
10	08:40	07:57	06:55						06:39		19:08 (5)	05:34			04:56		20:50 (3)
	16:27	17:24	18:19						20:17	31	19:39 (5)	21:11			21:55	12	21:02 (3)
11	08:40	07:55	06:52						06:37		19:08 (5)	05:33			04:56		20:51 (3)
	16:28	17:26	18:21						20:19	30	19:38 (5)	21:13			21:55	11	21:02 (3)
12	08:39	07:53	06:50						06:35		19:09 (5)	05:31			04:55		20:52 (3)
	16:30	17:28	18:23						20:20	28	19:37 (5)	21:15			21:56	9	21:01 (3)
13	08:38	07:51	06:48						06:32		19:09 (5)	05:29			04:55		20:52 (3)
	16:31	17:30	18:25						20:22	27	19:36 (5)	21:17			21:57	8	21:00 (3)
14	08:37	07:49	06:45						06:30		19:10 (5)	05:27		20:44 (3)	04:55		20:53 (3)
	16:33	17:32	18:27						20:24	25	19:35 (5)	21:18		3	20:47 (3)	7	21:00 (3)
15	08:36	07:47	06:43						06:28		19:12 (5)	05:26			04:55		20:54 (3)
	16:34	17:34	18:28						20:26	21	19:33 (5)	21:20		5	20:48 (3)	5	20:59 (3)
16	08:35	07:45	06:40						06:25		19:13 (5)	05:24			04:54		20:56 (3)
	16:36	17:36	18:30						20:28	19	19:32 (5)	21:22		7	20:50 (3)	3	20:59 (3)
17	08:34	07:43	06:38						06:23		19:15 (5)	05:22			04:54		
	16:38	17:38	18:32						20:30	13	19:28 (5)	21:23		10	20:51 (3)		21:59
18	08:33	07:41	06:35						06:21		19:21 (5)	05:21			04:54		
	16:40	17:40	18:34						20:31	1	19:22 (5)	21:25		11	20:53 (3)		22:00
19	08:32	07:39	06:33						06:18			05:19			04:54		
	16:41	17:42	18:36						20:33			21:27		12	20:54 (3)		22:00
20	08:31	07:36	06:31						06:16			05:18			04:54		
	16:43	17:44	18:38						20:35			21:28		14	20:55 (3)		22:00
21	08:30	07:34	06:28						06:14			05:16			04:54		
	16:45	17:46	18:40						20:37			21:30		16	20:57 (3)		22:00
22	08:28	07:32	06:26						06:12			05:15			04:55		
	16:47	17:48	18:42						20:39			21:31		18	20:59 (3)		22:01
23	08:27	07:30	06:23						06:09			05:13			04:55		
	16:49	17:50	18:43						20:41			21:33		18	20:59 (3)		22:01
24	08:26	07:28	06:21						06:07			05:12			04:55		
	16:51	17:52	18:45						20:42			21:34		20	21:01 (3)		22:01
25	08:24	07:25	06:18						06:05			05:11			04:56		
	16:52	17:54	18:47						20:44			21:36		21	21:02 (3)		22:01
26	08:23	07:23	06:16						06:03			05:09			04:56		20:58 (3)
	16:54	17:56	18:49						20:46			21:37		23	21:04 (3)	2	21:00 (3)
27	08:22	07:21	06:13						06:01			05:08			04:56		20:57 (3)
	16:56	17:58	18:51						20:48			21:39		23	21:05 (3)	4	21:01 (3)
28	08:20	07:18	06:11					18:24 (5)	05:58			05:07			04:57		20:57 (3)
	16:58	18:00	18:53	2				18:26 (5)	20:50			21:40		23	21:05 (3)	6	21:03 (3)
29	08:18		07:09					19:19 (5)	05:56			05:06			04:58		20:57 (3)
	17:00		19:54	9				19:28 (5)	20:52			21:41		23	21:05 (3)	7	21:04 (3)
30	08:17		07:06					19:17 (5)	05:54			05:05			04:58		20:55 (3)
	17:02		19:56	13				19:30 (5)	20:53			21:43		22	21:05 (3)	9	21:04 (3)
31	08:15		07:04					19:15 (5)				05:04			20:43 (3)		
	17:04		19:58	16				19:31 (5)				21:44		21	21:04 (3)		
Potential sun hours	250	273	367					420				494			510		
Total, worst case				40				453				290			238		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.67				0.67				0.63			0.63		
Total reduction				0.18				0.24				0.24			0.20		
Total, real				7				107				69			48		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IK - H245

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:55 (3)	05:39	06:33	19:07 (5)	07:26	07:24	08:19			
	22:00	10	21:05 (3)	21:25	20:18	30	19:37 (5)	19:05	16:54	16:10	
2	05:00	20:55 (3)	05:40	06:35	19:07 (5)	07:28	07:26	08:21			
	22:00	12	21:07 (3)	21:23	20:16	31	19:38 (5)	19:02	16:52	16:09	
3	05:00	20:54 (3)	05:42	06:36	19:06 (5)	07:30	07:28	08:22			
	21:59	13	21:07 (3)	21:21	20:13	32	19:38 (5)	19:00	16:50	16:08	
4	05:01	20:54 (3)	05:44	06:38	19:05 (5)	07:31	07:30	08:24			
	21:59	14	21:08 (3)	21:19	20:11	32	19:37 (5)	18:57	16:48	16:08	
5	05:02	20:54 (3)	05:45	06:40	19:05 (5)	07:33	07:32	08:25			
	21:58	14	21:08 (3)	21:17	20:09	32	19:37 (5)	18:55	16:46	16:07	
6	05:03	20:53 (3)	05:47	06:42	19:05 (5)	07:35	07:34	08:26			
	21:57	16	21:09 (3)	21:15	20:06	32	19:37 (5)	18:52	16:44	16:07	
7	05:04	20:53 (3)	05:49	06:43	19:04 (5)	07:37	07:36	08:28			
	21:57	17	21:10 (3)	21:13	20:04	31	19:35 (5)	18:50	16:43	16:06	
8	05:05	20:53 (3)	05:51	06:45	19:04 (5)	07:39	07:38	08:29			
	21:56	18	21:11 (3)	21:11	20:01	29	19:33 (5)	18:48	16:41	16:06	
9	05:06	20:53 (3)	05:52	06:47	19:05 (5)	07:41	07:40	08:30			
	21:55	18	21:11 (3)	21:09	19:59	26	19:31 (5)	18:45	16:39	16:05	
10	05:07	20:52 (3)	05:54	06:49	19:05 (5)	07:42	07:42	08:31			
	21:55	20	21:12 (3)	21:07	19:56	23	19:28 (5)	18:43	16:37	16:05	
11	05:08	20:52 (3)	05:56	06:50	19:06 (5)	07:44	07:44	08:33			
	21:54	20	21:12 (3)	21:05	19:54	20	19:26 (5)	18:40	16:36	16:05	
12	05:09	20:52 (3)	05:58	06:52	19:07 (5)	07:46	07:45	08:34			
	21:53	21	21:13 (3)	21:03	19:51	17	19:24 (5)	18:38	16:34	16:05	
13	05:11	20:51 (3)	05:59	06:54	19:08 (5)	07:48	07:47	08:35			
	21:52	22	21:13 (3)	21:01	19:49	14	19:22 (5)	18:36	16:32	16:05	
14	05:12	20:51 (3)	06:01	06:56	19:09 (5)	07:50	07:49	08:36			
	21:51	22	21:13 (3)	20:59	19:47	9	19:18 (5)	18:33	16:31	16:05	
15	05:13	20:51 (3)	06:03	06:58	19:12 (5)	07:52	07:51	08:37			
	21:50	23	21:14 (3)	20:57	19:44	4	19:16 (5)	18:31	16:29	16:05	
16	05:14	20:51 (3)	06:05	06:59	19:07 (5)	07:54	07:53	08:38			
	21:48	24	21:15 (3)	20:55	19:42		18:29	16:27	16:05		
17	05:16	20:51 (3)	06:06	07:01	19:05 (5)	07:55	07:55	08:38			
	21:47	23	21:14 (3)	20:53	19:39		18:26	16:26	16:05		
18	05:17	20:51 (3)	06:08	07:03	19:07 (5)	07:57	07:57	08:39			
	21:46	21	21:12 (3)	20:50	19:37		18:24	16:25	16:05		
19	05:18	20:50 (3)	06:10	07:05	19:05 (5)	07:59	07:59	08:40			
	21:45	21	21:11 (3)	20:48	19:34		18:22	16:23	16:05		
20	05:20	20:51 (3)	06:12	07:06	19:06 (5)	08:01	08:00	08:41			
	21:44	19	21:10 (3)	20:46	19:32		18:20	16:22	16:06		
21	05:21	20:51 (3)	06:13	07:08	19:07 (5)	08:03	08:02	08:41			
	21:42	18	21:09 (3)	20:44	19:29		18:17	16:20	16:06		
22	05:23	20:51 (3)	06:15	07:10	19:07 (5)	08:05	08:04	08:42			
	21:41	16	21:07 (3)	20:42	19:27		18:15	16:19	16:07		
23	05:24	20:51 (3)	06:17	07:12	19:07 (5)	08:07	08:06	08:42			
	21:39	16	21:07 (3)	20:39	19:24		18:13	16:18	16:07		
24	05:26	20:51 (3)	06:19	07:13	19:07 (5)	08:09	08:08	08:43			
	21:38	14	21:05 (3)	20:37	19:22		18:11	16:17	16:08		
25	05:27	20:52 (3)	06:20	19:22 (5)	07:15		07:11	08:09	08:43		
	21:36	12	21:04 (3)	20:35	19:17 (5)		17:09	16:16	16:08		
26	05:29	20:52 (3)	06:22	19:27 (5)	07:17		07:13	08:11	08:43		
	21:35	10	21:02 (3)	20:32	19:31 (5)		17:06	16:15	16:09		
27	05:30	20:53 (3)	06:24	19:15 (5)	07:19		07:14	08:13	08:44		
	21:33	8	21:01 (3)	20:30	19:34 (5)		17:04	16:13	16:10		
28	05:32	20:53 (3)	06:26	19:12 (5)	07:21		07:16	08:14	08:44		
	21:32	6	20:59 (3)	20:28	19:34 (5)		17:02	16:13	16:11		
29	05:34	20:54 (3)	06:28	19:11 (5)	07:22		07:18	08:16	08:44		
	21:30	4	20:58 (3)	20:25	19:36 (5)		17:00	16:12	16:11		
30	05:35	20:55 (3)	06:29	19:10 (5)	07:24		07:20	08:17	08:44		
	21:28	1	20:56 (3)	20:23	19:37 (5)		16:58	16:11	16:12		
31	05:37		06:31	19:08 (5)	19:07		07:22		08:44		
	21:26		20:21	19:36 (5)			16:56		16:13		
Potential sun hours	512		460	382			328	259	233		
Total, worst case		473	140	362							
Sun reduction		0.32	0.34	0.32							
Oper. time red.		1.00	1.00	1.00							
Wind dir. red.		0.63	0.67	0.67							
Total reduction		0.20	0.23	0.22							
Total, real		96	32	78							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IL - H246

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:20	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:34 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:38 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	08:13 (1) 08:17 (1)	06:43 18:29	05:26 20:26	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	08:11 (1) 08:18 (1)	06:41 18:31	06:25 20:28	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	08:37 (1) 08:46 (1)	07:53 16:28
17	08:35 16:38	07:43 17:38	08:09 (1) 08:19 (1)	06:38 18:32	06:23 20:30	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	08:35 (1) 08:48 (1)	07:55 16:26
18	08:34 16:40	07:41 17:40	08:07 (1) 08:20 (1)	06:36 18:34	06:21 20:32	04:54 21:25	05:17 22:00	06:08 21:46	07:03 19:37	07:58 18:24	08:34 (1) 08:49 (1)	07:57 16:25
19	08:32 16:42	07:39 17:42	08:04 (1) 08:19 (1)	06:33 18:36	06:19 20:34	04:54 21:27	05:19 22:00	06:10 21:45	07:05 19:34	07:59 18:22	08:33 (1) 08:50 (1)	07:59 16:23
20	08:31 16:43	07:37 17:44	08:02 (1) 08:20 (1)	06:31 18:38	06:16 20:35	04:54 21:28	05:20 22:01	06:12 21:44	07:07 19:32	08:01 18:20	08:32 (1) 08:50 (1)	08:01 16:22
21	08:30 16:45	07:34 17:46	08:01 (1) 08:20 (1)	06:28 18:40	06:14 20:37	04:55 21:30	05:21 22:01	06:14 21:42	07:08 19:29	08:03 18:18	08:31 (1) 08:50 (1)	08:03 16:21
22	08:29 16:47	07:32 17:48	08:02 (1) 08:20 (1)	06:26 18:42	06:12 20:39	04:55 21:32	05:23 22:01	06:15 21:41	07:10 19:27	08:05 18:15	08:33 (1) 08:50 (1)	08:04 16:19
23	08:27 16:49	07:30 17:50	08:02 (1) 08:18 (1)	06:23 18:44	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 19:24	07:12 18:13	08:07 08:50 (1)	08:06 16:18
24	08:26 16:51	07:28 17:52	08:03 (1) 08:17 (1)	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	06:19 21:38	07:14 19:22	08:09 18:11	08:37 (1) 08:49 (1)	08:08 16:17
25	08:25 16:53	07:26 17:54	08:05 (1) 08:16 (1)	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:11 17:09	07:39 (1) 07:48 (1)	08:10 16:16
26	08:23 16:54	07:23 17:56	08:07 (1) 08:12 (1)	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	06:22 21:35	07:17 19:17	07:13 17:07	07:41 (1) 07:47 (1)	08:11 16:15
27	08:22 16:56	07:21 17:58	5 08:16 (1)	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	06:24 21:34	07:19 19:15	07:15 17:05	07:43 (1) 07:46 (1)	08:13 16:10
28	08:20 16:58	07:19 18:00		06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	06:26 21:32	07:21 20:28	07:17 17:02		08:15 16:11
29	08:19 17:00			07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	07:23 20:26	07:19 17:00		08:16 16:12
30	08:17 17:02			07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:29	06:29 20:23	07:24 19:07		08:18 16:13
31	08:16 17:04			07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21	07:23 16:56		08:44 16:14
Potential sun hours	250	273		367	420	494	510	512	460	382	328	259
Total, worst case		150									153	
Sun reduction		0.23									0.29	
Oper. time red.		1.00									1.00	
Wind dir. red.		0.64									0.64	
Total reduction		0.15									0.19	
Total, real		22									29	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IM - H247

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	06:18 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	10	06:28 (1)	21:45	22:00	21:25	20:18	19:05	16:54
2	08:44	08:12	07:14	06:59	05:50	06:16 (1)	05:02	05:00	05:41	06:23 (1)	06:35	07:28	08:21
	16:16	17:08	18:04	20:02	20:57	12	06:28 (1)	21:47	22:00	21:23	9	06:32 (1)	20:16
3	08:44	08:10	07:12	06:57	05:48	06:14 (1)	05:01	05:01	05:42	06:21 (1)	06:37	07:30	08:22
	16:17	17:10	18:06	20:04	20:59	14	06:28 (1)	21:48	21:59	21:21	12	06:33 (1)	20:14
4	08:43	08:09	07:09	06:54	05:46	06:12 (1)	05:00	05:01	05:44	06:20 (1)	06:38	07:32	08:24
	16:18	17:12	18:08	20:06	21:01	15	06:27 (1)	21:49	21:59	21:19	15	06:35 (1)	20:11
5	08:43	08:07	07:07	06:52	05:44	06:10 (1)	04:59	05:02	05:46	06:19 (1)	06:40	07:33	08:25
	16:20	17:14	18:10	20:08	21:03	17	06:27 (1)	21:50	21:58	21:18	17	06:36 (1)	20:09
6	08:43	08:05	07:05	06:49	05:42	06:09 (1)	04:59	05:03	05:47	06:18 (1)	06:42	07:35	08:27
	16:21	17:16	18:12	20:10	21:05	18	06:27 (1)	21:51	21:58	21:16	18	06:36 (1)	20:06
7	08:42	08:03	07:02	06:47	05:40	06:09 (1)	04:58	05:04	05:49	06:19 (1)	06:44	07:37	08:28
	16:22	17:18	18:13	20:11	21:06	17	06:26 (1)	21:52	21:57	21:14	18	06:37 (1)	20:04
8	08:42	08:01	07:00	06:44	05:38	06:09 (1)	04:57	05:05	05:51	06:20 (1)	06:45	07:39	08:29
	16:24	17:20	18:15	20:13	21:08	16	06:25 (1)	21:53	21:56	21:12	16	06:36 (1)	20:02
9	08:41	07:59	06:58	06:42	05:36	06:10 (1)	04:57	05:06	05:52	06:22 (1)	06:47	07:41	08:30
	16:25	17:22	18:17	20:15	21:10	14	06:24 (1)	21:54	21:56	21:10	15	06:37 (1)	19:59
10	08:41	07:57	06:55	06:40	05:35	06:12 (1)	04:56	05:07	05:54	06:24 (1)	06:49	07:43	08:32
	16:27	17:24	18:19	20:17	21:12	11	06:23 (1)	21:55	21:55	21:08	13	06:37 (1)	19:57
11	08:40	07:55	06:53	06:37	05:33	06:14 (1)	04:56	05:08	05:56	06:25 (1)	06:51	07:44	08:33
	16:28	17:26	18:21	20:19	21:13	6	06:20 (1)	21:56	21:54	21:06	11	06:36 (1)	19:54
12	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	06:27 (1)	06:52	07:46	08:34
	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	9	06:36 (1)	19:52	18:38
13	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	06:29 (1)	06:54	07:48	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	7	06:36 (1)	19:49	18:36
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:30 (1)	06:56	07:50	08:36
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	4	06:34 (1)	19:47	18:34
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:32 (1)	06:58	07:52	08:37
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	2	06:34 (1)	19:44	18:31
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	07:00	07:54	07:53	08:38
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22		04:54	05:16	06:06	07:01	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08	07:03	07:58	07:57	08:39
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19		04:54	05:19	06:10	07:05	07:59	07:59	08:40
	16:42	17:42	18:36	20:34	21:27		22:00	21:45	20:49	19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	06:16	05:18		04:55	05:20	06:12	07:07	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	21:28		22:00	21:44	20:46	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16		04:55	05:22	06:14	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30		22:01	21:42	20:44	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15		04:55	05:23	06:15	07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	21:32		22:01	21:41	20:42	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13		04:55	05:24	06:17	07:12	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	21:33		22:01	21:40	20:40	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26	06:19	07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	21:35		22:01	21:38	20:37	19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11		04:56	05:28	06:21	07:15	07:11	08:09	08:43
	16:53	17:54	18:47	20:45	21:36		22:01	21:37	20:35	19:20	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:10		04:56	05:29	06:22	07:17	07:13	08:11	08:44
	16:55	17:56	18:49	20:46	21:37		22:01	21:35	20:33	19:17	17:07	16:15	16:09
27	08:22	07:21	06:14	06:01	05:08		04:57	05:31	06:24	07:19	07:15	08:13	08:44
	16:56	17:58	18:51	20:48	21:39		22:01	21:33	20:30	19:15	17:05	16:14	16:10
28	08:20	07:19	06:11	05:59	05:07	06:24 (1)	04:57	05:32	06:26	07:21	07:17	08:15	08:44
	16:58	18:00	18:53	20:50	2	06:26 (1)	22:01	21:32	20:28	19:12	17:02	16:13	16:11
29	08:19		07:09	05:56	05:06	06:22 (1)	04:58	05:34	06:28	07:23	07:19	08:16	08:44
	17:00		19:55	20:52	5	06:27 (1)	22:01	21:30	20:26	19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05	06:20 (1)	04:58	05:36	06:30	07:24	07:21	08:18	08:44
	17:02		19:57	20:54	8	06:28 (1)	22:01	21:28	20:23	19:07	16:58	16:11	16:13
31	08:15		07:04		05:04			05:37	06:31		07:22		08:44
	17:04		19:58		21:44			21:27	20:21		16:56		16:14
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233
Total, worst case					150				166				
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.67	0.67				0.67				
Total reduction				0.24	0.26				0.23				
Total, real				4	39				38				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** IN - H248

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16			07:01	05:52	05:03	04:59	05:39	06:33		07:26		07:53 (1)	07:24	08:19
	16:15	17:06	18:02			20:00	20:56	21:45	22:00	21:25	20:18		19:05	20	08:13 (1)	16:54	16:10
2	08:44	08:12	07:14			06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26	08:21
	16:16	17:08	18:04			20:02	20:57	21:47	22:00	21:23	20:16		19:02	18	08:12 (1)	16:52	16:09
3	08:44	08:10	07:12			06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06			20:04	20:59	21:48	21:59	21:21	20:14		19:00	16	08:12 (1)	16:50	16:09
4	08:43	08:09	07:09			06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08			20:06	21:01	21:49	21:59	21:19	20:11		18:57	13	08:11 (1)	16:48	16:08
5	08:43	08:07	07:07			06:52	05:44	04:59	05:02	05:46	06:40		07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10			20:08	21:03	21:50	21:58	21:18	20:09		18:55	10	08:10 (1)	16:46	16:07
6	08:43	08:05	07:05		07:29 (1)	06:49	05:42	04:59	05:03	05:47	06:42		07:35		08:02 (1)	07:34	08:27
	16:21	17:16	18:12	2	07:31 (1)	20:10	21:05	21:51	21:58	21:16	20:06		18:53	7	08:09 (1)	16:45	16:07
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	05:49	06:44		07:37		08:04 (1)	07:36	08:28
	16:22	17:18	18:13	6	07:33 (1)	20:11	21:06	21:52	21:57	21:14	20:04		18:50	4	08:08 (1)	16:43	16:06
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	05:51	06:45		07:39			07:38	08:29
	16:24	17:20	18:15	9	07:33 (1)	20:13	21:08	21:53	21:56	21:12	20:02		18:48			16:41	16:06
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52	06:47		07:41			07:40	08:31
	16:25	17:22	18:17	12	07:34 (1)	20:15	21:10	21:54	21:56	21:10	19:59		18:45			16:39	16:06
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49		07:43			07:42	08:32
	16:27	17:24	18:19	15	07:34 (1)	20:17	21:12	21:55	21:55	21:08	19:57		18:43			16:37	16:05
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56	06:51		07:45			07:44	08:33
	16:28	17:26	18:21	17	07:34 (1)	20:19	21:13	21:56	21:54	21:06	19:54		18:41			16:36	16:05
12	08:39	07:53	06:50		07:14 (1)	06:35	05:31	04:56	05:09	05:58	06:52		07:46			07:46	08:34
	16:30	17:28	18:23	19	07:33 (1)	20:21	21:15	21:56	21:53	21:04	19:52		18:38			16:34	16:05
13	08:38	07:51	06:48		07:13 (1)	06:33	05:29	04:55	05:11	05:59	06:54		07:48			07:48	08:35
	16:31	17:30	18:25	20	07:33 (1)	20:22	21:17	21:57	21:52	21:02	19:49		18:36			16:32	16:05
14	08:37	07:49	06:45		07:13 (1)	06:30	05:27	04:55	05:12	06:01	06:56		07:50			07:50	08:36
	16:33	17:32	18:27	18	07:31 (1)	20:24	21:19	21:58	21:51	20:59	19:47		18:34			16:31	16:05
15	08:37	07:47	06:43		07:14 (1)	06:28	05:26	04:55	05:13	06:03	06:58		07:52			07:51	08:37
	16:35	17:34	18:29	17	07:31 (1)	20:26	21:20	21:58	21:50	20:57	19:44		18:31			16:29	16:05
16	08:36	07:45	06:41		07:14 (1)	06:25	05:24	04:55	05:15	06:05	07:00		07:54			07:53	08:38
	16:36	17:36	18:31	14	07:28 (1)	20:28	21:22	21:59	21:49	20:55	19:42		18:29			16:28	16:05
17	08:35	07:43	06:38		07:17 (1)	06:23	05:22	04:54	05:16	06:06	07:01		07:56			07:55	08:39
	16:38	17:38	18:32	9	07:26 (1)	20:30	21:24	21:59	21:48	20:53	19:39		18:27			16:26	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03		07:58			07:57	08:39	
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37		18:24			16:25	16:05	
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05		07:59			07:59	08:40	
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34		18:22			16:23	16:05	
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01			08:01	08:41	
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20			16:22	16:06	
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03			08:02	08:41	
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18			16:21	16:06	
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05			08:04	08:42	
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15			16:19	16:07	
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07			08:06	08:43	
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13			16:18	16:07	
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09			08:08	08:43	
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22		18:11			16:17	16:08	
25	08:25	07:26	06:19		06:05	05:11	04:56	05:28	06:21	07:15		07:11			08:10	08:43	
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20		17:09			16:16	16:08	
26	08:23	07:23	06:16		06:03	05:10	04:56	05:29	06:22	07:17		07:13			08:11	08:44	
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17	7	08:07 (1)			16:15	16:09	
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:57 (1)			08:13	08:44	
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	13	08:10 (1)			16:14	16:10	
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		07:55 (1)			08:15	08:44	
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	16	08:11 (1)			16:13	16:11	
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:54 (1)			08:16	08:44	
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	18	08:12 (1)			16:12	16:12	
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		07:53 (1)			08:18	08:44	
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	20	08:13 (1)			16:11	16:13	
31	08:16		07:04			05:04		05:37	06:31			07:23				08:44	
	17:04		19:58			21:44		21:27	20:21			16:56				16:14	
Potential sun hours	250	273	367			420	494	510	512	460	382		328		259	233	
Total, worst case				158							74		88				
Sun reduction				0.27							0.32		0.29				
Oper. time red.				1.00							1.00		1.00				
Wind dir. red.				0.65							0.65		0.65				
Total reduction				0.18							0.21		0.19				
Total, real				28							15		17				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IO - H249

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December	
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26		07:56 (1)	07:24	08:19
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	19	08:15 (1)	16:54	16:10
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:54 (1)	07:26	08:21
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	21	08:15 (1)	16:52	16:09
3	08:44	08:10	07:12		06:57	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	19	08:15 (1)	16:50	16:09
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	17	08:15 (1)	16:48	16:08
5	08:43	08:07	07:07		07:31 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:33		08:00 (1)	07:32	08:25
	16:20	17:14	18:10	3	07:34 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	14	08:14 (1)	16:46	16:07
6	08:43	08:05	07:05		07:29 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35		08:02 (1)	07:34	08:27
	16:21	17:16	18:12	7	07:36 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	11	08:13 (1)	16:45	16:07
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37		08:04 (1)	07:36	08:28
	16:22	17:18	18:13	10	07:37 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	8	08:12 (1)	16:43	16:06
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39		08:06 (1)	07:38	08:29
	16:24	17:20	18:15	13	07:37 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	5	08:11 (1)	16:41	16:06
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41		08:07 (1)	07:40	08:31
	16:25	17:22	18:17	15	07:37 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	1	08:08 (1)	16:39	16:06
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43			07:42	08:32
	16:27	17:24	18:19	18	07:37 (1)	20:17	21:12	21:55	21:58	21:08	19:57	18:43			16:37	16:05
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:45			07:44	08:33
	16:28	17:26	18:21	20	07:37 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41			16:36	16:05
12	08:39	07:53	06:50		07:16 (1)	06:35	05:31	04:56	05:09	05:58	06:52	07:46			07:46	08:34
	16:30	17:28	18:23	20	07:36 (1)	20:21	21:15	21:56	21:53	21:04	19:52	18:38			16:34	16:05
13	08:38	07:51	06:48		07:17 (1)	06:33	05:29	04:55	05:11	05:59	06:54	07:48			07:48	08:35
	16:31	17:30	18:25	18	07:35 (1)	20:22	21:17	21:57	21:52	21:02	19:49	18:36			16:32	16:05
14	08:37	07:49	06:45		07:17 (1)	06:30	05:27	04:55	05:12	06:01	06:56	07:50			07:50	08:36
	16:33	17:32	18:27	17	07:34 (1)	20:24	21:19	21:58	21:51	20:59	19:47	18:34			16:31	16:05
15	08:37	07:47	06:43		07:18 (1)	06:28	05:26	04:55	05:13	06:03	06:58	07:52			07:51	08:37
	16:35	17:34	18:29	14	07:32 (1)	20:26	21:20	21:58	21:50	20:57	19:44	18:31			16:29	16:05
16	08:36	07:45	06:41		07:20 (1)	06:25	05:24	04:55	05:14	06:05	07:00	07:54			07:53	08:38
	16:36	17:36	18:31	9	07:29 (1)	20:28	21:22	21:59	21:49	20:55	19:42	18:29			16:28	16:05
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01		07:56			07:55	08:39
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39		18:27			16:26	16:05
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03		07:58			07:57	08:39
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37		18:24			16:25	16:05
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05		07:59			07:59	08:40
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34		18:22			16:23	16:05
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07		08:01			08:01	08:41
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32		18:20			16:22	16:06
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08		08:03			08:02	08:41
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29		18:18			16:21	16:06
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10		08:05			08:04	08:42
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27		18:15			16:19	16:07
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12		08:07			08:06	08:43
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24		18:13			16:18	16:07
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14		08:09			08:08	08:43
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22		18:11			16:17	16:08
25	08:25	07:26	06:19		06:05	05:11	04:56	05:28	06:21	07:15		07:11			08:10	08:43
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20		17:09			16:16	16:08
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17		07:13			08:11	08:44
	16:54	17:56	18:49		20:46	21:37	22:01	21:35	20:33	19:17		17:07			16:15	16:09
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19		07:15			08:13	08:44
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	7	08:03 (1)	07:15		08:13	08:44
												08:10 (1)	17:05		16:14	16:10
28	08:20	07:19	06:11		05:59	05:07	04:57	05:32	06:26	07:21		08:00 (1)	07:17		08:15	08:44
	16:58	18:00	18:53		20:50	21:40	22:01	21:32	20:28	19:12	12	08:12 (1)	17:02		16:13	16:11
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23		07:58 (1)	07:19		08:16	08:44
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	16	08:14 (1)	17:00		16:12	16:12
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24		07:57 (1)	07:21		08:18	08:44
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	18	08:15 (1)	16:58		16:11	16:13
31	08:16		07:04			05:04		05:37	06:31			07:23				08:44
	17:04		19:58			21:44		21:27	20:21			16:56				16:14
Potential sun hours	250	273			420	494	510	512	460	382		328		259	233	
Total, worst case			164								53		115			
Sun reduction			0.27								0.32		0.29			
Oper. time red.			1.00								1.00		1.00			
Wind dir. red.			0.65								0.65		0.65			
Total reduction			0.18								0.21		0.19			
Total, real			29								11		22			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IP - H250

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:41 (1)	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	7	07:48 (1)	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	07:39 (1)	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	10	07:49 (1)	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:44	08:10	07:12	07:36 (1)	06:57	05:48	05:01	05:00	05:42	06:37	07:30	08:11 (1)	07:28	08:22		
	16:17	17:10	18:06	13	07:49 (1)	20:04	20:59	21:48	21:59	21:21	20:14	19:00	9	08:20 (1)	16:50	16:09
4	08:44	08:09	07:09	07:34 (1)	06:54	05:46	05:00	05:01	05:44	06:38	07:32	08:08 (1)	07:30	08:24		
	16:18	17:12	18:08	15	07:49 (1)	20:06	21:01	21:49	21:59	21:20	20:11	18:57	14	08:22 (1)	16:48	16:08
5	08:43	08:07	07:07	07:31 (1)	06:52	05:44	04:59	05:02	05:46	06:40	07:34	08:07 (1)	07:32	08:25		
	16:20	17:14	18:10	17	07:48 (1)	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16	08:23 (1)	16:46	16:07
6	08:43	08:05	07:05	07:29 (1)	06:49	05:42	04:59	05:03	05:47	06:42	07:35	08:06 (1)	07:34	08:27		
	16:21	17:16	18:12	19	07:48 (1)	20:10	21:05	21:51	21:58	21:16	20:06	18:53	18	08:24 (1)	16:45	16:07
7	08:42	08:03	07:02	07:30 (1)	06:47	05:40	04:58	05:04	05:49	06:44	07:37	08:05 (1)	07:36	08:28		
	16:22	17:18	18:13	18	07:48 (1)	20:11	21:06	21:52	21:57	21:14	20:04	18:50	19	08:24 (1)	16:43	16:06
8	08:42	08:01	07:00	07:29 (1)	06:44	05:38	04:57	05:05	05:51	06:45	07:39	08:06 (1)	07:38	08:29		
	16:24	17:20	18:15	18	07:47 (1)	20:13	21:08	21:53	21:56	21:12	20:02	18:48	18	08:24 (1)	16:41	16:06
9	08:41	07:59	06:58	07:31 (1)	06:42	05:36	04:57	05:06	05:52	06:47	07:41	08:07 (1)	07:40	08:31		
	16:25	17:22	18:17	15	07:46 (1)	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16	08:23 (1)	16:39	16:06
10	08:41	07:57	06:55	07:32 (1)	06:40	05:35	04:56	05:07	05:54	06:49	07:43	08:09 (1)	07:42	08:32		
	16:27	17:24	18:19	11	07:43 (1)	20:17	21:12	21:55	21:55	21:08	19:57	18:43	14	08:23 (1)	16:37	16:05
11	08:40	07:55	06:53	07:36 (1)	06:37	05:33	04:56	05:08	05:56	06:51	07:45	08:11 (1)	07:44	08:33		
	16:28	17:26	18:21	4	07:40 (1)	20:19	21:13	21:56	21:54	21:06	19:54	18:41	11	08:22 (1)	16:36	16:05
12	08:39	07:53	06:50		06:35	05:31	04:56	05:09	05:58	06:52	07:46	08:13 (1)	07:46	08:34		
	16:30	17:28	18:23		20:21	21:15	21:56	21:53	21:04	19:52	18:38	8	08:21 (1)	16:34	16:05	
13	08:38	07:51	06:48		06:33	05:29	04:55	05:11	05:59	06:54	07:48	08:15 (1)	07:48	08:35		
	16:31	17:30	18:25		20:22	21:17	21:57	21:52	21:02	19:49	18:36	5	08:20 (1)	16:32	16:05	
14	08:37	07:49	06:45		06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:17 (1)	07:50	08:36		
	16:33	17:32	18:27		20:24	21:19	21:58	21:51	20:59	19:47	18:34	1	08:18 (1)	16:31	16:05	
15	08:37	07:47	06:43		06:28	05:26	04:55	05:13	06:03	06:58	07:52		07:51	08:37		
	16:35	17:34	18:29		20:26	21:20	21:58	21:50	20:57	19:44	18:31		16:29	16:05		
16	08:36	07:45	06:41		06:25	05:24	04:55	05:14	06:05	07:00	07:54		07:53	08:38		
	16:36	17:36	18:31		20:28	21:22	21:59	21:49	20:55	19:42	18:29		16:28	16:05		
17	08:35	07:43	06:38		06:23	05:22	04:54	05:16	06:06	07:01	07:56		07:55	08:39		
	16:38	17:38	18:32		20:30	21:24	21:59	21:48	20:53	19:39	18:27		16:26	16:05		
18	08:34	07:41	06:36		06:21	05:21	04:54	05:17	06:08	07:03	07:58		07:57	08:39		
	16:40	17:40	18:34		20:32	21:25	22:00	21:46	20:51	19:37	18:24		16:25	16:05		
19	08:32	07:39	06:33		06:19	05:19	04:54	05:19	06:10	07:05	07:59		07:59	08:40		
	16:42	17:42	18:36		20:34	21:27	22:00	21:45	20:49	19:34	18:22		16:23	16:05		
20	08:31	07:37	06:31		06:16	05:18	04:54	05:20	06:12	07:07	08:01		08:01	08:41		
	16:43	17:44	18:38		20:35	21:28	22:01	21:44	20:46	19:32	18:20		16:22	16:06		
21	08:30	07:34	06:28		06:14	05:16	04:55	05:21	06:14	07:08	08:03		08:02	08:41		
	16:45	17:46	18:40		20:37	21:30	22:01	21:42	20:44	19:29	18:18		16:21	16:06		
22	08:29	07:32	06:26		06:12	05:15	04:55	05:23	06:15	07:10	08:05		08:04	08:42		
	16:47	17:48	18:42		20:39	21:32	22:01	21:41	20:42	19:27	18:15		16:19	16:07		
23	08:27	07:30	06:23		06:10	05:13	04:55	05:24	06:17	07:12	08:07		08:06	08:43		
	16:49	17:50	18:44		20:41	21:33	22:01	21:40	20:40	19:24	18:13		16:18	16:07		
24	08:26	07:28	06:21		06:07	05:12	04:55	05:26	06:19	07:14	08:09		08:08	08:43		
	16:51	17:52	18:45		20:43	21:35	22:01	21:38	20:37	19:22	18:11		16:17	16:08		
25	08:25	07:26	06:19		06:05	05:11	04:56	05:27	06:21	07:15	08:11		08:10	08:43		
	16:53	17:54	18:47		20:45	21:36	22:01	21:37	20:35	19:20	17:09		16:16	16:08		
26	08:23	07:23	06:16		06:03	05:09	04:56	05:29	06:22	07:17	08:13		08:11	08:44		
	16:54	17:56	18:49		20:46	21:38	22:01	21:35	20:33	19:17	17:07		16:15	16:09		
27	08:22	07:21	06:14		06:01	05:08	04:57	05:31	06:24	07:19	08:15		08:13	08:44		
	16:56	17:58	18:51		20:48	21:39	22:01	21:33	20:30	19:15	17:05		16:14	16:10		
28	08:20	07:19	06:11	07:43 (1)	05:59	05:07	04:57	05:32	06:26	07:21	08:17		08:15	08:44		
	16:58	18:00	3	07:46 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02		16:13	16:11	
29	08:19		07:09		05:56	05:06	04:58	05:34	06:28	07:23	07:19		08:16	08:44		
	17:00		19:55		20:52	21:42	22:01	21:30	20:26	19:10	17:00		16:12	16:12		
30	08:17		07:06		05:54	05:05	04:58	05:35	06:29	07:24	07:21		08:18	08:44		
	17:02		19:57		20:54	21:43	22:01	21:28	20:23	19:07	16:58		16:11	16:13		
31	08:16		07:04			05:04		05:37	06:31		07:23		08:44			
	17:04		19:58			21:44		21:27	20:21		16:56		16:14			
Potential sun hours	250	273	367		420	494	510	512	460	382	328		259	233		
Total, worst case		3	147								149					
Sun reduction		0.23	0.27								0.29					
Oper. time red.		1.00	1.00								1.00					
Wind dir. red.		0.65	0.65								0.65					
Total reduction		0.15	0.18								0.19					
Total, real		0	26								28					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: IQ - H251

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	07:34 (1) 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:31 (1) 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:29 (1) 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:29 (1) 18:13	06:47 20:11	05:40 21:06	05:04 21:52	05:49 21:57	05:44 21:14	06:44 20:04	07:37 18:50	07:36 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:29 (1) 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:30 (1) 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:31 (1) 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:58	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:33 (1) 18:21	06:37 20:19	05:33 21:13	04:56 21:54	05:08 21:06	05:56 21:06	06:51 19:54	07:45 18:41	07:44 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:42 (1) 18:23	06:35 20:21	05:31 21:15	04:56 21:53	05:09 21:04	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 21:02	07:48 19:49	07:48 18:36	07:48 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 18:18	07:50 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:52 18:29	07:51 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:54 18:29	07:53 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:56 18:27	07:55 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:58 18:24	07:57 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 18:22	07:59 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 18:20	08:01 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 18:18	08:02 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 18:15	08:04 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:07 18:13	08:06 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:09 18:11	08:08 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	07:11 18:09	07:11 18:09	07:10 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 18:07	07:13 18:07	07:12 16:08
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 18:05	07:15 18:05	07:14 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 18:02	07:17 18:02	07:16 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 18:00	07:19 18:00	07:18 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 18:58	07:21 18:58	07:20 16:13
31	08:16 17:04		07:04 19:58	05:54 21:44	05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	07:23 18:56	07:23 18:56	07:23 18:56	07:22 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		3	156							160		
Sun reduction		0.23	0.27							0.29		
Oper. time red.		1.00	1.00							1.00		
Wind dir. red.		0.65	0.65							0.65		
Total reduction		0.15	0.18							0.19		
Total, real		0	27							30		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: IR - H252

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15 08:44 16:16 08:44 16:17 08:44 16:18	08:14 17:06 08:12 17:08 08:10 17:10 08:09 17:12	07:16 18:02 07:14 18:04 07:12 18:06 07:09 18:08	07:01 20:00 06:59 20:02 06:57 20:04 06:54 20:06	05:52 20:56 05:50 20:57 05:48 20:59 05:46 21:01	05:03 21:46 05:02 21:47 05:01 21:48 05:01 21:49	04:59 22:00 05:00 22:00 05:00 21:59 05:01 21:59	05:39 21:25 05:40 21:23 05:42 21:21 05:44 21:20	06:33 20:18 06:35 20:16 06:37 20:14 06:38 20:11	07:26 19:05 07:28 19:02 07:30 19:00 07:32 18:57	07:24 16:54 07:26 16:52 07:28 16:50 07:30 16:48	08:19 16:10 08:21 16:09 08:22 16:09 08:24 16:08
2	08:44 16:16 08:44 16:17 08:44 16:18	08:12 17:08 08:10 17:10 08:09 17:12	07:14 18:04 07:12 18:06 07:09 18:08	06:59 20:02 06:57 20:04 06:54 20:06	05:50 20:57 05:48 20:59 05:46 21:01	05:02 21:47 05:01 21:48 05:01 21:49	05:00 22:00 05:00 21:59 05:01 21:59	05:40 21:23 05:42 21:21 05:44 21:20	06:35 20:16 06:37 20:14 06:38 20:11	07:28 19:02 07:30 19:00 07:32 18:57	07:26 16:52 07:28 16:50 07:30 16:48	08:21 16:09 08:22 16:09 08:24 16:08
3	08:44 16:17 08:44 16:18	08:10 17:10 08:09 17:12	07:12 18:06 07:09 18:08	06:57 20:04 06:54 20:06	05:48 20:59 05:46 21:01	05:01 21:48 05:01 21:49	05:00 21:59 05:01 21:59	05:42 21:21 05:44 21:20	06:37 20:14 06:38 20:11	07:30 19:00 07:32 18:57	07:28 16:50 07:30 16:48	08:22 16:09 08:24 16:08
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31	08:16 17:04		07:04 19:58	05:52 20:58	05:04 21:44	04:58 22:01	05:37 21:27	06:31 				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: IS - H253

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		169								175		
Sun reduction		0.23								0.29		
Oper. time red.		1.00								1.00		
Wind dir. red.		0.64								0.64		
Total reduction		0.15								0.19		
Total, real		25								33		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: IT - H254

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:46	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:44 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:10	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:02	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:31 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:22 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:20 (1)	06:35 20:21	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:18 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:15 (1)	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:50 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:13 (1)	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:11 (1)	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:09 (1)	06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:09 (1)	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:08 (1)	06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:09 (1)	06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:10 (1)	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:03 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:10 (1)	06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:05 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:12 (1)	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13	08:07 16:18	08:43 16:07
24	08:26 16:51	07:28 17:52	06:21 18:15 (1)	06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:09 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	18:11 17:09	18:11 16:16	08:44 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:38	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	07:13 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	07:15 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	07:17 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	07:19 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 16:58	07:21 16:11	08:44 16:13
31	08:16 17:04		07:04 19:58	05:04 21:44	05:04 21:44	05:37 21:27	06:31 20:21	07:23 16:56	07:23 16:56	07:23 16:56	07:23 16:56	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		203								205		
Sun reduction		0.23								0.29		
Oper. time red.		1.00								1.00		
Wind dir. red.		0.63								0.63		
Total reduction		0.15								0.19		
Total, real		30								38		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: IU - H255

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		08:14		09:03 (1)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24										
2	16:15		17:06	10	09:13 (1)	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54										
3	08:44		08:12		09:06 (1)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26										
4	16:16		17:08	4	09:10 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52										
5	08:44		08:10			07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28										
6	16:17		17:10			18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50										
7	08:44		08:09			07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30										
8	16:18		17:12			18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:48										
9	08:43		08:07			07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32										
10	16:20		17:14			18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46										
11	08:43		08:05			07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34										
12	16:21		17:16			18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45										
13	08:42		08:03			07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36										
14	16:22		17:18			18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43										
15	08:42		08:01			07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38										
16	16:24		17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:41										
17	08:41		07:59			06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40										
18	16:25		17:22			18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	5									
19	08:41		07:57			06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42										
20	16:27		17:24			18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	11									
21	08:40		07:55			06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:45	07:44										
22	16:28		17:26			18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	13									
23	08:39		07:53			06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46										
24	16:30		17:28			18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	15									
25	08:38		07:51			06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48										
26	16:31		17:30			18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32	17									
27	08:38		07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50										
28	16:33		17:32			18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31	18									
29	08:37		07:47			06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51										
30	16:35		17:34			18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	19									
31	08:36		07:45			06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53										
32	16:36	3	09:07 (1)			18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	20									
33	08:35		09:05 (1)			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55										
34	16:38	5	09:10 (1)			18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	20									
35	08:34		09:04 (1)			06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57										
36	16:40	8	09:12 (1)			18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	20									
37	08:32		09:03 (1)			06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59										
38	16:41	10	09:13 (1)			18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23	18									
39	08:31		09:01 (1)			06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01										
40	16:43	12	09:13 (1)			18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	16									
41	08:30		09:00 (1)			06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:03										
42	16:45	14	09:14 (1)			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	14									
43	08:29		08:59 (1)			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04										
44	16:47	16	09:15 (1)			18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	12									
45	08:27		08:57 (1)			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06										
46	16:49	18	09:15 (1)			18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	10									
47	08:26		08:56 (1)			06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08										
48	16:51	20	09:16 (1)			18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	8									
49	08:25		08:56 (1)			06:19	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:10										
50	16:53	20	09:16 (1)			18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16	6									
51	08:23		08:56 (1)			06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11										
52	16:54	20	09:16 (1)			18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15	3									
53	08:22		08:57 (1)			06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13										
54	16:56	19	09:16 (1)			18:51	20:48	21:39	22:01	21:34	20:30	19:15	17:05	16:14										
55	08:20		08:58 (1)			06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17	08:15										
56	16:58	18	09:16 (1)			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13										
57	08:19		08:58 (1)			07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16										
58	17:00	17	09:15 (1)			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12										
59	08:17		08:59 (1)			07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21	08:18										
60	17:02	16	09:15 (1)			19:57	20:54	21:43	22:01	21:29	20:23	19:07	16:58	16:11										
61	08:16		09:01 (1)			07:04		05:04		05:37	06:31	07:23	07:23											
62	17:04	13	09:14 (1)			19:58		21:44		21:27	20:21	16:56												
Potential sun hours	250		273			367	420	494	510	512	460	382	328	259										
Total, worst case	229		14												245									
Sun reduction	0.24		0.23												0.27									
Oper. time red.	1.00		1.00												1.00									
Wind dir. red.	0.61		0.61												0.61									
Total reduction	0.15		0.14												0.16									
Total, real	34		2												40									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** IV - H256

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	09:18 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	4 09:22 (1)	17:06	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54
3	08:44	09:18 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26
4	16:16	5 09:23 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52
5	08:44	09:18 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28
6	16:17	6 09:24 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50
7	08:44	09:17 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30
8	16:18	7 09:24 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:48
9	08:43	09:17 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32
10	16:20	8 09:25 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46
11	08:43	09:16 (1)	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34
12	16:21	9 09:25 (1)	17:16	18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45
13	08:42	09:15 (1)	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36
14	16:22	10 09:26 (1)	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43
15	08:42	09:15 (1)	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38
16	16:24	11 09:27 (1)	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:41
17	08:41	09:14 (1)	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40
18	16:25	12 09:27 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39
19	08:41	09:13 (1)	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42
20	16:27	13 09:28 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37
21	08:40	09:12 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44
22	16:28	14 09:28 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36
23	08:39	09:11 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46
24	16:30	15 09:28 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34
25	08:38	09:10 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48
26	16:31	16 09:29 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32
27	08:38	09:10 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50
28	16:33	17 09:29 (1)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31
29	08:37	09:10 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51
30	16:35	18 09:29 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29
31	08:36	09:11 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53
32	16:36	19 09:30 (1)	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28
33	08:35	09:11 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55
34	16:38	20 09:29 (1)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26
35	08:34	09:12 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57
36	16:40	21 09:29 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25
37	08:32	09:13 (1)	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59
38	16:41	22 09:29 (1)	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23
39	08:31	09:14 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01
40	16:43	23 09:28 (1)	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22
41	08:30	09:15 (1)	07:34	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:03
42	16:45	24 09:28 (1)	17:46	18:40	20:37	21:30	22:01	21:43	20:44	19:29	18:18	16:21
43	08:29	09:17 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04
44	16:47	25 09:27 (1)	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19
45	08:27	09:20 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06
46	16:49	26 09:25 (1)	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18
47	08:26		07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08
48	16:51		17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17
49	08:25		07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:10
50	16:53		17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16
51	08:23		07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11
52	16:54		17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15
53	08:22		07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13
54	16:56		17:58	18:51	20:48	21:39	22:01	21:34	20:30	19:15	17:05	16:14
55	08:20		07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:15
56	16:58		18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13
57	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16
58	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12
59	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:18
60	17:02			19:57	20:54	21:43	22:01	21:29	20:23	19:07	16:58	16:11
61	08:16			07:04		05:04		05:37	06:31		07:23	
62	17:04			19:58		21:44		21:27	20:21		16:56	
Potential sun hours	250		273	367	420	494	510	512	460	382	328	259
Total, worst case		292										187
Sun reduction		0.24										0.21
Oper. time red.		1.00										1.00
Wind dir. red.		0.60										0.60
Total reduction		0.15										0.13
Total, real		43										30

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** IW - H257**Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	08:54 (1)
	16:15	17:06	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54	16:10	6 09:00 (1)
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21	08:56 (1)
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	4 09:00 (1)
3	08:44	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22	08:57 (1)
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08	2 08:59 (1)
4	08:44	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:20	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07	
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:10	21:05	21:51	21:58	21:16	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:02	18:48	16:41	16:06	
9	08:41	09:14 (1)	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:31
	16:25	2 09:16 (1)	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05
10	08:41	09:13 (1)	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42	08:32
	16:27	4 09:17 (1)	17:24	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37	16:05
11	08:40	09:12 (1)	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33
	16:28	6 09:18 (1)	17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05
12	08:39	09:11 (1)	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34
	16:30	8 09:19 (1)	17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05
13	08:38	09:10 (1)	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:35
	16:31	10 09:20 (1)	17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32	6 08:50 (1)
14	08:38	09:09 (1)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50	08:36
	16:33	11 09:20 (1)	17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31	11 08:53 (1)
15	08:37	09:08 (1)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37
	16:35	13 09:21 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	14 08:54 (1)
16	08:36	09:07 (1)	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38
	16:36	15 09:22 (1)	17:36	18:31	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16 08:55 (1)
17	08:35	09:05 (1)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39
	16:38	17 09:22 (1)	17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	17 08:56 (1)
18	08:34	09:04 (1)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57	08:39
	16:40	19 09:23 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	19 08:58 (1)
19	08:32	09:03 (1)	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	07:59	08:39
	16:41	20 09:23 (1)	17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23	20 08:59 (1)
20	08:31	09:02 (1)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01	08:39
	16:43	21 09:23 (1)	17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	20 08:59 (1)
21	08:30	09:03 (1)	07:34	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:02	08:39
	16:45	21 09:24 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	21 09:00 (1)
22	08:29	09:04 (1)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:39
	16:47	20 09:24 (1)	17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	21 09:00 (1)
23	08:27	09:04 (1)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:39
	16:49	20 09:24 (1)	17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	20 08:59 (1)
24	08:26	09:05 (1)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:41
	16:51	19 09:24 (1)	17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	19 09:00 (1)
25	08:25	09:06 (1)	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:10	08:10	08:43
	16:53	17 09:23 (1)	17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	16:16	17 09:00 (1)
26	08:23	09:06 (1)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:45
	16:54	16 09:22 (1)	17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15	15 09:00 (1)
27	08:22	09:08 (1)	07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:13	08:47
	16:56	14 09:22 (1)	17:58	18:51	20:48	21:39	22:01	21:34	20:30	19:15	17:05	16:14	13 09:00 (1)
28	08:20	09:10 (1)	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:15	08:49
	16:58	11 09:21 (1)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	12 09:01 (1)
29	08:19	09:12 (1)		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16	08:51
	17:00	6 09:18 (1)		19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	10 09:01 (1)
30	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:18	08:52
	17:02			19:57	20:54	21:43	22:01	21:29	20:23	19:07	16:58	16:11	8 09:00 (1)
31	08:16			07:04		05:04		05:37	06:31		07:23		08:44
	17:04			19:58		21:44		21:27	20:21		16:56		16:13
Potential sun hours	250												
Total, worst case		290	273	367	420	494	510	512	460	382	328	259	279
Sun reduction		0.24											0.27
Oper. time red.		1.00											1.00
Wind dir. red.		0.61											0.61
Total reduction		0.15											0.16
Total, real		43											45

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: IX - H258

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: IY - H259

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: IZ - H260

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JA - H261

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JB - H262

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JC - H263

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JD - H264

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JE - H265

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Table layout: For each day in each month the following matrix apply

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	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JF - H266

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JG - H267

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JH - H268

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JI - H269

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JJ - H270

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
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19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JK - H271

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JL - H272

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JM - H273

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JN - H274

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
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	January	February	March	April	May	June	July	August	September	October	November	December
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JO - H275

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JP - H276

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JQ - H277

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JR - H278

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JS - H279

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JT - H280

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JU - H281

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JV - H282

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JW - H283

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
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15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58	05:04 21:44	05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JX - H284

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JY - H285

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: JZ - H286

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: KA - H287

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: KB - H288

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: KC - H289

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: KD - H290

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
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18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
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31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: KE - H291

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
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6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
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20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
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28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** KF - H292

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours), [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March	April	May	June	July	August	September	October	November	December							
1	08:44	08:14	07:16	07:01	05:52	06:18 (5)	05:03	05:33 (4)	04:59	05:32 (4)	05:39	06:23 (5)	06:33	07:26	07:24	08:19				
	16:15	17:06	18:02	20:00	20:55	27	06:45 (5)	21:45	7	05:40 (4)	22:00	13	05:45 (4)	21:25	26	06:49 (5)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	06:16 (5)	05:02	05:33 (4)	05:00	05:33 (4)	05:40	06:23 (5)	06:35	07:28	07:26	08:21				
	16:16	17:08	18:04	20:02	20:57	28	06:44 (5)	21:47	8	05:41 (4)	22:00	13	05:46 (4)	21:23	27	06:50 (5)	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:56	05:48	06:14 (5)	05:01	05:32 (4)	05:00	05:33 (4)	05:42	06:22 (5)	06:36	07:30	07:28	08:22				
	16:17	17:10	18:06	20:04	20:59	30	06:44 (5)	21:48	9	05:41 (4)	21:59	12	05:45 (4)	21:21	29	06:51 (5)	20:14	19:00	16:50	16:09
4	08:43	08:08	07:09	06:54	05:46	06:12 (5)	05:00	05:31 (4)	05:01	05:34 (4)	05:44	06:21 (5)	06:38	07:32	07:30	08:24				
	16:18	17:12	18:08	20:06	21:01	32	06:44 (5)	21:49	10	05:41 (4)	21:59	12	05:46 (4)	21:19	31	06:52 (5)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44	06:10 (5)	04:59	05:31 (4)	05:02	05:35 (4)	05:46	06:21 (5)	06:40	07:33	07:32	08:25				
	16:20	17:14	18:10	20:08	21:03	33	06:43 (5)	21:50	10	05:41 (4)	21:58	11	05:46 (4)	21:17	32	06:53 (5)	20:09	18:55	16:46	16:07
6	08:43	08:05	07:05	06:49	05:42	06:10 (5)	04:59	05:30 (4)	05:03	05:36 (4)	05:47	06:20 (5)	06:42	07:35	07:34	08:26				
	16:21	17:16	18:11	20:09	21:04	34	06:44 (5)	21:51	11	05:41 (4)	21:58	11	05:47 (4)	21:16	32	06:52 (5)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	06:11 (5)	04:58	05:30 (4)	05:04	05:37 (4)	05:49	06:20 (5)	06:44	07:37	07:36	08:28				
	16:22	17:18	18:13	20:11	21:06	32	06:43 (5)	21:52	11	05:41 (4)	21:57	10	05:47 (4)	21:14	33	06:53 (5)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	06:11 (5)	04:57	05:29 (4)	05:05	05:38 (4)	05:51	06:20 (5)	06:45	07:39	07:38	08:29				
	16:24	17:20	18:15	20:13	21:08	31	06:42 (5)	21:53	12	05:41 (4)	21:56	10	05:48 (4)	21:12	33	06:53 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	06:11 (5)	04:57	05:29 (4)	05:06	05:39 (4)	05:52	06:22 (5)	06:47	07:41	07:40	08:30				
	16:25	17:22	18:17	20:15	21:10	30	06:41 (5)	21:54	12	05:41 (4)	21:55	9	05:48 (4)	21:10	31	06:53 (5)	19:59	18:45	16:39	16:06
10	08:40	07:57	06:55	06:40	05:35	06:12 (5)	04:56	05:28 (4)	05:07	05:40 (4)	05:54	06:24 (5)	06:49	07:43	07:42	08:32				
	16:27	17:24	18:19	20:17	21:12	29	06:41 (5)	21:55	12	05:40 (4)	21:55	8	05:48 (4)	21:08	30	06:54 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33	06:13 (5)	04:56	05:28 (4)	05:08	05:41 (4)	05:56	06:25 (5)	06:51	07:44	07:44	08:33				
	16:28	17:26	18:21	20:19	21:13	27	06:40 (5)	21:55	13	05:41 (4)	21:54	8	05:49 (4)	21:06	28	06:53 (5)	19:54	18:41	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31	06:13 (5)	04:56	05:28 (4)	05:09	05:42 (4)	05:58	06:27 (5)	06:52	07:46	07:46	08:34				
	16:30	17:28	18:23	20:20	21:15	25	06:38 (5)	21:50	13	05:41 (4)	21:54	7	05:48 (4)	21:04	26	06:53 (5)	19:52	18:39	16:34	16:04
13	08:38	07:51	06:48	06:32	05:29	06:15 (5)	04:55	05:27 (4)	05:11	05:43 (4)	05:59	06:29 (5)	06:54	07:48	07:47	08:35				
	16:31	17:30	18:25	20:22	21:17	23	06:38 (5)	21:57	13	05:40 (4)	21:52	6	05:48 (4)	21:01	24	06:53 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27	06:16 (5)	04:55	05:27 (4)	05:12	05:44 (4)	06:01	06:30 (5)	06:56	07:50	07:49	08:36				
	16:33	17:32	18:27	20:24	21:18	20	06:36 (5)	21:58	14	05:41 (4)	21:51	5	05:49 (4)	20:59	22	06:52 (5)	19:47	18:34	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26	06:17 (5)	04:55	05:27 (4)	05:13	05:45 (4)	06:03	06:32 (5)	06:58	07:52	07:51	08:37				
	16:35	17:34	18:29	20:26	21:20	17	06:34 (5)	21:58	14	05:41 (4)	21:50	4	05:49 (4)	20:57	20	06:52 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24	06:19 (5)	04:55	05:27 (4)	05:14	05:47 (4)	06:05	06:33 (5)	06:59	07:54	07:53	08:38				
	16:36	17:36	18:30	20:28	21:22	13	06:32 (5)	21:59	14	05:41 (4)	21:49	3	05:50 (4)	20:55	18	06:51 (5)	19:42	18:29	16:28	16:05
17	08:34	07:43	06:38	06:23	05:22	06:23 (5)	04:54	05:27 (4)	05:16	05:48 (4)	06:06	06:35 (5)	07:01	07:56	07:55	08:38				
	16:38	17:38	18:32	20:30	21:23	7	06:30 (5)	21:59	14	05:41 (4)	21:47	1	05:49 (4)	20:53	15	06:50 (5)	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21	06:24 (5)	04:54	05:27 (4)	05:17	05:47 (4)	06:08	06:37 (5)	07:03	07:57	07:57	08:39				
	16:40	17:40	18:34	20:32	21:25	22	06:30 (5)	22:00	14	05:41 (4)	21:46	20:51	13	06:50 (5)	19:37	18:24	16:25	16:05		
19	08:32	07:39	06:33	06:18	05:19	06:28 (5)	04:54	05:27 (4)	05:15	05:49 (4)	06:09	06:38 (5)	07:05	07:59	07:59	08:40				
	16:42	17:42	18:36	20:33	21:27	22	06:31 (5)	22:01	14	05:41 (4)	21:45	10	06:48 (5)	19:33	18:22	17:13	16:14	16:05		
20	08:31	07:37	06:31	06:16	05:18	06:24 (5)	04:54	05:27 (4)	05:20	05:47 (4)	06:05	06:12	06:40	07:06	08:01	08:00	08:41			
	16:43	17:44	18:38	20:35	21:28	22	06:30 (5)	22:00	14	05:41 (4)	21:44	20:46	7	06:47 (5)	19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16	06:39 (5)	05:16	05:27 (4)	05:21	05:46 (5)	06:13	06:42 (5)	07:08	08:03	08:02	08:41				
	16:45	17:46	18:40	20:37	21:30	1	06:40 (5)	22:01	14	05:41 (4)	21:42	20:44	4	06:46 (5)	19:29	18:18	16:21	16:06		
22	08:29	07:32	06:26	06:12	05:15	06:36 (5)	05:15	05:28 (4)	05:23	05:45 (5)	06:15	06:15	07:10	08:05	08:04	08:42				
	16:47	17:48	18:42	20:39	21:31	4	06:40 (5)	22:01	14	05:42 (4)	21:41	20:42	19:27	18:15	16:19	16:07				
23	08:27	07:30	06:23	06:09	05:13	06:34 (5)	05:13	05:28 (4)	05:24	05:45 (5)	06:17	07:12	08:07	08:06	08:42					
	16:49	17:50	18:43	20:41	21:33	7	06:41 (5)	22:01	14	05:42 (4)	21:39	20:39	19:24	18:13	16:18	16:07				
24	08:26	07:28	06:21	06:07	05:12	06:32 (5)	05:12	05:28 (4)	05:26	05:46 (5)	06:19	07:14	08:09	08:08	08:43					
	16:51	17:52	18:45	20:43	21:34	10	06:42 (5)	22:01	14	05:42 (4)	21:38	20:37	19:22	18:11	16:17	16:08				
25	08:25	07:25	06:18	06:05	05:11	06:30 (5)	05:11	05:29 (4)	05:27	05:47 (5)	06:21	07:15	07:11	08:09	08:08	08:43				
	16:53	17:54	18:47	20:44	21:36	13	06:43 (5)	22:01	14	05:43 (4)	21:36	20:35	19:19	17:09	16:16	16:08				
26	08:23	07:23	06:16	06:03	05:09	06:28 (5)	05:09	05:29 (4)	05:29	05:49 (4)	06:13	06:13	07:13	08:11	08:11	08:43				
	16:54	17:56	18:49	20:46	21:37	1	06:44 (5)	22:01	14	05:43 (4)	21:35	20:32	19:17	17:07	16:15	16:09				
27	08:22	07:21	06:14	06:01	05:08	06:26 (5)	05:08	05:38 (4)	04:57	05:30 (4)	05:31	06:32 (5)	06:24	07:19	07:15	08:13	08:44			
	16:56	17:58	18:51	20:48	21:39	2	06:40 (4)	22:01	14	05:44 (4)	21:33	10	06:42 (5)	20:30	19:15	17:05	16:14	16:10		
28	08:20	07:19	06:11	05:59	05:07	06:24 (5)	05:07	05:37 (4)	04:57	05:30 (4)	05:32	06:29 (5)	06:26	07:21	07:17	08:14	08:44			
	16:58	18:00	18:53	20:50	21:40	3	06:40 (4)	22:01	14	05:44 (4)	21:32	15	06:44 (5)	20:28	17:02	16:13	16:11			
29	08:19	07:09	05:56	06:22	05:06	06:22 (5)	05:06	05:36 (4)	04:58	05:31 (4)	05:34	06:28 (5)	06:28	07:23	07:18	08:16	08:44			
	17:00	19:55	20:52	23	06:45 (5)	21:41	4	06:40 (4)	22:01	13	05:44 (4)	21:30	18	06:46 (5)	20:25	17:00	16:12	16:12		
30	08:17	07:06	05:54	06:20	05:05	06:20 (5)	05:05	05:35 (4)	04:58	05:31 (4)	05:35	06:26 (5)	06:29	07:24	07:20	08:18	08:44			
	17:02	19:56	20:54	25	06:45 (5)	21:43	5	06:40 (4)	22:00	13	05:44 (4)	21:28	21	06:47 (5)	20:23	16:58	16:11	16:13		
31	08:15	07:04	05:58	06:24	05:04	06:21 (5)	05:04	05:34 (4)	04:57	05:37	05:37	06:25 (5)	06:31	07:22	07:22	08:44				
	17:04	19:58	20:54	24	06:40 (4)	21:44	6	06:40 (4)	22:01	12	05:44 (4)	21:27	24	06:49 (5)	20:21	16:56	16:14			
Potential sun hours		250	273	367	420		494		510		512		460		382	328	259	233		
Total, worst case					137		459		377		231		491							
Sun reduction					0.35		0.38		0.32		0.32		0.34							
Oper. time red.					1.00		1.00		1.00		1.00		1.00							
Wind dir. red.					0.68		0.68		0.66		0.67		0.68							
Total reduction					0.24		0.26		0.21		0.22		0.23							
Total, real					33		118		79		50		113							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: KG - H293

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	07:25 (5)	05:52
	16:15	17:06	18:02	20:00	1	07:26 (5)
2	08:44	08:12	07:14	06:59		20:55
	16:16	17:08	18:04	20:02	4	07:23 (5)
3	08:44	08:10	07:12	06:56		05:50
	16:17	17:10	18:06	20:04	7	07:27 (5)
4	08:43	08:09	07:09	06:54		20:57
	16:18	17:12	18:08	20:06	10	07:20 (5)
5	08:43	08:07	07:07	06:52		05:48
	16:20	17:14	18:10	20:08	13	07:27 (5)
6	08:43	08:05	07:05	06:49		20:59
	16:21	17:16	18:11	20:09	15	07:18 (5)
7	08:42	08:03	07:02	06:47		05:46
	16:22	17:18	18:13	20:11	17	07:28 (5)
8	08:42	08:01	07:00	06:44		21:01
	16:24	17:20	18:15	20:13	19	07:15 (5)
9	08:41	07:59	06:57	06:42		05:44
	16:25	17:22	18:17	20:15	21	07:28 (5)
10	08:40	07:57	06:55	06:40		21:03
	16:27	17:24	18:19	20:17	22	07:13 (5)
11	08:40	07:55	06:53	06:37		05:42
	16:28	17:26	18:21	20:19	24	07:28 (5)
12	08:39	07:53	06:50	06:35		21:04
	16:30	17:28	18:23	20:21	22	07:11 (5)
13	08:38	07:51	06:48	06:32		05:40
	16:31	17:30	18:25	20:22	19	07:28 (5)
14	08:37	07:49	06:45	06:30		21:06
	16:33	17:32	18:27	20:24	16	07:08 (5)
15	08:36	07:47	06:43	06:28		05:38
	16:35	17:34	18:29	20:26	11	07:27 (5)
16	08:35	07:45	06:41	06:25		21:08
	16:36	17:36	18:30	20:28		05:36
17	08:34	07:43	06:38	06:23		21:10
	16:38	17:38	18:32	20:30		05:35
18	08:33	07:41	06:36	06:21		21:11
	16:40	17:40	18:34	20:32		05:34
19	08:32	07:39	06:33	06:19		21:17
	16:42	17:42	18:36	20:33		05:27
20	08:31	07:37	06:31	06:16		21:18
	16:43	17:44	18:38	20:35		05:26
21	08:30	07:34	06:28	06:14		21:22
	16:45	17:46	18:40	20:37		05:25
22	08:29	07:32	06:26	06:12		21:23
	16:47	17:48	18:42	20:39		05:24
23	08:27	07:30	06:23	06:09		21:24
	16:49	17:50	18:44	20:41		05:23
24	08:26	07:28	06:21	06:07		21:25
	16:51	17:52	18:45	20:43		05:22
25	08:25	07:25	06:18	06:05		21:26
	16:53	17:54	18:47	20:44		05:21
26	08:23	07:23	06:16	06:03		21:27
	16:54	17:56	18:49	20:46		05:20
27	08:22	07:21	06:14	06:01		21:28
	16:56	17:58	18:51	20:48		05:19
28	08:20	07:19	06:11	05:59		21:29
	16:58	18:00	18:53	20:50		05:18
29	08:19		07:09	05:56		21:30
	17:00		19:55	20:52		05:17
30	08:17		07:06	05:54		21:31
	17:02		19:56	20:54		05:16
31	08:15		07:04			21:32
	17:04		19:58			05:15
Potential sun hours	250	273	367	420	494	510
Total, worst case				221	56	89
Sun reduction				0.35	0.38	0.32
Oper. time red.				1.00	1.00	1.00
Wind dir. red.				0.67	0.67	0.66
Total reduction				0.24	0.26	0.21
Total, real				53	14	19

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KG - H293

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33	07:00 (5)	07:26	07:24	08:19			
	22:00	2	05:34 (3)	21:25	20:18	24	07:24 (5)	19:05	16:54	16:10	
2	05:00	05:33 (3)	05:40	06:15 (4)	06:35		07:02 (5)	07:28	07:26	08:21	
	22:00	2	05:35 (3)	21:23	4	06:19 (4)	20:16	22	07:24 (5)	19:02	16:52
3	05:00	05:33 (3)	05:42	06:12 (4)	06:37		07:04 (5)	07:30	07:28	08:22	
	21:59	1	05:34 (3)	21:21	9	06:21 (4)	20:14	21	07:25 (5)	19:00	16:50
4	05:01		05:44	06:14 (4)	06:38		07:05 (5)	07:32	07:30	08:24	
	21:59		21:19	9	06:23 (4)	20:11	19	07:24 (5)	18:57	16:48	16:08
5	05:02		05:46	06:16 (4)	06:40		07:07 (5)	07:33	07:32	08:25	
	21:58		21:17	9	06:25 (4)	20:09	17	07:24 (5)	18:55	16:46	16:07
6	05:03		05:47	06:17 (4)	06:42		07:09 (5)	07:35	07:34	08:26	
	21:58		21:16	8	06:25 (4)	20:06	15	07:24 (5)	18:53	16:45	16:07
7	05:04		05:49	06:19 (4)	06:44		07:10 (5)	07:37	07:36	08:28	
	21:57		21:14	7	06:26 (4)	20:04	13	07:23 (5)	18:50	16:43	16:06
8	05:05		05:51	06:20 (4)	06:45		07:12 (5)	07:39	07:38	08:29	
	21:56		21:12	6	06:26 (4)	20:01	10	07:22 (5)	18:48	16:41	16:06
9	05:06		05:52	06:22 (4)	06:47		07:14 (5)	07:41	07:40	08:30	
	21:55		21:10	4	06:26 (4)	19:59	8	07:22 (5)	18:45	16:39	16:06
10	05:07		05:54	06:24 (4)	06:49		07:16 (5)	07:43	07:42	08:32	
	21:55		21:08	3	06:27 (4)	19:57	5	07:21 (5)	18:43	16:37	16:05
11	05:08		05:56	06:25 (4)	06:51		07:17 (5)	07:44	07:44	08:33	
	21:54		21:06	1	06:26 (4)	19:54	2	07:19 (5)	18:41	16:36	16:05
12	05:09		05:58		06:52			07:46	07:46	08:34	
	21:53		21:03		19:52			18:38	16:34	16:05	
13	05:11		05:59		06:54			07:48	07:47	08:35	
	21:52		21:01		19:49			18:36	16:32	16:05	
14	05:12		06:01		06:56			07:50	07:49	08:36	
	21:51		20:59		19:47			18:34	16:31	16:05	
15	05:13		06:03		06:58			07:52	07:51	08:37	
	21:50		20:57		19:44			18:31	16:29	16:05	
16	05:15		06:05		06:59			07:54	07:53	08:38	
	21:49		20:55		19:42			18:29	16:28	16:05	
17	05:16		06:06		07:01			07:56	07:55	08:39	
	21:47		20:53		19:39			18:27	16:26	16:05	
18	05:17		06:08		07:03			07:57	07:57	08:39	
	21:46		20:51		19:37			18:24	16:25	16:05	
19	05:19		06:10		07:05			07:59	07:59	08:40	
	21:45		20:48		19:34			18:22	16:23	16:05	
20	05:20		06:12		07:07			08:01	08:01	08:41	
	21:44		20:46		19:32			18:20	16:22	16:06	
21	05:21		06:14		07:08			08:03	08:02	08:41	
	21:42		20:44		19:29			18:18	16:21	16:06	
22	05:23		06:15		07:10			08:05	08:04	08:42	
	21:41		20:42		19:27			18:15	16:19	16:07	
23	05:24		06:17		07:12			08:07	08:06	08:42	
	21:39		20:39		19:24			18:13	16:18	16:07	
24	05:26		06:19		07:14			08:09	08:08	08:43	
	21:38		20:37		19:22			18:11	16:17	16:08	
25	05:28		06:21		07:15			07:11	08:09	08:43	
	21:36		20:35		19:19			17:09	16:16	16:08	
26	05:29		06:22		07:17			07:13	08:11	08:43	
	21:35		20:32		19:17			17:07	16:15	16:09	
27	05:31		06:24		07:19			07:15	08:13	08:44	
	21:33		20:30		19:15			17:05	16:14	16:10	
28	05:32		06:26	07:08 (5)	07:21			07:17	08:14	08:44	
	21:32		20:28	11	07:19 (5)	19:12		17:02	16:13	16:11	
29	05:34		06:28	07:05 (5)	07:23			07:19	08:16	08:44	
	21:30		20:25	16	07:21 (5)	19:10		17:00	16:12	16:12	
30	05:35		06:29	07:03 (5)	07:24			07:20	08:18	08:44	
	21:28		20:23	19	07:22 (5)	19:07		16:58	16:11	16:13	
31	05:37		06:31	07:02 (5)				07:22		08:44	
	21:27		20:21	22	07:24 (5)			16:56		16:14	
Potential sun hours	512		460		382			328	259	233	
Total, worst case	5		128		156						
Sun reduction	0.32		0.34		0.32						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.66		0.67		0.67						
Total reduction	0.21		0.23		0.22						
Total, real	1		29		34						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KH - H294

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		07:25 (5)	05:52		06:18 (4)	05:03		05:34 (3)
	16:15	17:06	18:02						20:00	9	07:34 (5)	20:55	6	06:24 (4)	21:45	11	05:45 (3)
2	08:44	08:12	07:14						06:59		07:23 (5)	05:50		06:16 (4)	05:02		05:33 (3)
	16:16	17:08	18:04						20:02	11	07:34 (5)	20:57	7	06:23 (4)	21:47	12	05:45 (3)
3	08:44	08:10	07:12						06:56		07:20 (5)	05:48		06:14 (4)	05:01		05:32 (3)
	16:17	17:10	18:06						20:04	14	07:34 (5)	20:59	8	06:22 (4)	21:48	13	05:45 (3)
4	08:43	08:09	07:09						06:54		07:18 (5)	05:46		06:12 (4)	05:00		05:31 (3)
	16:18	17:12	18:08						20:06	16	07:34 (5)	21:01	8	06:20 (4)	21:49	14	05:45 (3)
5	08:43	08:07	07:07						06:52		07:15 (5)	05:44		06:14 (4)	04:59		05:31 (3)
	16:20	17:14	18:10						20:08	17	07:32 (5)	21:03	2	06:16 (4)	21:50	15	05:46 (3)
6	08:43	08:05	07:05						06:49		07:13 (5)	05:42			04:59		05:30 (3)
	16:21	17:16	18:11						20:09	19	07:32 (5)	21:04			21:51	15	05:45 (3)
7	08:42	08:03	07:02						06:47		07:11 (5)	05:40			04:58		05:30 (3)
	16:22	17:18	18:13						20:11	20	07:31 (5)	21:06			21:52	16	05:46 (3)
8	08:42	08:01	07:00						06:44		07:10 (5)	05:38			04:57		05:29 (3)
	16:24	17:20	18:15						20:13	20	07:30 (5)	21:08			21:53	17	05:46 (3)
9	08:41	07:59	06:57						06:42		07:11 (5)	05:36			04:57		05:29 (3)
	16:25	17:22	18:17						20:15	17	07:28 (5)	21:10			21:54	17	05:46 (3)
10	08:40	07:57	06:55						06:40		07:12 (5)	05:35			04:56		05:28 (3)
	16:27	17:24	18:19						20:17	13	07:25 (5)	21:12			21:55	18	05:46 (3)
11	08:40	07:55	06:53						06:37		07:15 (5)	05:33			04:56		05:28 (3)
	16:28	17:26	18:21						20:19	7	07:22 (5)	21:13			21:55	18	05:46 (3)
12	08:39	07:53	06:50						06:35			05:31			04:56		05:28 (3)
	16:30	17:28	18:23						20:21			21:15			21:56	18	05:46 (3)
13	08:38	07:51	06:48						06:32			05:29			04:55		05:27 (3)
	16:31	17:30	18:25						20:22			21:17			21:57	19	05:46 (3)
14	08:37	07:49	06:45						06:30			05:27			04:55		05:27 (3)
	16:33	17:32	18:27						20:24			21:18			21:58	19	05:46 (3)
15	08:36	07:47	06:43						06:28			05:26			04:55		05:27 (3)
	16:35	17:34	18:29						20:26			21:20			21:58	19	05:46 (3)
16	08:35	07:45	06:41						06:25			05:24			04:55		05:27 (3)
	16:36	17:36	18:30						20:28			21:22			21:59	19	05:46 (3)
17	08:34	07:43	06:38						06:23			05:22			04:54		05:27 (3)
	16:38	17:38	18:32						20:30			21:23			21:59	20	05:47 (3)
18	08:33	07:41	06:36						06:21			05:21			04:54		05:27 (3)
	16:40	17:40	18:34						20:32			21:25			22:00	20	05:47 (3)
19	08:32	07:39	06:33						06:19			05:19			04:54		05:27 (3)
	16:42	17:42	18:36						20:33			21:27			22:00	20	05:47 (3)
20	08:31	07:37	06:31						06:16			05:18			04:55		05:27 (3)
	16:43	17:44	18:38						20:35			21:28			22:00	20	05:47 (3)
21	08:30	07:34	06:28						06:14			05:16			04:55		05:27 (3)
	16:45	17:46	18:40						20:37			21:30			22:01	20	05:47 (3)
22	08:29	07:32	06:26						06:12			05:15			04:55		05:28 (3)
	16:47	17:48	18:42						20:39			21:31			22:01	20	05:48 (3)
23	08:27	07:30	06:23						06:09			05:13			04:55		05:28 (3)
	16:49	17:50	18:44						20:41			21:33			22:01	20	05:48 (3)
24	08:26	07:28	06:21						06:07			05:12		05:41 (3)	04:55		05:28 (3)
	16:51	17:52	18:45						20:43			21:34	1	05:42 (3)	22:01	20	05:48 (3)
25	08:25	07:25	06:18						06:05			05:11		05:40 (3)	04:56		05:29 (3)
	16:53	17:54	18:47						20:44			21:36	3	05:43 (3)	22:01	20	05:49 (3)
26	08:23	07:23	06:16						06:03			05:10		05:39 (3)	04:56		05:29 (3)
	16:54	17:56	18:49						20:46			21:37	4	05:43 (3)	22:01	19	05:48 (3)
27	08:22	07:21	06:14						06:01			05:08		05:38 (3)	04:57		05:30 (3)
	16:56	17:58	18:51						20:48			21:39	6	05:44 (3)	22:01	19	05:49 (3)
28	08:20	07:19	06:11						05:59		06:24 (4)	05:07		05:37 (3)	04:57		05:30 (3)
	16:58	18:00	18:53						20:50	2	06:26 (4)	21:40	7	05:44 (3)	22:01	19	05:49 (3)
29	08:19		07:09						05:56		06:22 (4)	05:06		05:36 (3)	04:58		05:31 (3)
	17:00		19:55						20:52	4	06:26 (4)	21:41	8	05:44 (3)	22:01	19	05:50 (3)
30	08:17		07:06						05:54		06:20 (4)	05:05		05:35 (3)	04:58		05:31 (3)
	17:02		19:56	3		07:33 (5)			20:54	5	06:25 (4)	21:43	9	05:44 (3)	22:00	18	05:49 (3)
31	08:15		07:04						07:27 (5)			05:04		05:34 (3)			
	17:04		19:58	6		07:33 (5)						21:44	10	05:44 (3)			
Potential sun hours	250	273	367						420			494			510		
Total, worst case				9					174			79			534		
Sun reduction			0.27						0.35			0.38			0.32		
Oper. time red.			1.00						1.00			1.00			1.00		
Wind dir. red.			0.68						0.68			0.66			0.66		
Total reduction			0.18						0.24			0.25			0.21		
Total, real			2						41			20			112		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KH - H294

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:32 (3)	05:39	06:33	07:14 (5)	07:26	07:24	08:19			
	22:00	18 05:50 (3)	21:25	20:18	7 07:21 (5)	19:05	16:54	16:10			
2	05:00	05:33 (3)	05:40	06:35	07:11 (5)	07:28	07:26	08:21			
	22:00	18 05:51 (3)	21:23	20:16	13 07:24 (5)	19:02	16:52	16:09			
3	05:00	05:33 (3)	05:42	06:37	07:09 (5)	07:30	07:28	08:22			
	21:59	17 05:50 (3)	21:21	20:14	17 07:26 (5)	19:00	16:50	16:09			
4	05:01	05:34 (3)	05:44	06:38	07:07 (5)	07:32	07:30	08:24			
	21:59	17 05:51 (3)	21:19	20:11	20 07:27 (5)	18:57	16:48	16:08			
5	05:02	05:35 (3)	05:46	06:40	07:07 (5)	07:33	07:32	08:25			
	21:58	16 05:51 (3)	21:17	20:09	21 07:28 (5)	18:55	16:46	16:07			
6	05:03	05:36 (3)	05:47	06:42	07:09 (5)	07:35	07:34	08:26			
	21:58	16 05:52 (3)	21:16	20:06	19 07:28 (5)	18:53	16:45	16:07			
7	05:04	05:37 (3)	05:49	06:44	07:10 (5)	07:37	07:36	08:28			
	21:57	15 05:52 (3)	21:14	20:04	18 07:28 (5)	18:50	16:43	16:06			
8	05:05	05:38 (3)	05:51	06:45	07:12 (5)	07:39	07:38	08:29			
	21:56	14 05:52 (3)	21:12	6 06:22 (4)	20:01	16 07:28 (5)	18:48	16:41	16:06		
9	05:06	05:39 (3)	05:52	06:47	07:14 (5)	07:41	07:40	08:30			
	21:55	14 05:53 (3)	21:10	8 06:30 (4)	19:59	14 07:28 (5)	18:45	16:39	16:06		
10	05:07	05:40 (3)	05:54	06:49	07:16 (5)	07:43	07:42	08:32			
	21:55	13 05:53 (3)	21:08	8 06:32 (4)	19:57	12 07:28 (5)	18:43	16:37	16:05		
11	05:08	05:41 (3)	05:56	06:51	07:17 (5)	07:44	07:44	08:33			
	21:54	12 05:53 (3)	21:06	7 06:32 (4)	19:54	9 07:26 (5)	18:41	16:36	16:05		
12	05:10	05:42 (3)	05:58	06:52	07:19 (5)	07:46	07:46	08:34			
	21:53	11 05:53 (3)	21:03	6 06:33 (4)	19:52	6 07:25 (5)	18:38	16:34	16:05		
13	05:11	05:43 (3)	05:59	06:54	07:21 (5)	07:48	07:47	08:35			
	21:52	10 05:53 (3)	21:01	5 06:34 (4)	19:49	4 07:25 (5)	18:36	16:32	16:05		
14	05:12	05:44 (3)	06:01	06:56	07:22 (5)	07:50	07:49	08:36			
	21:51	9 05:53 (3)	20:59	3 06:33 (4)	19:47		18:34	16:31	16:05		
15	05:13	05:45 (3)	06:03	06:58	07:23 (5)	07:52	07:51	08:37			
	21:50	8 05:53 (3)	20:57	2 06:34 (4)	19:44		18:31	16:29	16:05		
16	05:15	05:47 (3)	06:05	06:59	07:24 (5)	07:54	07:53	08:38			
	21:49	6 05:53 (3)	20:55	19:42		18:29	16:28	16:05			
17	05:16	05:48 (3)	06:06	07:01	07:25 (5)	07:56	07:55	08:39			
	21:47	5 05:53 (3)	20:53	19:39		18:27	16:26	16:05			
18	05:17	05:49 (3)	06:08	07:03	07:26 (5)	07:57	07:57	08:39			
	21:46	4 05:53 (3)	20:51	19:37		18:24	16:25	16:05			
19	05:19	05:50 (3)	06:10	07:05	07:27 (5)	07:59	07:59	08:40			
	21:45	2 05:52 (3)	20:48	19:34		18:22	16:23	16:05			
20	05:20		06:12	07:07	07:28 (5)	08:01	08:01	08:41			
	21:44		20:46	19:32		18:20	16:22	16:06			
21	05:21		06:14	07:08	07:29 (5)	08:03	08:02	08:41			
	21:42		20:44	19:29		18:18	16:21	16:06			
22	05:23		06:15	07:10	07:30 (5)	08:05	08:04	08:42			
	21:41		20:42	19:27		18:15	16:19	16:07			
23	05:24		06:17	07:12	07:31 (5)	08:07	08:06	08:42			
	21:39		20:39	19:24		18:13	16:18	16:07			
24	05:26		06:19	07:14	07:32 (5)	08:09	08:08	08:43			
	21:38		20:37	19:22		18:11	16:17	16:08			
25	05:28		06:21	07:15	07:33 (5)	07:11	08:09	08:43			
	21:36		20:35	19:19		17:09	16:16	16:08			
26	05:29		06:22	07:17	07:34 (5)	07:13	08:11	08:43			
	21:35		20:33	19:17		17:07	16:15	16:09			
27	05:31		06:24	07:19	07:35 (5)	07:15	08:13	08:44			
	21:33		20:30	19:15		17:05	16:14	16:10			
28	05:32		06:26	07:21	07:36 (5)	07:17	08:14	08:44			
	21:32		20:28	19:12		17:02	16:13	16:11			
29	05:34		06:28	07:23	07:37 (5)	07:19	08:16	08:44			
	21:30		20:25	19:10		17:00	16:12	16:12			
30	05:35		06:29	07:24	07:38 (5)	07:20	08:18	08:44			
	21:28		20:23	19:07		16:58	16:11	16:13			
31	05:37		06:31			07:22		08:44			
	21:27		20:21			16:56		16:14			
Potential sun hours	512		460	382		328	259	233			
Total, worst case		225	45	176							
Sun reduction		0.32	0.34	0.32							
Oper. time red.		1.00	1.00	1.00							
Wind dir. red.		0.66	0.67	0.68							
Total reduction		0.21	0.23	0.22							
Total, real		48	10	38							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KI - H295

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	16:15	08:14	17:06	18:02	07:16	18:02	18:02	07:01	20:00	8	07:25 (5)	05:52	20:55	05:03	05:34 (3)	
2	08:44	16:16	08:12	17:08	18:04	07:14	18:04	18:04	06:59	20:02	11	07:33 (5)	05:50	20:57	05:02	05:33 (3)	
3	08:44	16:17	08:10	17:10	18:06	07:12	18:06	18:06	06:56	20:04	13	07:34 (5)	05:48	20:59	05:01	05:32 (3)	
4	08:43	16:18	08:09	17:12	18:08	07:09	18:08	18:08	06:54	20:06	15	07:33 (5)	05:46	21:01	05:00	05:31 (3)	
5	08:43	16:20	08:07	17:14	18:10	07:07	18:10	18:10	06:52	20:08	16	07:31 (5)	05:44	21:03	04:59	05:31 (3)	
6	08:43	16:21	08:05	17:16	18:11	07:05	18:11	18:11	06:49	20:09	18	07:31 (5)	05:42	21:04	04:59	05:30 (3)	
7	08:42	16:22	08:03	17:18	18:13	07:02	18:13	18:13	06:47	20:11	18	07:30 (5)	05:40	21:06	04:58	05:30 (3)	
8	08:42	16:24	08:01	17:20	18:15	07:00	18:15	18:15	06:44	20:13	15	07:27 (5)	05:38	21:08	04:57	05:30 (3)	
9	08:41	16:25	07:59	17:22	18:17	06:57	18:17	18:17	06:42	20:15	11	07:25 (5)	05:36	21:10	04:57	05:31 (3)	
10	08:40	16:27	07:57	17:24	18:19	06:55	18:19	18:19	06:40	20:17			05:35	21:12	04:56	05:31 (3)	
11	08:40	16:28	07:55	17:26	18:21	06:53	18:21	18:21	06:37	20:19			05:33	21:13	04:56	05:32 (3)	
12	08:39	16:30	07:53	17:28	18:23	06:50	18:23	18:23	06:35	20:21			05:31	21:15	04:56	05:33 (3)	
13	08:38	16:31	07:51	17:30	18:25	06:48	18:25	18:25	06:32	20:22			05:29	21:17	04:55	05:33 (3)	
14	08:37	16:33	07:49	17:32	18:27	06:45	18:27	18:27	06:30	20:24			05:27	21:18	04:55	05:34 (3)	
15	08:36	16:35	07:47	17:34	18:29	06:43	18:29	18:29	06:28	20:26			05:26	21:20	04:55	05:34 (3)	
16	08:35	16:36	07:45	17:36	18:30	06:41	18:30	18:30	06:25	20:28			05:24	21:22	04:55	05:35 (3)	
17	08:34	16:38	07:43	17:38	18:32	06:38	18:32	18:32	06:23	20:30			05:22	21:23	04:54	05:35 (3)	
18	08:33	16:40	07:41	17:40	18:34	06:36	18:34	18:34	06:21	20:32			05:21	21:25	04:54	05:36 (3)	
19	08:32	16:42	07:39	17:42	18:36	06:33	18:36	18:36	06:19	20:33			05:19	21:27	04:54	05:36 (3)	
20	08:31	16:43	07:37	17:44	18:38	06:31	18:38	18:38	06:16	20:35			05:18	21:28	04:55	05:37 (3)	
21	08:30	16:45	07:34	17:46	18:40	06:28	18:40	18:40	06:14	20:37			05:16	21:30	04:55	05:37 (3)	
22	08:29	16:47	07:32	17:48	18:42	06:26	18:42	18:42	06:12	20:39			05:15	21:31	04:55	05:37 (3)	
23	08:27	16:49	07:30	17:50	18:44	06:23	18:44	18:44	06:09	20:41			05:13	21:33	04:55	05:37 (3)	
24	08:26	16:51	07:28	17:52	18:45	06:21	18:45	18:45	06:07	20:43			05:12	21:34	04:55	05:37 (3)	
25	08:25	16:53	07:25	17:54	18:47	06:18	18:47	18:47	06:05	20:44			05:11	21:36	04:56	05:37 (3)	
26	08:23	16:54	07:23	17:56	18:49	06:16	18:49	18:49	06:03	20:46			05:10	21:37	04:56	05:37 (3)	
27	08:22	16:56	07:21	17:58	18:51	06:14	18:51	18:51	06:01	20:48			05:08	21:39	04:57	05:37 (3)	
28	08:20	16:58	07:19	18:00	18:53	06:11	18:53	18:53	05:59	20:50			05:07	21:40	04:57	05:37 (3)	
29	08:19	17:00			19:55	07:09			05:56	20:52			05:06	21:41	04:58	05:37 (3)	
30	08:17	17:02			19:56	07:06			05:54	20:54			05:05	21:43	04:58	05:36 (3)	
31	08:15	17:04			19:58	07:04			05:54	20:54			05:04	21:44	04:59	05:36 (3)	
Potential sun hours	250	273	367			420			494				510				
Total, worst case						9			125				115			427	
Sun reduction						0.27			0.35				0.38			0.32	
Oper. time red.						1.00			1.00				1.00			1.00	
Wind dir. red.						0.68			0.68				0.66			0.66	
Total reduction						0.18			0.24				0.25			0.21	
Total, real						2			30				29			89	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KI - H295

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00 15	05:37 (3) 05:52 (3) 21:25	05:39 21:25 20:18	06:33 20:18	07:26 19:05 16:54	08:19 16:10
2	05:00 22:00 16	05:37 (3) 05:53 (3) 21:23	05:40 21:23 20:16	06:35 20:16	07:28 19:02 16:52	08:21 16:09
3	05:00 21:59 17	05:36 (3) 05:53 (3) 21:21	05:42 21:21 20:14	06:37 20:14	07:30 19:00 16:50	08:22 16:09
4	05:01 21:59 17	05:36 (3) 05:53 (3) 21:19	05:44 21:19 20:11	06:38 20:11	07:32 18:57 16:48	08:24 16:08
5	05:02 21:58 18	05:36 (3) 05:54 (3) 21:17	05:46 21:17 20:09	06:40 20:09	07:33 18:55 16:46	08:25 16:07
6	05:03 21:58 19	05:36 (3) 05:55 (3) 21:16	05:47 21:16 20:06	06:42 20:06	07:35 18:53 16:45	08:26 16:07
7	05:04 21:57 18	05:37 (3) 05:55 (3) 21:14	05:49 21:14 20:04	06:44 20:04	07:37 18:50 16:43	08:28 16:06
8	05:05 21:56 18	05:38 (3) 05:56 (3) 21:12	05:51 21:12 20:01	06:45 20:01	07:39 18:48 16:41	08:29 16:06
9	05:06 21:55 17	05:39 (3) 05:56 (3) 21:10	05:52 21:10 19:59	06:47 19:59	07:41 18:45 16:39	08:30 16:06
10	05:07 21:55 17	05:40 (3) 05:57 (3) 21:08	05:54 21:08 19:57	06:49 19:57	07:43 18:43 16:37	08:32 16:05
11	05:08 21:54 16	05:41 (3) 05:57 (3) 21:06	05:56 21:06 19:54	06:51 19:54	07:44 18:41 16:36	08:33 16:05
12	05:10 21:53 16	05:42 (3) 05:58 (3) 21:04	05:58 21:04 19:52	06:52 19:52	07:46 18:38 16:34	08:34 16:05
13	05:11 21:52 15	05:43 (3) 05:58 (3) 21:01	05:59 21:01 19:49	06:54 19:49	07:48 18:36 16:32	08:35 16:05
14	05:12 21:51 14	05:44 (3) 05:58 (3) 20:59	06:01 20:59 19:47	06:56 19:47	07:50 18:34 16:31	08:36 16:05
15	05:13 21:50 13	05:45 (3) 05:58 (3) 20:57	06:03 20:57 19:44	06:58 19:44	07:52 18:31 16:29	08:37 16:05
16	05:15 21:49 12	05:47 (3) 05:59 (3) 20:55	06:05 20:55 19:42	06:59 19:42	07:54 18:29 16:28	08:38 16:05
17	05:16 21:47 11	05:48 (3) 05:59 (3) 20:53	06:06 20:53 19:39	07:01 19:39	07:56 18:27 16:26	08:39 16:05
18	05:17 21:46 10	05:49 (3) 05:59 (3) 20:51	06:08 20:51 19:37	07:03 19:37	07:57 18:24 16:25	08:39 16:05
19	05:19 21:45 9	05:51 (3) 06:00 (3) 20:48	07:05 20:48 19:34	07:05 19:34	07:59 18:22 16:23	08:40 16:05
20	05:20 21:44 8	05:52 (3) 06:00 (3) 20:46	07:07 20:46 19:32	07:07 19:32	08:01 18:20 16:22	08:41 16:06
21	05:21 21:42 6	05:53 (3) 05:59 (3) 20:44	07:08 20:44 19:29	07:08 19:29	08:03 18:18 16:21	08:41 16:06
22	05:23 21:41 5	05:55 (3) 06:00 (3) 20:42	07:10 20:42 19:27	07:10 19:27	08:05 18:15 16:19	08:42 16:07
23	05:24 21:39 3	05:56 (3) 05:59 (3) 20:39	07:12 20:39 19:24	07:12 19:24	08:07 18:13 16:18	08:42 16:07
24	05:26 21:38 2	05:57 (3) 05:59 (3) 20:37	07:14 20:37 19:22	07:14 19:22	08:09 18:11 16:17	08:43 16:08
25	05:28 21:36 1	06:21 20:35 19:19	07:15 19:19	07:15 19:19	07:11 17:09 16:16	08:43 16:08
26	05:29 21:35 1	06:22 20:33 19:17	07:17 19:17	07:17 19:17	07:13 17:07 16:15	08:43 16:09
27	05:31 21:33 1	06:24 20:30 19:15	07:19 19:15	07:19 19:15	07:15 17:05 16:14	08:44 16:10
28	05:32 21:32 1	06:26 20:28 19:12	07:21 19:12	07:21 19:12	07:17 17:02 16:13	08:44 16:11
29	05:34 21:30 1	06:28 20:25 19:10	07:23 19:10	07:23 19:10	07:19 17:00 16:12	08:44 16:12
30	05:35 21:28 1	06:29 20:23 19:07	07:24 19:07	07:24 19:07	07:20 16:58 16:11	08:44 16:13
31	05:37 21:27 1	06:31 20:21 19:05	07:26 19:05	07:26 19:05	07:22 16:56 16:10	08:44 16:14
Potential sun hours	512	460	382	328	259	233
Total, worst case	312		137			
Sun reduction	0.32		0.32			
Oper. time red.	1.00		1.00			
Wind dir. red.	0.66		0.68			
Total reduction	0.21		0.22			
Total, real	66		30			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: KJ - H296

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:09 (1)	06:33	07:26	07:24	08:19	
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	4 06:13 (1)	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:41	06:11 (1)	06:35	07:28	07:26	08:21	
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	2 06:13 (1)	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48	05:01	05:01	05:42		06:37	07:30	07:28	08:22	
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21		20:14	19:00	16:50	16:09	
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44		06:38	07:32	07:30	08:24	
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19		20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44	05:00	05:02	05:46		06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18		20:09	18:55	16:47	16:07	
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47		06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:09	21:05	21:51	21:58	21:16		20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49		06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14		20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51		06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12		20:02	18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	05:36	04:57	05:06	05:52		06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10		19:59	18:45	16:39	16:06	
10	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54		06:49	07:43	07:42	08:32	
	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08		19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33	06:00 (1)	04:56	05:56		06:51	07:44	07:44	08:33	
	16:28	17:26	18:21	20:19	21:13	3 06:03 (1)	21:56	21:06		19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31	05:58 (1)	04:56	05:58		06:52	07:46	07:46	08:34	
	16:30	17:28	18:23	20:21	21:15	5 06:03 (1)	21:56	21:04		19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:33	05:29	05:57 (1)	04:55	05:59		06:54	07:48	07:48	08:35	
	16:31	17:30	18:25	20:22	21:17	6 06:03 (1)	21:57	21:52		19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27	05:55 (1)	04:55	05:12		06:01	06:56	07:50	08:36	
	16:33	17:32	18:27	20:24	21:19	8 06:03 (1)	21:58	21:51		19:47	18:34	16:31	16:05	
15	08:37	07:47	06:43	06:28	05:26	05:54 (1)	04:55	05:13		06:03	06:58	07:52	08:37	
	16:35	17:34	18:29	20:26	21:20	10 06:04 (1)	21:58	21:50		20:57	19:44	18:31	16:29	16:05
16	08:36	07:45	06:41	06:25	05:24	05:52 (1)	04:55	05:15		06:05	07:00	07:54	08:38	
	16:36	17:36	18:31	20:28	21:22	11 06:03 (1)	21:59	21:49		20:55	19:42	18:29	16:28	16:05
17	08:35	07:43	06:38	06:23	05:22	05:51 (1)	04:55	05:16	06:02 (1)	06:07	07:01	07:56	07:55	08:39
	16:38	17:38	18:32	20:30	21:24	12 06:03 (1)	21:59	21:48	2 06:04 (1)	20:53	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21	05:49 (1)	04:54	05:17	05:59 (1)	06:08	07:03	07:58	07:57	08:39
	16:40	17:40	18:34	20:32	21:25	14 06:03 (1)	22:00	21:46	8 06:07 (1)	20:51	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:19	05:19	05:48 (1)	04:54	05:19	05:58 (1)	06:10	07:05	07:59	07:59	08:40
	16:42	17:42	18:36	20:34	21:27	15 06:03 (1)	22:00	21:45	11 06:09 (1)	20:49	19:34	18:22	16:23	16:06
20	08:31	07:37	06:31	06:16	05:18	05:46 (1)	04:55	05:20	05:57 (1)	06:12	07:07	08:01	08:01	08:41
	16:43	17:44	18:38	20:35	21:28	16 06:02 (1)	22:00	21:44	13 06:10 (1)	20:46	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	05:45 (1)	04:55	05:22	05:56 (1)	06:14	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30	17 06:02 (1)	22:01	21:42	14 06:10 (1)	20:44	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	05:46 (1)	04:55	05:23	05:56 (1)	06:15	07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	21:31	15 06:01 (1)	22:01	21:41	16 06:12 (1)	20:42	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13	05:47 (1)	04:55	05:24	05:56 (1)	06:17	07:12	08:07	08:06	08:42
	16:49	17:50	18:44	20:41	21:33	14 06:01 (1)	22:01	21:40	16 06:12 (1)	20:39	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	05:47 (1)	04:55	05:26	05:57 (1)	06:19	07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	21:35	12 05:59 (1)	22:01	21:38	15 06:12 (1)	20:37	19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11	05:49 (1)	04:56	05:28	05:59 (1)	06:21	07:15	07:11	08:09	08:43
	16:53	17:54	18:47	20:45	21:36	9 05:58 (1)	22:01	21:37	14 06:13 (1)	20:35	19:20	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:10	05:51 (1)	04:56	05:29	06:00 (1)	06:22	07:17	07:13	08:11	08:44
	16:55	17:56	18:49	20:46	21:37	5 05:56 (1)	22:01	21:35	13 06:13 (1)	20:33	19:17	17:07	16:15	16:09
27	08:22	07:21	06:14	06:01	05:08		04:57	05:31	06:02 (1)	06:24	07:19	07:15	08:13	08:44
	16:56	17:58	18:51	20:48	21:39		22:01	21:33	12 06:14 (1)	20:30	19:15	17:05	16:14	16:10
28	08:20	07:19	06:11	05:59	05:07		04:57	05:32	06:03 (1)	06:26	07:21	07:17	08:15	08:44
	16:58	18:00	18:53	20:50	21:40		22:01	21:32	11 06:14 (1)	20:28	19:12	17:02	16:13	16:11
29	08:19		07:09	05:56	05:06		04:58	05:34	06:05 (1)	06:28	07:23	07:19	08:16	08:44
	17:00		19:55	20:52	21:42		22:01	21:30	9 06:14 (1)	20:26	19:10	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05		04:58	05:36	06:06 (1)	06:30	07:24	07:21	08:18	08:44
	17:02		19:57	20:54	21:43		22:00	21:28	7 06:13 (1)	20:23		16:58	16:11	16:13
31	08:15		07:04		05:04			05:37	06:08 (1)	06:31		07:22		08:44
	17:04		19:58		21:44			21:27	6 06:14 (1)	20:21		16:56		16:14
Potential sun hours	250	273	367	420	494	510	512	460			382	328	259	233
Total, worst case					172			167		6				
Sun reduction					0.38			0.32		0.34				
Oper. time red.					1.00			1.00		1.00				
Wind dir. red.					0.66			0.66		0.66				
Total reduction					0.25			0.21		0.23				
Total, real					43			36		1				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: KK - H297

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		January	February	March	April	May		June	July		August		September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52			05:03	04:59		05:39	14	06:09 (1)	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56			21:45	22:00		21:25		06:23 (1)	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50			05:02	05:00		05:41		06:11 (1)	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57			21:47	22:00		21:23	12	06:23 (1)	20:16	19:02	16:52	16:09
3	08:44	08:10	07:12	06:57	05:48			05:01	05:01		05:42		06:12 (1)	06:37	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59			21:48	21:59		21:21	11	06:23 (1)	20:14	19:00	16:50	16:09
4	08:43	08:09	07:09	06:54	05:46			05:00	05:01		05:44		06:14 (1)	06:38	07:32	07:30	08:24
	16:18	17:12	18:08	20:06	21:01			21:49	21:59		21:19	9	06:23 (1)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:52	05:44			04:59	05:02		05:46		06:16 (1)	06:40	07:33	07:32	08:25
	16:20	17:14	18:10	20:08	21:03			21:50	21:58		21:18	7	06:23 (1)	20:09	18:55	16:47	16:07
6	08:43	08:05	07:05	06:49	05:42		06:09 (1)	04:59	05:03		05:47		06:17 (1)	06:42	07:35	07:34	08:27
	16:21	17:16	18:12	20:09	21:05	3	06:12 (1)	21:51	21:58		21:16	4	06:21 (1)	20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40			06:07 (1)	04:58		05:49		06:19 (1)	06:44	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	5	06:12 (1)	21:52	21:57		21:14	2	06:21 (1)	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38			06:05 (1)	04:57		05:51		06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	7	06:12 (1)	21:53	21:56		21:12		20:01	18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	05:36			06:03 (1)	04:57		05:52		06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	9	06:12 (1)	21:54	21:56		21:10		19:59	18:45	16:39	16:06	
10	08:41	07:57	06:55	06:40	05:35			06:02 (1)	04:56		05:54		06:49	07:43	07:42	08:32	
	16:27	17:24	18:19	20:17	21:12	11	06:13 (1)	21:55	21:55		21:08		19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33			06:00 (1)	04:56		05:56		06:51	07:44	07:44	08:33	
	16:28	17:26	18:21	20:19	21:13	13	06:13 (1)	21:56	21:54		21:06		19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		05:58 (1)	04:56	05:10		05:58		06:52	07:46	07:46	08:34	
	16:30	17:28	18:23	20:21	21:15	15	06:13 (1)	21:56	21:53		21:04		19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:33	05:29		05:57 (1)	04:55	05:11		05:59		06:54	07:48	07:48	08:35	
	16:31	17:30	18:25	20:22	21:17	16	06:13 (1)	21:57	21:52		21:01		19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		05:55 (1)	04:55	05:12		06:01		06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:19	17	06:12 (1)	21:58	21:51		20:59		19:47	18:34	16:31	16:05	
15	08:37	07:47	06:43	06:28	05:26		05:54 (1)	04:55	05:13		06:03		06:58	07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	21:20	19	06:13 (1)	21:58	21:50		20:57		19:44	18:31	16:29	16:05	
16	08:36	07:45	06:41	06:25	05:24		05:52 (1)	04:55	05:15		06:05		07:00	07:54	07:53	08:38	
	16:36	17:36	18:31	20:28	21:22	20	06:12 (1)	21:59	21:49		20:55		19:42	18:29	16:28	16:05	
17	08:35	07:43	06:38	06:23	05:22		05:53 (1)	04:54	05:16		06:06		07:01	07:56	07:55	08:39	
	16:38	17:38	18:32	20:30	21:24	19	06:12 (1)	21:59	21:48		20:53		19:39	18:27	16:26	16:05	
18	08:33	07:41	06:36	06:21	05:21		05:54 (1)	04:54	05:17		06:08		07:03	07:58	07:57	08:39	
	16:40	17:40	18:34	20:32	21:25	16	06:10 (1)	22:00	21:46		20:51		19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:19	05:19		05:55 (1)	04:54	05:19		06:10		07:05	07:59	07:59	08:40	
	16:42	17:42	18:36	20:34	21:27	15	06:10 (1)	22:00	21:45		20:49		19:34	18:22	16:23	16:05	
20	08:31	07:37	06:31	06:16	05:18		05:55 (1)	04:55	05:20		06:12		07:07	08:01	08:01	08:41	
	16:43	17:44	18:38	20:35	21:28	13	06:08 (1)	22:00	21:44		20:46		19:32	18:20	16:22	16:06	
21	08:30	07:34	06:28	06:14	05:16		05:57 (1)	04:55	05:22		06:10 (1)		07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	21:30	11	06:08 (1)	22:01	21:42	4	06:14 (1)		19:29	18:18	16:21	16:06	
22	08:29	07:32	06:26	06:12	05:15		05:59 (1)	04:55	05:23		06:08 (1)		07:10	08:05	08:04	08:42	
	16:47	17:48	18:42	20:39	21:31	7	06:06 (1)	22:01	21:41	9	06:17 (1)		19:27	18:15	16:19	16:07	
23	08:27	07:30	06:23	06:10	05:13		04:55	05:24	05:24		06:07 (1)		07:12	08:07	08:06	08:42	
	16:49	17:50	18:44	20:41	21:33		22:01	21:40	21:40	12	06:19 (1)		19:24	18:13	16:18	16:07	
24	08:26	07:28	06:21	06:07	05:12		04:55	05:26	05:26		06:05 (1)		07:14	08:09	08:08	08:43	
	16:51	17:52	18:45	20:43	21:35		22:01	21:38	21:38	14	06:19 (1)		19:22	18:11	16:17	16:08	
25	08:25	07:26	06:19	06:05	05:11		04:56	05:28	05:28		06:05 (1)		07:15	07:11	08:09	08:43	
	16:53	17:54	18:47	20:45	21:36		22:01	21:37	21:37	16	06:21 (1)		19:20	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:10		04:56	05:29	05:29		06:04 (1)		07:17	07:13	08:11	08:44	
	16:55	17:56	18:49	20:46	21:37		22:01	21:35	21:35	17	06:21 (1)		19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08		04:57	05:31	05:31		06:04 (1)		07:19	07:15	08:13	08:44	
	16:56	17:58	18:51	20:48	21:39		22:01	21:33	21:33	18	06:22 (1)		19:15	17:05	16:14	16:10	
28	08:20	07:19	06:11	05:59	05:07		04:57	05:32	05:32		06:03 (1)		07:21	07:17	08:15	08:44	
	16:58	18:00	18:53	20:50	21:40		22:01	21:32	21:32	19	06:22 (1)		19:12	17:02	16:13	16:11	
29	08:19		07:09	05:56	05:06		04:58	05:34	05:34		06:05 (1)		07:23	07:19	08:16	08:44	
	17:00		19:55	20:52	21:42		22:01	21:30	21:30	18	06:23 (1)		19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05		04:58	05:36	05:36		06:06 (1)		07:24	07:21	08:18	08:44	
	17:02		19:57	20:54	21:43		22:00	21:28	21:28	17	06:23 (1)		19:07	16:58	16:11	16:13	
31	08:15		07:04	05:04	05:04			05:37	05:37		06:08 (1)			07:22	08:14	08:44	
	17:04		19:58	21:44	21:44			21:27	21:27	16	06:24 (1)			16:56		16:14	
Potential sun hours	250	273	367	420	494			510			460		382	328	259	233	
Total, worst case					216				160		59						
Sun reduction					0.38				0.32		0.34						
Oper. time red.					1.00				1.00		1.00						
Wind dir. red.					0.67				0.67		0.67						
Total reduction					0.25				0.22		0.23						
Total, real					55				35		13						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: KL - H298

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:09 (1)	06:33	07:26	07:24	08:19		
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20	06:29 (1)	20:18	19:05	16:54	16:10	
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:41	06:11 (1)	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	18	06:29 (1)	20:16	19:02	16:52	16:09	
3	08:44	08:10	07:12	06:57	05:48	05:01	05:01	05:42	06:12 (1)	06:37	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	17	06:29 (1)	20:14	19:00	16:50	16:09	
4	08:43	08:09	07:09	06:54	05:46	06:12 (1)	05:00	05:44	06:14 (1)	06:38	07:32	07:30	08:24		
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	15	06:29 (1)	20:11	18:57	16:48	16:08	
5	08:43	08:07	07:07	06:52	05:44	06:10 (1)	04:59	05:02	05:46	06:16 (1)	06:40	07:33	07:32	08:25	
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	14	06:30 (1)	20:09	18:55	16:47	16:07	
6	08:43	08:05	07:05	06:49	05:42	06:09 (1)	04:59	05:03	05:47	06:17 (1)	06:42	07:35	07:34	08:27	
	16:21	17:16	18:12	20:09	21:05	21:51	21:58	21:16	12	06:29 (1)	20:06	18:53	16:45	16:07	
7	08:42	08:03	07:02	06:47	05:40	06:07 (1)	04:58	05:04	05:49	06:19 (1)	06:44	07:37	07:36	08:28	
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	10	06:29 (1)	20:04	18:50	16:43	16:06	
8	08:42	08:01	07:00	06:44	05:38	06:05 (1)	04:57	05:05	05:51	06:20 (1)	06:45	07:39	07:38	08:29	
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	7	06:27 (1)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	05:36	06:03 (1)	04:57	05:06	05:52	06:22 (1)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	5	06:27 (1)	19:59	18:45	16:39	16:06	
10	08:41	07:57	06:55	06:40	05:35	06:02 (1)	04:56	05:07	05:54	06:24 (1)	06:49	07:43	07:42	08:32	
	16:27	17:24	18:19	20:17	21:12	21:55	21:55	21:08	2	06:26 (1)	19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33	06:00 (1)	04:56	05:08	05:56		06:51	07:44	07:44	08:33	
	16:28	17:26	18:21	20:19	21:13	21:56	21:54	21:06		19:54	18:41	16:36	16:05		
12	08:39	07:53	06:50	06:35	05:31	05:58 (1)	04:56	05:10	05:58		06:52	07:46	07:46	08:34	
	16:30	17:28	18:23	20:21	21:15	21:56	21:53	21:04		19:52	18:38	16:34	16:05		
13	08:38	07:51	06:48	06:33	05:29	05:58 (1)	04:55	05:11	05:59		06:54	07:48	07:48	08:35	
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:01		19:49	18:36	16:32	16:05		
14	08:37	07:49	06:45	06:30	05:27	05:59 (1)	04:55	05:12	06:01		06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:19	21:58	21:51	20:59		19:47	18:34	16:31	16:05		
15	08:37	07:47	06:43	06:28	05:26	06:00 (1)	04:55	05:13	06:03		06:58	07:52	07:51	08:37	
	16:35	17:34	18:29	20:26	21:20	21:58	21:50	20:57		19:44	18:31	16:29	16:05		
16	08:36	07:45	06:41	06:25	05:24	06:00 (1)	04:55	05:15	06:05		07:00	07:54	07:53	08:38	
	16:36	17:36	18:31	20:28	21:22	21:59	21:49	20:55		19:42	18:29	16:28	16:05		
17	08:35	07:43	06:38	06:23	05:22	06:02 (1)	04:54	05:16	06:06		07:01	07:56	07:55	08:39	
	16:38	17:38	18:32	20:30	21:24	21:59	21:48	20:53		19:39	18:27	16:26	16:05		
18	08:33	07:41	06:36	06:21	05:21	06:02 (1)	04:54	05:17	06:08		07:03	07:58	07:57	08:39	
	16:40	17:40	18:34	20:32	21:25	22:00	21:46	20:51		19:37	18:24	16:25	16:05		
19	08:32	07:39	06:33	06:19	05:19	06:05 (1)	04:54	05:19	06:10		07:05	07:59	07:59	08:40	
	16:42	17:42	18:36	20:34	21:27	22:00	21:45	20:49		19:34	18:22	16:23	16:05		
20	08:31	07:37	06:31	06:16	05:18	06:12 (1)	04:55	05:20	06:12		07:07	08:01	08:01	08:41	
	16:43	17:44	18:38	20:35	21:28	22:00	21:44	20:46		19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16	04:55	05:22	06:14		19:30	18:18	16:21	16:06		
	16:45	17:46	18:40	20:37	21:30	22:01	21:42	20:44		19:29	18:16	16:21	16:06		
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15		19:27	18:15	16:19	16:07		
	16:47	17:48	18:42	20:39	21:31	22:01	21:41	20:42		19:27	18:15	16:19	16:07		
23	08:27	07:30	06:23	06:10	05:13	04:55	05:24	06:17		19:24	18:13	16:18	16:07		
	16:49	17:50	18:44	20:41	21:33	22:01	21:40	20:39		19:24	18:13	16:18	16:07		
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19		19:21	18:10	16:17	16:08		
	16:51	17:52	18:45	20:43	21:35	22:01	21:38	2	06:19 (1)	06:37	19:22	18:11	16:17	16:08	
25	08:25	07:26	06:19	06:05	05:11	04:56	05:28	06:21		06:14 (1)	06:21	19:15	18:09	16:17	16:08
	16:53	17:54	18:47	20:45	21:36	22:01	21:37	9	06:23 (1)	06:35	19:20	17:09	16:16	16:08	
26	08:23	07:23	06:16	06:03	05:10	04:56	05:29	06:22		06:12 (1)	06:22	19:17	17:07	16:15	16:09
	16:55	17:56	18:49	20:46	21:37	22:01	21:35	12	06:24 (1)	06:33	19:17	17:07	16:15	16:09	
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24		06:11 (1)	06:24	19:17	17:07	16:15	16:09
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	15	06:26 (1)	06:30	19:15	17:05	16:14	16:10	
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26		06:10 (1)	06:26	19:15	17:05	16:14	16:10
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	17	06:27 (1)	06:28	19:12	17:02	16:13	16:11	
29	08:19		07:09	05:56	05:06	04:58	05:34	06:28		06:10 (1)	06:28	19:12	17:02	16:13	16:11
	17:00		19:55	20:52	21:42	22:01	21:30	18	06:28 (1)	06:26	19:10	17:00	16:12	16:12	
30	08:17		07:06	05:54	05:05	04:58	05:36	06:29		06:09 (1)	06:29	19:07	16:58	16:11	16:13
	17:02		19:57	20:54	21:43	22:00	21:28	19	06:28 (1)	06:31	19:07	16:58	16:11	16:13	
31	08:15		07:04	05:54	05:04		05:37	06:29		06:09 (1)	06:31	19:07	16:58	16:11	16:13
	17:04		19:58	21:44			21:27	20	06:29 (1)	06:31	19:07	16:58	16:11	16:13	
Potential sun hours	250	273	367	420	494	510	512	460		382	328	259	233		
Total, worst case					228		112	120							
Sun reduction					0.38		0.32	0.34							
Oper. time red.					1.00		1.00	1.00							
Wind dir. red.					0.67		0.67	0.67							
Total reduction					0.26		0.22	0.23							
Total, real					58		24	27							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KM - H299

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	06:27 (1)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:56	06:45 (1)	21:45	22:00	21:25	20:18	19:05	16:54	16:10			
2	08:44	08:12	07:14	06:59	05:50	06:27 (1)	05:02	05:00	05:40	06:35	07:28	07:26	08:21			
	16:16	17:08	18:04	20:02	20:57	06:44 (1)	21:47	22:00	21:23	20:16	19:02	16:52	16:09			
3	08:44	08:10	07:12	06:57	05:48	06:29 (1)	05:01	05:00	05:42	06:37	07:30	07:28	08:22			
	16:17	17:10	18:06	20:04	20:59	06:42 (1)	21:48	21:59	21:21	20:14	19:00	16:50	16:09			
4	08:43	08:09	07:09	06:54	05:46	06:30 (1)	05:00	05:01	05:44	06:38	07:32	07:30	08:24			
	16:18	17:12	18:08	20:06	21:01	06:40 (1)	21:49	21:59	21:19	20:11	18:57	16:48	16:08			
5	08:43	08:07	07:07	06:52	05:44		04:59	05:02	05:46	06:40	07:33	07:32	08:25			
	16:20	17:14	18:10	20:08	21:03		21:50	21:58	21:18	20:09	18:55	16:47	16:07			
6	08:43	08:05	07:05	06:49	05:42		04:59	05:03	05:47	06:42	07:35	07:34	08:27			
	16:21	17:16	18:12	20:09	21:05		21:51	21:58	21:16	20:06	18:53	16:45	16:07			
7	08:42	08:03	07:02	06:47	05:40		04:58	05:04	05:49	06:44	07:37	07:36	08:28			
	16:22	17:18	18:13	20:11	21:06		21:52	21:57	21:14	20:04	18:50	16:43	16:06			
8	08:42	08:01	07:00	06:44	05:38		04:57	05:05	05:51	06:42 (1)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08		21:53	21:56	21:12	5	06:47 (1)	20:01	18:48	16:41	16:06	
9	08:41	07:59	06:58	06:42	05:36		04:57	05:06	05:52	06:39 (1)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10		21:54	21:56	21:10	11	06:50 (1)	19:59	18:45	16:39	16:06	
10	08:41	07:57	06:55	06:40	05:35		04:56	05:07	05:54	06:38 (1)	06:49	07:43	07:42	08:32		
	16:27	17:24	18:19	20:17	21:12		21:55	21:55	21:08	14	06:52 (1)	19:57	18:43	16:37	16:05	
11	08:40	07:55	06:53	06:37	05:33		04:56	05:08	05:56	06:36 (1)	06:51	07:44	07:44	08:33		
	16:28	17:26	18:21	20:19	21:13		21:56	21:54	21:06	17	06:53 (1)	19:54	18:41	16:36	16:05	
12	08:39	07:53	06:50	06:35	05:31		04:56	05:10	05:58	06:35 (1)	06:52	07:46	07:46	08:34		
	16:30	17:28	18:23	20:21	21:15		21:56	21:53	21:04	19	06:54 (1)	19:52	18:38	16:34	16:05	
13	08:38	07:51	06:48	06:33	05:29		04:55	05:11	05:59	06:34 (1)	06:54	07:48	07:48	08:35		
	16:31	17:30	18:25	20:22	21:17		21:57	21:52	21:01	21	06:55 (1)	19:49	18:36	16:32	16:05	
14	08:37	07:49	06:45	06:30	05:27		04:55	05:12	06:01	06:33 (1)	06:56	07:50	07:49	08:36		
	16:33	17:32	18:27	20:24	21:19		21:58	21:51	20:59	22	06:55 (1)	19:47	18:34	16:31	16:05	
15	08:37	07:47	06:43	06:28	05:26		04:55	05:13	06:03	06:33 (1)	06:58	07:52	07:51	08:37		
	16:35	17:34	18:29	20:26	21:20		21:58	21:50	20:57	22	06:55 (1)	19:44	18:31	16:29	16:05	
16	08:36	07:45	06:41	06:25	05:24		04:55	05:15	06:05	06:34 (1)	07:00	07:54	07:53	08:38		
	16:36	17:36	18:31	20:28	21:22		21:59	21:49	20:55	22	06:56 (1)	19:42	18:29	16:28	16:05	
17	08:35	07:43	06:38	06:23	05:22		04:54	05:16	06:06	06:35 (1)	07:01	07:56	07:55	08:39		
	16:38	17:38	18:32	20:30	21:24		21:59	21:48	20:53	20	06:55 (1)	19:39	18:27	16:26	16:05	
18	08:33	07:41	06:36	06:21	05:21		04:54	05:17	06:08	06:37 (1)	07:03	07:58	07:57	08:39		
	16:40	17:40	18:34	20:32	21:25		22:00	21:46	20:51	18	06:55 (1)	19:37	18:24	16:25	16:05	
19	08:32	07:39	06:33	06:19	05:19	06:43 (1)	21:27	04:54	05:19	06:10	06:39 (1)	07:05	07:59	07:59	08:40	
	16:42	17:42	18:36	20:34	2	06:45 (1)	21:27	22:00	21:45	20:49	16	06:55 (1)	19:34	18:22	16:23	16:05
20	08:31	07:37	06:31	06:16	05:18	06:41 (1)	21:28	04:55	05:20	06:12	06:40 (1)	07:07	08:01	08:01	08:41	
	16:43	17:44	18:38	20:35	6	06:47 (1)	21:28	22:00	21:44	20:46	14	06:54 (1)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16	06:39 (1)	21:30	04:55	05:21	06:14	06:42 (1)	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	9	06:48 (1)	21:30	22:01	21:42	20:44	11	06:53 (1)	19:29	18:18	16:21	16:06
22	08:29	07:32	06:26	06:12	05:15	06:36 (1)	21:32	04:55	05:23	06:15	06:44 (1)	07:10	08:05	08:04	08:42	
	16:47	17:48	18:42	20:39	11	06:47 (1)	21:32	22:01	21:41	20:42	8	06:52 (1)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:10	05:13	06:34 (1)	21:33	04:55	05:24	06:17	06:45 (1)	07:12	08:07	08:06	08:42	
	16:49	17:50	18:44	20:41	14	06:48 (1)	21:33	22:01	21:40	20:39	5	06:50 (1)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12	06:32 (1)	21:35	04:55	05:26	06:19	06:47 (1)	07:14	08:09	08:08	08:43	
	16:51	17:52	18:45	20:43	16	06:48 (1)	21:35	22:01	21:38	20:37	2	06:49 (1)	19:22	18:11	16:17	16:08
25	08:25	07:26	06:19	06:05	05:11	06:30 (1)	21:36	04:56	05:28	06:21	07:15	07:11	08:09	08:09	08:43	
	16:53	17:54	18:47	20:45	18	06:48 (1)	21:36	22:01	21:37	20:35	19:20	17:09	16:16	16:08		
26	08:23	07:23	06:16	06:03	05:10	06:28 (1)	21:37	04:56	05:29	06:22	07:17	07:13	08:11	08:44		
	16:55	17:56	18:49	20:46	20	06:48 (1)	21:37	22:01	21:35	20:33	19:17	17:07	16:15	16:09		
27	08:22	07:21	06:14	06:01	05:08	06:26 (1)	21:38	04:57	05:31	06:24	07:19	07:15	08:13	08:44		
	16:56	17:58	18:51	20:48	22	06:48 (1)	21:39	22:01	21:33	20:30	19:15	17:05	16:14	16:10		
28	08:20	07:19	06:11	05:59	05:07	06:25 (1)	21:40	04:57	05:32	06:26	07:21	07:17	08:15	08:44		
	16:58	18:00	18:53	20:50	23	06:48 (1)	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16:11		
29	08:19		07:09	05:56	05:06	06:26 (1)	21:41	04:58	05:34	06:28	07:23	07:19	08:16	08:44		
	17:00		19:55	20:52	21	06:47 (1)	21:42	22:01	21:30	20:26	19:10	17:00	16:12	16:12		
30	08:17		07:06	05:54	05:05	06:26 (1)	21:43	04:58	05:36	06:29	07:24	07:21	08:18	08:44		
	17:02		19:57	20:54	20	06:46 (1)	21:43	22:01	21:28	20:23	19:07	16:58	16:11	16:13		
31	08:15		07:04		05:04				05:37	06:31		07:22		08:44		
	17:04		19:58		21:44				21:27	20:21		16:56		16:14		
Potential sun hours	250	273	367	420	494		510	512	460		382	328	259	233		
Total, worst case				182	58					247						
Sun reduction				0.35	0.38					0.34						
Oper. time red.				1.00	1.00					1.00						
Wind dir. red.				0.68	0.68					0.68						
Total reduction				0.24	0.26					0.23						
Total, real				43	15					57						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: KN - H300

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	9 06:47 (1) 06:56 (1)	07:48 19:49	07:48 18:36	08:35 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	14 06:44 (1) 06:58 (1)	07:50 19:47	07:49 18:34	08:36 16:31
15	08:37 16:35	07:47 17:34	06:43 18:29	06:28 20:26	06:52 (1) 06:53 (1)	04:55 21:20	05:13 21:50	06:03 20:57	16 06:43 (1) 06:59 (1)	07:52 19:44	07:51 18:31	08:37 16:29
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	06:50 (1) 06:55 (1)	04:55 21:22	05:15 21:59	06:05 20:55	19 06:42 (1) 07:01 (1)	07:54 19:42	07:53 18:29	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	06:47 (1) 06:55 (1)	04:54 21:24	05:16 21:59	06:06 20:53	21 06:40 (1) 07:01 (1)	07:56 19:39	07:55 18:27	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	06:45 (1) 06:56 (1)	04:54 21:25	05:17 22:00	06:08 20:51	22 06:39 (1) 07:01 (1)	07:58 19:37	07:57 18:24	08:39 16:25
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:34	06:43 (1) 06:56 (1)	04:54 21:27	05:19 22:00	06:10 21:45	23 06:39 (1) 07:02 (1)	07:59 19:34	07:59 18:22	08:40 16:23
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	06:41 (1) 06:57 (1)	04:55 21:28	05:20 22:00	06:12 20:46	21 06:40 (1) 07:01 (1)	08:01 19:32	08:01 18:20	08:41 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	06:39 (1) 06:57 (1)	04:55 21:30	05:21 22:01	06:14 20:44	19 06:42 (1) 07:01 (1)	08:03 19:29	08:02 18:18	08:41 16:21
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	06:36 (1) 06:56 (1)	04:55 21:32	05:23 22:01	06:15 20:42	18 06:44 (1) 07:02 (1)	08:05 19:27	08:04 18:15	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	06:34 (1) 06:56 (1)	04:55 21:33	05:24 22:01	06:17 20:39	15 06:45 (1) 07:00 (1)	08:07 19:24	08:06 18:13	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	06:32 (1) 06:55 (1)	04:55 21:35	05:26 22:01	06:19 20:37	13 06:47 (1) 07:00 (1)	08:09 19:22	08:08 18:11	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	06:33 (1) 06:55 (1)	04:56 21:36	05:28 22:01	06:21 20:35	11 06:49 (1) 07:00 (1)	07:11 19:20	07:11 18:09	08:43 16:16
26	08:23 16:55	07:23 17:56	06:16 18:49	06:03 20:46	06:33 (1) 06:54 (1)	04:56 21:37	05:29 22:01	06:22 20:33	8 06:50 (1) 06:58 (1)	07:13 19:17	08:11 17:07	08:44 16:15
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	06:34 (1) 06:53 (1)	04:57 21:39	05:31 22:01	06:24 20:30	5 06:52 (1) 06:54 (1)	07:19 19:15	08:13 17:05	08:44 16:14
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	06:35 (1) 06:51 (1)	04:57 21:40	05:32 22:01	06:26 20:28	1 06:55 (1) 07:23	07:17 19:12	08:15 17:02	08:44 16:11
29	08:19 17:00	07:09 17:55	06:09 18:55	05:56 20:52	06:37 (1) 06:50 (1)	04:58 21:42	05:34 22:01	06:28 20:26	19:10 07:24	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02	07:06 17:57	06:06 18:57	05:54 20:54	06:39 (1) 06:47 (1)	04:58 21:43	05:36 22:01	06:29 20:23	19:07 07:22	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04	07:04 17:58	06:04 18:58	05:54 20:58	05:04 21:44	05:04 21:27	06:31 20:21	06:23 20:21	382 328	07:22 16:56	259 233	08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				236				235				
Sun reduction				0.35				0.34				
Oper. time red.				1.00				1.00				
Wind dir. red.				0.68				0.68				
Total reduction				0.24				0.23				
Total, real				56				54				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KO - H301

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:00 (1)	07:26	07:24	08:19
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:04 (1)	07:28	07:26	08:21
3	08:44	08:10	07:12	06:57	05:48	05:01	05:00	05:42	06:37		07:30	07:28	08:22
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38		07:32	07:30	08:24
5	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:46	06:40		07:33	07:32	08:25
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42		07:35	07:34	08:27
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44		07:37	07:36	08:28
8	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45		07:39	07:38	08:29
9	08:41	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47		07:41	07:40	08:30
10	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49		07:43	07:42	08:32
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51		07:44	07:44	08:33
12	08:39	07:53	06:50	06:35	05:31	04:56	05:10	05:58	06:52		07:46	07:46	08:34
13	08:38	07:51	06:48	06:33	05:29	04:55	05:11	05:59	06:54		07:48	07:48	08:35
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56		07:50	07:49	08:36
15	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58		07:52	07:51	08:37
16	08:36	07:45	06:41	06:25	05:24	04:55	05:15	06:05	06:59		07:54	07:53	08:38
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	06:59		07:56	07:55	08:39
18	08:33	07:41	06:36	06:21	05:21	04:54	05:17	06:08	06:53 (1)	07:03	07:58	07:57	08:39
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	06:52 (1)	07:05	07:59	07:59	08:40
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	06:50 (1)	07:07	08:01	08:01	08:41
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	06:49 (1)	07:08	08:03	08:02	08:41
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	06:48 (1)	07:10	08:05	08:04	08:42
23	08:27	07:30	06:23	06:10	05:13	04:55	05:24	06:17	06:47 (1)	07:12	08:07	08:06	08:42
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	06:47 (1)	07:14	08:09	08:08	08:43
25	08:25	07:26	06:19	06:05	05:11	04:56	05:28	06:21	06:49 (1)	07:15	08:11	08:09	08:43
26	08:23	07:23	06:16	06:03	05:10	04:56	05:29	06:22	06:50 (1)	07:17	08:13	08:11	08:44
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	06:52 (1)	07:19	08:15	08:13	08:44
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	06:54 (1)	07:21	08:17	08:15	08:44
29	08:19	07:18	06:10	05:58	05:06	04:56	05:33	06:27	06:55 (1)	07:22	08:18	08:16	08:44
30	08:17	07:16	06:08	05:56	05:05	04:55	05:34	06:28	06:57 (1)	07:23	08:19	08:17	08:44
31	08:15	07:14	06:06	05:54	05:04	04:54	05:35	06:29	06:59 (1)	07:24	08:21	08:18	08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case				271					268	4			
Sun reduction				0.35					0.34	0.32			
Oper. time red.				1.00					1.00	1.00			
Wind dir. red.				0.68					0.68	0.68			
Total reduction				0.24					0.23	0.22			
Total, real				65				62		1			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** KP - H302

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April		May	June	July	August		September		October	November	December
1	08:44	08:14	07:16	07:01		05:52	05:03	04:59	05:39		06:33	07:02 (1)	07:26	07:24	08:19
	16:15	17:06	18:02	20:00		20:56	21:45	22:00	21:25		20:18	24	07:26 (1)	19:05	16:54
2	08:44	08:12	07:14	06:59		05:50	05:02	05:00	05:40		06:35		07:02 (1)	07:28	08:21
	16:16	17:08	18:04	20:02		20:57	21:47	22:00	21:23		20:16	24	07:26 (1)	19:02	16:52
3	08:44	08:10	07:12	06:57		05:48	05:01	05:00	05:42		06:37		07:04 (1)	07:30	08:22
	16:17	17:10	18:06	20:04	5	07:25 (1)	20:59	21:48	21:59		20:14	22	07:26 (1)	19:00	16:50
4	08:43	08:09	07:09	06:54		07:18 (1)	05:46	05:00	05:01		06:38		07:05 (1)	07:32	08:24
	16:18	17:12	18:08	20:06	9	07:27 (1)	21:01	21:49	21:59		20:11	20	07:25 (1)	18:57	16:48
5	08:43	08:07	07:07	06:52		07:15 (1)	05:44	04:59	05:02		06:40		07:07 (1)	07:33	08:25
	16:20	17:14	18:10	20:08	12	07:27 (1)	21:03	21:50	21:58		20:09	18	07:25 (1)	18:55	16:46
6	08:43	08:05	07:05	06:49		07:13 (1)	05:42	04:59	05:03		06:42		07:09 (1)	07:35	08:27
	16:21	17:16	18:12	20:09	15	07:28 (1)	21:05	21:51	21:58		20:06	15	07:24 (1)	18:53	16:45
7	08:42	08:03	07:02	06:47		07:11 (1)	05:40	04:58	05:04		06:44		07:10 (1)	07:37	08:28
	16:22	17:18	18:13	20:11	18	07:29 (1)	21:06	21:52	21:57		20:04	12	07:22 (1)	18:50	16:43
8	08:42	08:01	07:00	06:44		07:08 (1)	05:38	04:57	05:05		06:45		07:12 (1)	07:39	08:29
	16:24	17:20	18:15	20:13	20	07:28 (1)	21:08	21:53	21:56		20:01	9	07:21 (1)	18:48	16:41
9	08:41	07:59	06:58	06:42		07:06 (1)	05:36	04:57	05:06		06:47		07:14 (1)	07:41	08:30
	16:25	17:22	18:17	20:15	22	07:28 (1)	21:10	21:54	21:56		19:59	5	07:19 (1)	18:45	16:39
10	08:41	07:57	06:55	06:40		07:04 (1)	05:35	04:56	05:07		06:49		07:16 (1)	07:43	08:32
	16:27	17:24	18:19	20:17	24	07:28 (1)	21:12	21:55	21:58		19:57	1	07:17 (1)	18:43	16:37
11	08:40	07:55	06:53	06:37		07:03 (1)	05:33	04:56	05:08		06:51			07:44	08:33
	16:28	17:26	18:21	20:19	24	07:27 (1)	21:13	21:56	21:54		19:54			18:41	16:36
12	08:39	07:53	06:50	06:35		07:03 (1)	05:31	04:56	05:09		06:52			07:46	08:34
	16:30	17:28	18:23	20:21	24	07:27 (1)	21:15	21:56	21:53		19:52			18:38	16:34
13	08:38	07:51	06:48	06:32		07:04 (1)	05:29	04:55	05:11		06:54			07:48	08:35
	16:31	17:30	18:25	20:22	22	07:26 (1)	21:17	21:57	21:52		19:49			18:36	16:32
14	08:37	07:49	06:45	06:30		07:04 (1)	05:27	04:55	05:12		06:56			07:50	08:36
	16:33	17:32	18:27	20:24	21	07:25 (1)	21:19	21:58	21:51		19:47			18:34	16:31
15	08:37	07:47	06:43	06:28		07:05 (1)	05:26	04:55	05:13		06:58			07:52	08:37
	16:35	17:34	18:29	20:26	19	07:24 (1)	21:20	21:58	21:50		19:44			18:31	16:29
16	08:36	07:45	06:41	06:25		07:06 (1)	05:24	04:55	05:15		06:59			07:54	08:38
	16:36	17:36	18:31	20:28	16	07:22 (1)	21:22	21:59	21:49		19:42			18:29	16:28
17	08:35	07:43	06:38	06:23		07:07 (1)	05:22	04:54	05:16		07:01			07:56	08:39
	16:38	17:38	18:32	20:30	12	07:19 (1)	21:24	21:59	21:48		19:39			18:27	16:26
18	08:33	07:41	06:36	06:21		07:11 (1)	05:21	04:54	05:17		07:03			07:58	08:39
	16:40	17:40	18:34	20:32	4	07:15 (1)	21:25	22:00	21:46		19:37			18:24	16:25
19	08:32	07:39	06:33	06:19		05:19	04:54	05:19	06:10		07:05			07:59	08:40
	16:42	17:42	18:36	20:34		21:27	22:00	21:45	20:49		19:34			18:22	16:23
20	08:31	07:37	06:31	06:16		05:18	04:54	05:20	06:12		07:07			08:01	08:41
	16:43	17:44	18:38	20:35		21:28	22:00	21:44	20:46		19:32			18:20	16:22
21	08:30	07:34	06:28	06:14		05:16	04:55	05:21	06:14		07:08			08:03	08:41
	16:45	17:46	18:40	20:37		21:30	22:01	21:42	20:44		19:29			18:18	16:21
22	08:29	07:32	06:26	06:12		05:15	04:55	05:23	06:15		07:10			08:05	08:42
	16:47	17:48	18:42	20:39		21:32	22:01	21:41	20:42		19:27			18:15	16:19
23	08:27	07:30	06:23	06:10		05:13	04:55	05:24	06:17		07:12			08:07	08:42
	16:49	17:50	18:44	20:41		21:33	22:01	21:40	20:39		19:24			18:13	16:18
24	08:26	07:28	06:21	06:07		05:12	04:55	05:26	06:19		07:14			08:09	08:43
	16:51	17:52	18:45	20:43		21:35	22:01	21:38	20:37		19:22			18:11	16:17
25	08:25	07:26	06:19	06:05		05:11	04:56	05:28	06:21		07:15			07:11	08:09
	16:53	17:54	18:47	20:45		21:36	22:01	21:37	20:35	5	07:19 (1)			17:09	16:16
26	08:23	07:23	06:16	06:03		05:10	04:56	05:29	06:22		07:10 (1)			07:13	08:11
	16:54	17:56	18:49	20:46		21:37	22:01	21:35	20:33	12	07:22 (1)			17:07	16:15
27	08:22	07:21	06:14	06:01		05:08	04:57	05:31	06:24		07:08 (1)			07:15	08:13
	16:56	17:58	18:51	20:48		21:39	22:01	21:33	20:30	16	07:24 (1)			17:05	16:14
28	08:20	07:19	06:11	05:59		05:07	04:57	05:32	06:26		07:06 (1)			07:17	08:15
	16:58	18:00	18:53	20:50		21:40	22:01	21:32	20:28	20	07:26 (1)			17:02	16:13
29	08:19		07:09	05:56		05:06	04:58	05:34	06:28		07:04 (1)			07:19	08:16
	17:00		19:55	20:52		21:42	22:01	21:30	20:26	22	07:26 (1)			17:00	16:12
30	08:17		07:06	05:54		05:05	04:58	05:36	06:29		07:04 (1)			07:21	08:18
	17:02		19:57	20:54		21:43	22:01	21:28	20:23	22	07:26 (1)			16:58	16:11
31	08:15		07:04			05:04		05:37	06:31		07:03 (1)			07:22	08:44
	17:04		19:58			21:44		21:27	20:21	24	07:27 (1)			16:56	16:14
Potential sun hours	250	273	367	420		494	510	512	460		382			328	259
Total, worst case				267							150				233
Sun reduction				0.35							0.34				
Oper. time red.				1.00							1.00				
Wind dir. red.				0.67							0.67				
Total reduction				0.24							0.23				
Total, real				64							28				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** KQ - H303

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March		April	May	June	July	August	September		October		November	December		
1	08:44	08:14	07:16		07:01	05:52	05:03	04:59	05:39	06:33		07:26	07:56 (1)	07:24	08:19		
	16:15	17:06	18:02		20:00	20:56	21:45	22:00	21:25	20:18		19:05	24	08:20 (1)	16:54	16:10	
2	08:44	08:12	07:14		06:59	05:50	05:02	05:00	05:40	06:35		07:28		07:55 (1)	07:26	08:21	
	16:16	17:08	18:04		20:02	20:57	21:47	22:00	21:23	20:16		19:02	24	08:19 (1)	16:52	16:09	
3	08:44	08:10	07:12		06:56	05:48	05:01	05:00	05:42	06:37		07:30		07:56 (1)	07:28	08:22	
	16:17	17:10	18:06		20:04	20:59	21:48	21:59	21:21	20:14		19:00	22	08:18 (1)	16:50	16:09	
4	08:43	08:09	07:09		06:54	05:46	05:00	05:01	05:44	06:38		07:32		07:58 (1)	07:30	08:24	
	16:18	17:12	18:08		20:06	21:01	21:49	21:59	21:19	20:11		18:57	20	08:18 (1)	16:48	16:08	
5	08:43	08:07	07:07		07:31 (1)	06:52	05:44	04:59	05:02	05:46		07:33		08:00 (1)	07:32	08:25	
	16:20	17:14	18:10	6	07:37 (1)	20:08	21:03	21:50	21:18	20:09		18:55	17	08:17 (1)	16:46	16:07	
6	08:43	08:05	07:05		07:29 (1)	06:49	05:42	04:59	05:03	05:47		07:35		08:02 (1)	07:34	08:27	
	16:21	17:16	18:12	9	07:38 (1)	20:10	21:05	21:51	21:58	21:16		18:53	14	08:16 (1)	16:45	16:07	
7	08:42	08:03	07:02		07:27 (1)	06:47	05:40	04:58	05:04	05:49		07:37		08:04 (1)	07:36	08:28	
	16:22	17:18	18:13	13	07:40 (1)	20:11	21:06	21:52	21:57	21:14		18:50	11	08:15 (1)	16:43	16:06	
8	08:42	08:01	07:00		07:24 (1)	06:44	05:38	04:57	05:05	05:51		07:39		08:06 (1)	07:38	08:29	
	16:24	17:20	18:15	16	07:40 (1)	20:13	21:08	21:53	21:56	21:12		18:48	8	08:14 (1)	16:41	16:06	
9	08:41	07:59	06:58		07:22 (1)	06:42	05:36	04:57	05:06	05:52		07:41		08:07 (1)	07:40	08:30	
	16:25	17:22	18:17	19	07:41 (1)	20:15	21:10	21:54	21:56	21:10		18:45	3	08:10 (1)	16:39	16:06	
10	08:41	07:57	06:55		07:19 (1)	06:40	05:35	04:56	05:07	05:54		07:43		07:42	08:32		
	16:27	17:24	18:19	21	07:40 (1)	20:17	21:12	21:55	21:55	21:08		18:43		16:37	16:05		
11	08:40	07:55	06:53		07:17 (1)	06:37	05:33	04:56	05:08	05:56		07:44		07:44	08:33		
	16:28	17:26	18:21	24	07:41 (1)	20:19	21:13	21:56	21:54	21:06		18:41		16:36	16:05		
12	08:39	07:53	06:50		07:16 (1)	06:35	05:31	04:56	05:09	05:58		07:46		07:46	08:34		
	16:30	17:28	18:23	24	07:40 (1)	20:21	21:15	21:56	21:53	21:04		18:38		16:34	16:05		
13	08:38	07:51	06:48		07:17 (1)	06:32	05:29	04:55	05:11	05:59		07:48		07:48	08:35		
	16:31	17:30	18:25	23	07:40 (1)	20:22	21:17	21:57	21:52	21:02		18:36		16:32	16:05		
14	08:37	07:49	06:45		07:17 (1)	06:30	05:27	04:55	05:12	06:01		07:50		07:50	08:36		
	16:33	17:32	18:27	21	07:38 (1)	20:24	21:19	21:58	21:51	20:59		18:34		16:31	16:05		
15	08:37	07:47	06:43		07:18 (1)	06:28	05:26	04:55	05:13	06:03		07:52		07:51	08:37		
	16:35	17:34	18:29	20	07:38 (1)	20:26	21:20	21:58	21:50	20:57		18:31		16:29	16:05		
16	08:36	07:45	06:41		07:18 (1)	06:25	05:24	04:55	05:14	06:05		07:54		07:53	08:38		
	16:36	17:36	18:31	18	07:36 (1)	20:28	21:22	21:59	21:49	20:55		18:29		16:28	16:05		
17	08:35	07:43	06:38		07:20 (1)	06:23	05:22	04:54	05:16	06:06		07:56		07:55	08:39		
	16:38	17:38	18:32	14	07:34 (1)	20:30	21:24	21:59	21:48	20:53		18:27		16:26	16:05		
18	08:34	07:41	06:36		07:21 (1)	06:21	05:21	04:54	05:17	06:08		07:58		07:57	08:39		
	16:40	17:40	18:34	10	07:31 (1)	20:32	21:25	22:00	21:46	20:51		18:24		16:25	16:05		
19	08:32	07:39	06:33			06:19	05:19	04:54	05:19	06:10		07:59		07:59	08:40		
	16:42	17:42	18:36			20:34	21:27	22:00	21:45	20:49		18:22		16:23	16:05		
20	08:31	07:37	06:31			06:16	05:18	04:54	05:20	06:12		08:01		08:01	08:41		
	16:43	17:44	18:38			20:35	21:28	22:01	21:44	20:46		18:20		16:22	16:06		
21	08:30	07:34	06:28			06:14	05:16	04:55	05:21	06:14		08:03		08:02	08:41		
	16:45	17:46	18:40			20:37	21:30	22:01	21:42	20:44		18:18		16:21	16:06		
22	08:29	07:32	06:26			06:12	05:15	04:55	05:23	06:15		08:05		08:04	08:42		
	16:47	17:48	18:42			20:39	21:32	22:01	21:41	20:42		18:15		16:19	16:07		
23	08:27	07:30	06:23			06:09	05:13	04:55	05:24	06:17		08:07		08:06	08:42		
	16:49	17:50	18:44			20:41	21:33	22:01	21:40	20:40		18:13		16:18	16:07		
24	08:26	07:28	06:21			06:07	05:12	04:55	05:26	06:19		08:09		08:08	08:43		
	16:51	17:52	18:45			20:43	21:35	22:01	21:38	20:37		18:11		16:17	16:08		
25	08:25	07:26	06:19			06:05	05:11	04:56	05:27	06:21		07:15		08:10	08:43		
	16:53	17:54	18:47			20:45	21:36	22:01	21:37	20:35		6	08:13 (1)	17:09	16:16	16:08	
26	08:23	07:23	06:16			06:03	05:09	04:56	05:29	06:22		07:17		08:02 (1)	07:13	16:11	08:44
	16:54	17:56	18:49			20:46	21:37	22:01	21:35	20:33		13	08:15 (1)	17:07	16:15	16:09	
27	08:22	07:21	06:14			06:01	05:08	04:57	05:31	06:24		07:19		08:00 (1)	07:15	16:13	08:44
	16:56	17:58	18:51			20:48	21:39	22:01	21:33	20:30		17	08:17 (1)	17:05	16:14	16:10	
28	08:20	07:19	06:11			05:59	05:07	04:57	05:32	06:26		07:21		07:59 (1)	07:17	16:15	08:44
	16:58	18:00	18:53			20:50	21:40	22:01	21:32	20:28		19	08:18 (1)	17:02	16:13	16:11	
29	08:19		07:09			05:56	05:06	04:58	05:34	06:28		07:23		07:58 (1)	07:19	16:16	08:44
	17:00		19:55			20:52	21:42	22:01	21:30	20:26		21	08:19 (1)	17:00	16:12	16:12	
30	08:17		07:06			05:54	05:05	04:58	05:35	06:29		07:24		07:57 (1)	07:21	16:18	08:44
	17:02		19:57			20:54	21:43	22:01	21:28	20:23		22	08:19 (1)	16:58	16:11	16:13	
31	08:16		07:04				05:04		05:37	06:31				07:22		16:14	08:44
	17:04		19:58				21:44		21:27	20:21				16:56		16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382		328		259	233		
Total, worst case				238						98		143					
Sun reduction				0.27						0.32		0.29					
Oper. time red.				1.00						1.00		1.00					
Wind dir. red.				0.65						0.65		0.65					
Total reduction				0.18						0.21		0.19					
Total, real				42						20		27					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KR - H304

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:41 (1) 07:54 (1)	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	08:14 (1) 16:54	07:24 16:10	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	07:39 (1) 07:56 (1)	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	08:11 (1) 08:31 (1)	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	07:36 (1) 07:56 (1)	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	08:10 (1) 08:32 (1)	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	07:34 (1) 07:57 (1)	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	08:09 (1) 08:33 (1)	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	07:32 (1) 07:57 (1)	06:52 20:08	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	08:09 (1) 08:33 (1)	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	07:32 (1) 07:57 (1)	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:08 (1) 08:33 (1)	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	07:32 (1) 07:57 (1)	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	08:08 (1) 08:33 (1)	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	07:31 (1) 07:56 (1)	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	08:08 (1) 08:33 (1)	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	07:32 (1) 07:56 (1)	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	08:07 (1) 08:31 (1)	07:40 16:39	08:30 16:06
10	08:41 16:27	07:57 17:24	06:55 18:19	07:32 (1) 07:55 (1)	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	08:09 (1) 08:31 (1)	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	07:33 (1) 07:54 (1)	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	08:11 (1) 08:30 (1)	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	07:33 (1) 07:52 (1)	06:35 20:21	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	08:13 (1) 08:28 (1)	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	07:35 (1) 07:50 (1)	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:02	06:54 19:49	07:48 18:36	08:15 (1) 08:27 (1)	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	07:37 (1) 07:47 (1)	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	08:17 (1) 08:25 (1)	07:49 16:31	08:36 16:05
15	08:37 16:35	07:47 17:34	06:43 18:29		06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	08:19 (1) 08:20 (1)	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31		06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29		07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32		06:23 20:30	05:22 21:24	04:54 21:59	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27		07:55 16:26	08:39 16:05
18	08:34 16:40	07:41 17:40	06:36 18:34		06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24		07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36		06:19 20:34	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:49	07:05 19:34	07:59 18:22		07:59 16:23	08:40 16:05
20	08:31 16:43	07:37 17:44	06:31 18:38		06:16 20:35	05:18 21:28	04:54 22:01	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20		08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40		06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:14 20:44	07:08 19:29	08:03 18:18		08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42		06:12 20:39	05:15 21:32	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15		08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44		06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:40	06:17 20:40	07:12 19:24	08:07 18:13		08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45		06:07 20:43	05:12 21:35	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11		08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47		06:05 20:45	05:11 21:36	04:56 22:01	05:27 21:37	06:21 20:35	07:15 19:20	08:11 17:09		08:10 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49		06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	08:09 17:07		08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	07:46 (1) 07:50 (1)	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05		08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	07:43 (1) 07:52 (1)	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02		08:15 16:13	08:44 16:11
29	08:19 17:00			07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 7	08:19 (1) 08:26 (1)	07:19 17:00	08:44 16:12
30	08:17 17:02			07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:01	05:35 21:28	06:29 20:23	07:24 19:07	07:21 13	08:16 (1) 08:29 (1)	07:21 16:58	08:44 16:13
31	08:15 17:04			07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14	
Potential sun hours	250	273	367		420	494	510	512	460	382	328	259	233	
Total, worst case		13		285							283			
Sun reduction		0.23		0.27						0.32	0.29			
Oper. time red.		1.00		1.00						1.00	1.00			
Wind dir. red.		0.65		0.65						0.65	0.65			
Total reduction		0.15		0.18						0.21	0.19			
Total, real		2		50						4	54			

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KS - H305

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (1)	08:19		
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54	1	07:55 (1)	16:10	
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26			08:21	
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52			16:09	
3	08:44	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28			08:22	
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50			16:09	
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30			08:24	
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48			16:08	
5	08:43	08:07	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32			08:25	
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46			16:07	
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34			08:27	
	16:21	17:16	18:12	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45			16:07	
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36			08:28	
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43			16:06	
8	08:42	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38			08:29	
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41			16:06	
9	08:41	07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40			08:30	
	16:25	17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39			16:05	
10	08:41	07:57	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42			08:32	
	16:27	17:24	2	08:24 (1)	06:55	20:17	21:12	21:55	21:08	19:57	18:43			16:05	
11	08:40	07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44			08:33	
	16:28	17:26	7	08:29 (1)	18:21	20:19	21:13	21:56	21:54	21:06	19:54			16:05	
12	08:39	07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46			08:34	
	16:30	17:28	10	08:30 (1)	18:23	20:21	21:15	21:56	21:53	21:04	19:52			16:05	
13	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48			08:35	
	16:31	17:30	14	08:32 (1)	18:25	20:22	21:17	21:57	21:52	21:02	19:49			16:05	
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:50 (1)		08:36	
	16:33	17:32	17	08:32 (1)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	5	08:55 (1)	16:05	
15	08:37	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:46 (1)		08:37	
	16:35	17:34	20	08:33 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	13	08:59 (1)	16:05	
16	08:36	07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:54	08:43 (1)		08:38	
	16:36	17:36	23	08:34 (1)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	18	09:01 (1)	16:05
17	08:35	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:42 (1)	07:55		08:39	
	16:38	17:38	25	08:34 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	20	09:02 (1)	16:05
18	08:34	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	08:41 (1)	07:57		08:39	
	16:40	17:40	27	08:35 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	22	09:03 (1)	16:05
19	08:32	07:39	06:33	06:19	05:19	04:54	05:19	06:10	07:05	07:59	08:40 (1)	07:59		08:40	
	16:41	17:42	27	08:34 (1)	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	24	09:04 (1)	16:05
20	08:31	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:39 (1)	08:01		08:41	
	16:43	17:44	26	08:34 (1)	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	25	09:04 (1)	16:06
21	08:30	07:34	06:28	06:14	05:16	04:55	05:21	06:14	07:08	08:03	08:38 (1)	08:02		08:41	
	16:45	17:46	26	08:34 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	26	09:04 (1)	16:06
22	08:29	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:38 (1)	08:04		08:42	
	16:47	17:48	25	08:33 (1)	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	26	09:04 (1)	16:07
23	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:38 (1)	08:06		08:42	
	16:49	17:50	23	08:32 (1)	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	26	09:04 (1)	16:07
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:38 (1)	08:08		08:43	
	16:51	17:52	22	08:32 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	26	09:04 (1)	16:08
25	08:25	07:26	06:19	06:05	05:11	04:56	05:27	06:21	07:15	08:11	07:39 (1)	08:10		08:43	
	16:53	17:54	19	08:29 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:20	17:09	25	08:04 (1)	16:08
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	07:41 (1)	08:11		08:44	
	16:54	17:56	16	08:28 (1)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	22	08:03 (1)	16:09
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	07:43 (1)	08:13		08:44	
	16:56	17:58	11	08:26 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	19	08:02 (1)	16:10
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	07:45 (1)	08:15		08:44	
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	08:01 (1)	16:13	16	08:01 (1)	16:11
29	08:19		07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	07:47 (1)	08:16		08:44	
	17:00		19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	08:00 (1)	16:12	13	08:00 (1)	16:12
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	07:50 (1)	08:18		08:44	
	17:02		19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	08:00 (1)	16:11	10	08:00 (1)	16:13
31	08:15		07:04		05:04		05:37	06:31		07:22	07:52 (1)			08:44	
	17:04		19:58		21:44		21:27	20:21		16:56	6	07:58 (1)		16:14	
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259			233	
Total, worst case			340								342				
Sun reduction			0.23								0.29		0.27		
Oper. time red.			1.00								1.00		1.00		
Wind dir. red.			0.63								0.63		0.63		
Total reduction			0.15								0.19		0.17		
Total, real			50								63		0		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case **Shadow receptor:** KT - H306**Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	08:42 (3)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24
2	16:15	17:06	08:44 (3)	18:02	20:00	20:56	21:45	22:00	21:25	20:18	19:05	16:54
3	08:44	08:12	08:40 (3)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26
4	16:16	17:08	08:44 (3)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:56
5	08:44	08:10	08:38 (3)	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28
6	16:17	17:10	08:45 (3)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50
7	08:43	08:09	08:36 (3)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30
8	16:18	17:12	08:45 (3)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48
9	08:43	08:07	08:34 (3)	07:07	06:52	05:44	04:59	05:02	05:46	06:40	07:33	07:32
10	16:20	17:14	08:45 (3)	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46
11	08:43	08:05	08:32 (3)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34
12	16:21	17:16	08:46 (1)	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45
13	08:42	08:03	08:30 (3)	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36
14	16:22	17:18	08:47 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43
15	08:42	08:01	08:28 (3)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38
16	16:24	17:20	08:49 (1)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41
17	08:41	07:59	08:26 (1)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40
18	16:25	17:22	08:50 (1)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39
19	08:41	07:57	08:24 (1)	06:55	06:40	05:35	04:56	05:07	05:54	06:49	07:43	07:42
20	16:27	17:24	08:51 (1)	18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43	16:37
21	08:40	07:55	08:22 (1)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44
22	16:28	17:26	08:52 (1)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36
23	08:39	07:53	08:21 (1)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46
24	16:30	17:28	08:53 (1)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34
25	08:38	07:51	08:21 (1)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48
26	16:31	17:30	08:54 (1)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32
27	08:37	07:49	08:20 (1)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49
28	16:33	17:32	08:55 (1)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31
29	08:37	07:47	08:20 (1)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51
30	16:35	17:34	08:54 (1)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29
31	08:36	07:45	08:20 (1)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53
32	16:36	17:36	08:54 (1)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28
33	08:35	07:43	08:20 (1)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55
34	16:38	17:38	08:54 (1)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26
35	08:33	07:41	08:20 (1)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57
36	16:40	17:40	08:54 (1)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25
37	08:32	07:39	08:20 (1)	06:33	06:18	05:19	04:54	05:19	06:10	07:05	07:59	07:59
38	16:41	17:42	08:53 (1)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23
39	08:31	07:37	08:20 (1)	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01
40	16:43	17:44	08:53 (1)	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22
41	08:30	07:34	08:21 (1)	06:28	06:14	05:16	04:55	05:21	06:13	07:08	08:03	08:02
42	16:45	17:46	08:53 (1)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21
43	08:29	07:32	08:21 (1)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04
44	16:47	17:48	08:51 (1)	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19
45	08:27	07:30	08:22 (1)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06
46	16:49	17:50	08:50 (1)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18
47	08:26	07:28	08:23 (1)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08
48	16:51	17:52	08:49 (1)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17
49	08:25	07:26	08:24 (1)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:09
50	16:53	17:54	08:47 (1)	18:47	20:45	21:36	22:01	21:37	20:35	19:19	18:09	16:16
51	08:23	07:23	08:26 (1)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11
52	16:54	17:56	08:45 (1)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	18:07	16:15
53	08:22	07:21	08:28 (1)	06:14	06:01	05:08	04:57	05:31	06:24	07:19	08:15	08:13
54	16:56	17:58	08:43 (1)	18:51	20:48	21:39	22:01	21:33	20:30	19:15	18:05	16:14
55	08:20	07:19	08:33 (1)	06:11	05:59	05:07	04:57	05:32	06:26	07:21	08:17	08:15
56	16:58	18:00	08:37 (1)	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:13
57	08:19			07:09	05:56	05:06	04:58	05:34	06:28	07:23	08:19	08:16
58	17:00			19:55	20:52	21:42	22:01	21:30	20:26	19:10	18:00	16:12
59	08:17			07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:21	08:18
60	17:02			19:57	20:54	21:43	22:01	21:28	20:23	19:07	18:58	16:11
61	08:15			07:04		05:04		05:37	06:31		07:22	07:19
62	17:04			19:58		21:44		21:27	20:21		18:56	16:10
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case		643								523	132	
Sun reduction		0.23								0.29	0.27	
Oper. time red.		1.00								1.00	1.00	
Wind dir. red.		0.62								0.62	0.62	
Total reduction		0.14								0.18	0.16	
Total, real		93								95	22	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KU - H307

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	08:42 (3)	07:16	08:32 (1)	07:01
	16:15	17:06	12 08:54 (1)	18:02	09:03 (1)	20:00
2	08:44	08:12	08:40 (3)	07:14	08:35 (1)	06:59
	16:16	17:08	17 08:57 (1)	18:04	09:01 (1)	20:02
3	08:44	08:10	08:38 (3)	07:12	08:36 (1)	06:56
	16:17	17:10	22 09:00 (1)	18:06	08:57 (1)	20:04
4	08:43	08:09	08:36 (3)	07:09	08:40 (1)	06:54
	16:18	17:12	26 09:02 (1)	18:08	08:54 (1)	20:06
5	08:43	08:07	08:34 (3)	07:07		06:52
	16:20	17:14	30 09:04 (1)	18:10		20:08
6	08:43	08:05	08:32 (3)	07:05		06:49
	16:21	17:16	33 09:05 (1)	18:11		20:09
7	08:42	08:03	08:31 (3)	07:02		06:47
	16:22	17:18	35 09:06 (1)	18:13		20:11
8	08:42	08:01	08:31 (1)	07:00	07:24 (2)	06:44
	16:24	17:20	36 09:07 (1)	18:15	07:28 (2)	20:13
9	08:41	07:59	08:30 (1)	06:57	07:22 (2)	06:42
	16:25	17:22	38 09:08 (1)	18:17	07:29 (2)	20:15
10	08:41	07:57	08:29 (1)	06:55	07:19 (2)	06:40
	16:27	17:24	40 09:09 (1)	18:19	07:29 (2)	20:17
11	08:40	07:55	08:29 (1)	06:53	07:17 (2)	06:37
	16:28	17:26	41 09:10 (1)	18:21	07:29 (2)	20:19
12	08:39	07:53	08:28 (1)	06:50	07:14 (2)	06:35
	16:30	17:28	43 09:11 (1)	18:23	07:28 (2)	20:21
13	08:38	07:51	08:28 (1)	06:48	07:12 (2)	06:32
	16:31	17:30	44 09:12 (1)	18:25	07:28 (2)	20:22
14	08:37	07:49	08:27 (1)	06:45	07:09 (2)	06:30
	16:33	17:32	44 09:11 (1)	18:27	07:27 (2)	20:24
15	08:37	07:47	08:27 (1)	06:43	07:09 (2)	06:28
	16:35	17:34	45 09:12 (1)	18:29	07:26 (2)	20:26
16	08:36	07:45	08:27 (1)	06:41	07:10 (2)	06:25
	16:36	17:36	45 09:12 (1)	18:30	07:24 (2)	20:28
17	08:35	07:43	08:27 (1)	06:38	07:12 (2)	06:23
	16:38	17:38	45 09:12 (1)	18:32	07:22 (2)	20:30
18	08:33	07:41	08:27 (1)	06:36		06:21
	16:40	17:40	45 09:12 (1)	18:34		20:32
19	08:32	07:39	08:26 (1)	06:33		06:18
	16:41	17:42	46 09:12 (1)	18:36		20:33
20	08:31	07:37	08:26 (1)	06:31		06:16
	16:43	17:44	46 09:12 (1)	18:38		20:35
21	08:30	07:34	08:27 (1)	06:28		06:14
	16:45	17:46	44 09:11 (1)	18:40		20:37
22	08:29	07:32	08:27 (1)	06:26		06:12
	16:47	17:48	43 09:10 (1)	18:42		20:39
23	08:27	07:30	08:27 (1)	06:23		06:09
	16:49	17:50	43 09:10 (1)	18:44		20:41
24	08:26	07:28	08:28 (1)	06:21		06:07
	16:51	17:52	41 09:09 (1)	18:45		20:43
25	08:25	07:26	08:28 (1)	06:18		06:05
	16:53	17:54	40 09:08 (1)	18:47		20:45
26	08:23	07:23	08:29 (1)	06:16		06:03
	16:54	17:56	38 09:07 (1)	18:49		20:46
27	08:22	07:21	08:30 (1)	06:14		06:01
	16:56	17:58	36 09:06 (1)	18:51		20:48
28	08:20	07:19	08:31 (1)	06:11		05:59
	16:58	18:00	33 09:04 (1)	18:53		20:50
29	08:19	08:47 (3)		07:09		05:56
	17:00	2 08:49 (3)		19:55		20:52
30	08:17	08:45 (3)		07:06		05:54
	17:02	5 08:50 (3)		19:57		20:54
31	08:15	08:44 (3)		07:04		05:04
	17:04	8 08:52 (3)		19:58		21:44
Potential sun hours	250	273		367	420	510
Total, worst case	15	1051		214		
Sun reduction	0.24	0.23		0.27		
Oper. time red.	1.00	1.00		1.00		
Wind dir. red.	0.61	0.62		0.64		
Total reduction	0.15	0.14		0.17		
Total, real	2	150		37		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KU - H307

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:52 (2) 16:54	07:59 (1) 16:10
2	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:54 (2) 16:52	08:00 (1) 16:09
3	05:00 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:56 (2) 16:50	08:00 (1) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:58 (2) 16:48	08:01 (3) 16:08
5	05:02 21:58	05:45 21:18	06:40 20:09	07:33 18:55	08:00 (2) 16:46	08:02 (3) 16:07
6	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	08:02 (2) 16:45	08:04 (3) 16:07
7	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:06 (3) 16:06
8	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:09 (3) 16:06
9	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	09:17 (1) 16:39	08:11 (3) 16:05
10	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	09:12 (1) 16:37	08:13 (3) 16:05
11	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	09:09 (1) 16:36	08:15 (3) 16:05
12	05:09 21:53	05:58 21:04	06:52 19:52	07:46 18:38	09:07 (1) 16:34	08:17 (3) 16:05
13	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	09:05 (1) 16:32	08:19 (3) 16:05
14	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	09:03 (1) 16:31	08:21 (3) 16:05
15	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	09:02 (1) 16:29	08:37 16:05
16	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	09:01 (1) 16:28	08:38 16:05
17	05:16 21:48	06:06 20:53	07:01 19:39	07:56 18:27	09:00 (1) 16:26	08:39 16:05
18	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	08:59 (1) 16:25	08:39 16:05
19	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	08:58 (1) 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	09:41 (1) 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:57 (1) 16:21	08:41 16:06
22	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:57 (1) 16:19	08:42 16:07
23	05:24 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:56 (1) 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:56 (1) 16:17	08:43 16:08
25	05:27 21:37	06:21 20:35	07:15 19:19	07:11 17:09	07:56 (1) 16:16	08:43 16:08
26	05:29 21:35	06:22 20:33	07:17 19:17	07:13 08:03 (2)	07:56 (1) 16:15	08:44 16:09
27	05:31 21:33	06:24 20:30	07:19 19:15	07:15 08:05 (2)	07:56 (1) 16:14	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	07:17 08:06 (2)	07:56 (1) 16:13	08:44 16:11
29	05:34 21:30	06:28 20:26	07:23 19:10	07:19 08:07 (2)	07:57 (1) 16:12	08:44 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	07:21 08:08 (2)	07:58 (1) 16:11	08:44 16:12
31	05:37 21:27	06:31 20:21		07:22 16:56	07:58 (1) 08:40 (1)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case			70	933	300	
Sun reduction			0.32	0.29	0.27	
Oper. time red.			1.00	1.00	1.00	
Wind dir. red.			0.66	0.62	0.61	
Total reduction			0.21	0.18	0.16	
Total, real			15	169	49	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KV - H308

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		09:39 (3)	08:14		07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26		07:24						07:24		08:19		11:01 (1)
	16:15	58	11:50 (1)	17:06		18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05		16:54						16:54		16:10	29	11:30 (1)
2	08:44		09:41 (3)	08:12		07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28		07:26						07:26		08:21		11:01 (1)
	16:16	55	11:50 (1)	17:08		18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02		16:52						16:52		16:09	31	11:32 (1)
3	08:44		09:41 (3)	08:10		07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30		07:28						07:28		08:22		11:00 (1)
	16:17	54	11:50 (1)	17:10		18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00		16:50						16:50		16:08	33	11:33 (1)
4	08:43		09:43 (3)	08:09		07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32		07:30						07:30		08:24		11:00 (1)
	16:18	51	11:50 (1)	17:12		18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57		16:48						16:48		16:08	34	11:34 (1)
5	08:43		09:44 (3)	08:07		07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33		07:32						07:32		08:25		09:34 (3)
	16:20	48	11:50 (1)	17:14		18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55		16:46						16:46		16:07	39	11:35 (1)
6	08:43		09:46 (3)	08:05		07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35		07:34						07:34		08:27		09:32 (3)
	16:21	45	11:50 (1)	17:16		18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53		16:45						16:45		16:07	45	11:36 (1)
7	08:42		09:48 (3)	08:03		07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37		07:36						07:36		08:28		09:31 (3)
	16:22	40	11:50 (1)	17:18		18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50		16:43						16:43		16:06	48	11:37 (1)
8	08:42		11:15 (1)	08:01		07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39		07:38						07:38		08:29		09:31 (3)
	16:24	34	11:49 (1)	17:20		18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48		16:41						16:41		16:06	51	11:38 (1)
9	08:41		11:17 (1)	07:59		06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41		07:40						07:40		08:30		09:30 (3)
	16:25	33	11:50 (1)	17:22		18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45		16:39						16:39		16:05	54	11:39 (1)
10	08:41		11:18 (1)	07:57		06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43		07:42						07:42		08:32		09:30 (3)
	16:27	31	11:49 (1)	17:24		18:19	20:17	21:12	21:55	21:55	21:08	19:57	18:43		16:37						16:37		16:05	56	11:40 (1)
11	08:40		11:19 (1)	07:55		06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44		07:44						07:44		08:33		09:29 (3)
	16:28	29	11:48 (1)	17:26	1	08:23 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36						16:36		16:05	58	11:40 (1)
12	08:39		11:20 (1)	07:53		08:20 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	08:34						08:34		09:30 (3)		
	16:30	27	11:47 (1)	17:28	5	08:25 (2)	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34						16:34		16:05	60	11:42 (1)
13	08:38		11:22 (1)	07:51		08:18 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	08:35						07:48		08:30		09:30 (3)
	16:31	24	11:46 (1)	17:30	8	08:26 (2)	18:24	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32						16:32		16:05	60	11:42 (1)
14	08:37		11:24 (1)	07:49		08:15 (2)	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	08:36						07:49		08:36		09:31 (3)
	16:33	21	11:45 (1)	17:32	11	08:26 (2)	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31						16:31		16:05	61	11:43 (1)
15	08:36		11:27 (1)	07:47		08:13 (2)	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	08:37		08:44 (2)	07:51			07:51		08:37		09:31 (3)
	16:35	16	11:43 (1)	17:34	14	08:27 (2)	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	4	08:48 (2)	07:52				16:29		16:05	63	11:44 (1)
16	08:36		11:31 (1)	07:45		08:11 (2)	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	08:38		08:40 (2)	07:53			07:53		08:38		09:30 (3)
	16:36	9	11:40 (1)	17:36	17	08:28 (2)	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	12	08:52 (2)	07:52				16:28		16:05	63	11:43 (1)
17	08:35		07:43			08:09 (2)	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	08:39		08:37 (2)	07:55			07:55		08:39		09:31 (3)
	16:38		17:38	19		08:28 (2)	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	17	08:54 (2)	07:52				16:26		16:05	63	11:44 (1)
18	08:33		07:41			08:07 (2)	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	08:39		08:36 (2)	07:57			07:57		08:39		09:31 (3)
	16:40		17:40	21		08:28 (2)	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	20	08:56 (2)	07:52				16:25		16:05	64	11:45 (1)
19	08:32		07:39			08:04 (2)	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	08:40		08:35 (2)	07:59			07:59		08:40		09:32 (3)
	16:41		17:42	23		08:27 (2)	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	22	08:57 (2)	07:52				16:23		16:05	64	11:46 (1)
20	08:31		07:37			08:02 (2)	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:41		08:34 (2)	07:51			07:51		08:41		09:32 (3)
	16:43		17:44	25		08:27 (2)	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	23	08:57 (2)	07:52				16:22		16:06	65	11:46 (1)
21	08:30		07:34			08:03 (2)	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:41		08:33 (2)	08:02			08:02		08:41		09:33 (3)
	16:45		17:46	24		08:27 (2)	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	25	08:58 (2)	07:52				16:20		16:06	65	11:47 (1)
22	08:29		07:32			08:03 (2)	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:42		08:33 (2)	08:04			08:04		08:42		09:32 (3)
	16:47		17:48	23		08:26 (2)	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	25	08:58 (2)	07:52				16:19		16:07	66	11:47 (1)
23	08:27		07:30			08:04 (2)	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:42		08:35 (2)	08:06			08:06		08:42		09:34 (3)
	16:49		17:50	21		08:25 (2)	18:44	20:41	21:33	22:01	21:40	20:39	19:24	18:13	23	08:58 (2)	07:52				16:18		16:07	65	11:48 (1)
24	08:26		07:28			08:05 (2)	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:43		08:37 (2)	08:08			08:08		08:43		09:34 (3)
	16:51		17:52	19		08:24 (2)	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	21	08:58 (2)	07:52				16:17		16:08	65	11:48 (1)
25	08:25		07:25			08:06 (2)	06:18	06:05	05:11	04:56	05:27	06:21	07:15	08:11	08:43		07:39 (2)	08:09			08:09		08:43		09:34 (3)
	16:52		17:54	15		08:21 (2)	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	18	07:57 (2)	07:52				16:16		16:08	64	11:48 (1)
26	08:23		07:23			08:09 (2)	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:44		07:41 (2)	08:11			08:11		08:44		09:35 (3)
	16:54		17:56	10		08:19 (2)	18:49	20:46	21:37	22:01	21:35	20:33	19:17	17:07	16	07:57 (2)	07:52				16:15		16:09	64	11:49 (1)
27	08:22		07:21			08:14	06:14	06:01	05:08	04:56	05:31	06:24	07:19	08:15	08:45		07:43 (2)	08:13			08:13		08:45		09:36 (3)
	16:56		17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:04	13	07:56 (2)	16:14	16 11:22 (1)	16:10			16:10		16:04		11:49 (1)
28	08:20		07:19			06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	08:12	08:44		07:45 (2)	08:14			08:14		08:4:		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KW - H309

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44	12:23 (1)	08:14	08:42 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	07:54 (2)	08:19	08:40	09:06 (2)	08:02	07:56 (2)	08:21	08:42	09:06 (2)	08:19
2	08:44	12:24 (1)	08:12	08:40 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	07:56 (2)	08:21	08:40	09:06 (2)	08:02	07:56 (2)	08:21	08:42	09:06 (2)	08:19
3	08:44	12:25 (1)	08:10	08:38 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	07:58 (2)	08:22	08:40	09:06 (2)	08:02	07:58 (2)	08:22	08:40	09:06 (2)	08:19
4	08:43	12:26 (1)	08:09	08:36 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:00 (2)	08:24	08:40	09:06 (2)	08:02	08:00 (2)	08:24	08:40	09:06 (2)	08:19
5	08:43	12:27 (1)	08:07	08:34 (2)	07:07	06:52	05:44	05:02	05:02	05:45	06:40	07:33	07:32	08:02 (2)	08:25	08:40	09:06 (2)	08:02	08:02 (2)	08:25	08:40	09:06 (2)	08:19
6	08:43	12:29 (1)	08:05	08:32 (2)	07:05	06:49	05:42	05:03	05:03	05:47	06:42	07:35	07:34	08:04 (2)	08:27	08:40	09:06 (2)	08:04	08:04 (2)	08:27	08:40	09:06 (2)	08:19
7	08:42	12:30 (1)	08:03	08:30 (2)	07:02	06:47	05:40	05:04	05:04	05:49	06:44	07:37	07:36	08:06 (2)	08:28	08:40	09:06 (2)	08:06	08:06 (2)	08:28	08:40	09:06 (2)	08:19
8	08:42	12:32 (1)	08:01	08:28 (2)	07:00	06:44	05:38	05:05	05:05	05:51	06:45	07:39	07:38	08:09 (2)	08:29	08:40	09:06 (2)	08:09	08:09 (2)	08:29	08:40	09:06 (2)	08:19
9	08:41	12:35 (1)	07:59	08:26 (2)	06:57	06:42	05:36	05:06	05:06	05:52	06:47	07:41	07:40	08:11 (2)	08:30	08:40	09:06 (2)	08:11	08:11 (2)	08:30	08:40	09:06 (2)	08:19
10	08:40	12:38 (1)	07:57	08:24 (2)	06:55	06:40	05:34	05:06	05:07	05:54	06:49	07:43	07:42	08:13 (2)	08:32	08:40	09:06 (2)	08:13	08:13 (2)	08:32	08:40	09:06 (2)	08:19
11	08:40	12:40 (1)	07:55	08:24 (2)	06:53	06:37	05:33	05:08	05:08	05:56	06:51	07:44	07:44	08:16 (2)	08:33	08:40	09:06 (2)	08:16	08:16 (2)	08:33	08:40	09:06 (2)	08:19
12	08:39	12:42 (1)	07:53	08:24 (2)	06:50	06:35	05:31	05:09	05:09	05:58	06:52	07:46	07:46	08:18 (2)	08:34	08:40	09:06 (2)	08:18	08:18 (2)	08:34	08:40	09:06 (2)	08:19
13	08:38	12:44 (1)	07:51	08:24 (2)	06:48	06:32	05:29	05:11	05:11	05:59	06:54	07:48	07:48	08:20 (2)	08:36	08:40	09:06 (2)	08:20	08:20 (2)	08:36	08:40	09:06 (2)	08:19
14	08:37	12:46 (1)	07:49	08:24 (2)	06:45	06:30	05:27	05:12	05:12	06:01	06:56	07:50	07:49	08:22 (2)	08:38	08:40	09:06 (2)	08:22	08:22 (2)	08:38	08:40	09:06 (2)	08:19
15	08:36	12:48 (1)	07:47	08:25 (2)	06:43	06:28	05:26	05:13	05:13	06:03	06:58	07:52	07:51	08:24 (2)	08:40	08:40	09:06 (2)	08:24	08:24 (2)	08:40	08:40	09:06 (2)	08:19
16	08:36	12:50 (1)	07:45	08:26 (2)	06:40	06:25	05:24	05:14	05:14	06:05	06:59	07:54	07:53	08:26 (2)	08:42	08:40	09:06 (2)	08:26	08:26 (2)	08:42	08:40	09:06 (2)	08:19
17	08:35	12:52 (1)	07:43	08:27 (2)	06:38	06:23	05:22	05:16	05:16	06:06	07:01	07:56	07:55	08:28 (2)	08:44	08:40	09:06 (2)	08:28	08:28 (2)	08:44	08:40	09:06 (2)	08:19
18	08:33	12:54 (1)	07:41	08:27 (2)	06:36	06:21	05:21	05:17	05:17	06:08	07:03	07:57	07:57	08:30 (2)	08:46	08:40	09:06 (2)	08:30	08:30 (2)	08:46	08:40	09:06 (2)	08:19
19	08:32	12:56 (1)	07:39	08:28 (2)	06:34	06:20	05:20	05:18	05:18	06:10	07:05	07:59	07:59	08:32 (2)	08:48	08:40	09:06 (2)	08:32	08:32 (2)	08:48	08:40	09:06 (2)	08:19
20	08:31	12:58 (1)	07:37	08:29 (2)	06:33	06:19	05:19	05:18	05:18	06:12	07:06	08:01	08:01	08:34 (2)	08:50	08:40	09:06 (2)	08:34	08:34 (2)	08:50	08:40	09:06 (2)	08:19
21	08:30	13:00 (1)	07:34	08:30 (2)	06:32	06:18	05:18	05:17	05:17	06:13	07:08	08:03	08:03	08:36 (2)	08:52	08:40	09:06 (2)	08:36	08:36 (2)	08:52	08:40	09:06 (2)	08:19
22	08:29	13:02 (1)	07:32	08:31 (2)	06:31	06:17	05:17	05:16	05:16	06:14	07:09	08:04	08:04	08:38 (2)	08:54	08:40	09:06 (2)	08:38	08:38 (2)	08:54	08:40	09:06 (2)	08:19
23	08:27	13:04 (1)	07:30	08:32 (2)	06:30	06:16	05:16	05:15	05:15	06:15	07:10	08:05	08:05	08:40 (2)	08:56	08:40	09:06 (2)	08:40	08:40 (2)	08:56	08:40	09:06 (2)	08:19
24	08:26	13:06 (1)	07:28	08:33 (2)	06:29	06:15	05:15	05:14	05:14	06:16	07:11	08:06	08:06	08:42 (2)	08:58	08:40	09:06 (2)	08:42	08:42 (2)	08:58	08:40	09:06 (2)	08:19
25	08:25	13:08 (1)	07:25	08:34 (2)	06:28	06:14	05:14	05:13	05:13	06:17	07:12	08:07	08:07	08:44 (2)	08:60	08:40	09:06 (2)	08:44	08:44 (2)	08:60	08:40	09:06 (2)	08:19
26	08:23	13:10 (1)	07:23	08:35 (2)	06:27	06:13	05:13	05:12	05:12	06:18	07:13	08:08	08:08	08:46 (2)	08:62	08:40	09:06 (2)	08:46	08:46 (2)	08:62	08:40	09:06 (2)	08:19
27	08:22	13:12 (1)	07:21	08:36 (2)	06:26	06:12	05:12	05:11	05:11	06:19	07:14	08:09	08:09	08:48 (2)	08:64	08:40	09:06 (2)	08:48	08:48 (2)	08:64	08:40	09:06 (2)	08:19
28	08:20	13:14 (1)	07:19	08:37 (2)	06:25	06:11	05:11	05:10	05:10	06:20	07:15	08:10	08:10	08:50 (2)	08:66	08:40	09:06 (2)	08:50	08:50 (2)	08:66	08:40	09:06 (2)	08:19
29	08:19	13:16 (1)	07:17	08:38 (2)	06:24	06:10	05:10	05:09	05:09	06:21	07:16	08:11	08:11	08:52 (2)	08:68	08:40	09:06 (2)	08:52	08:52 (2)	08:68	08:40	09:06 (2)	08:19
30	08:17	13:18 (1)	07:15	08:39 (2)	06:23	06:09	05:09	05:08	05:08	06:22	07:17	08:12	08:12	08:54 (2)	08:70	08:40	09:06 (2)	08:54	08:54 (2)	08:70	08:40	09:06 (2)	08:19
31	08:15	13:20 (1)	07:13	08:40 (2)	06:22	06:08	05:08	05:07	05:07	06:23	07:18	08:13	08:13	08:56 (2)	08:72	08:40	09:06 (2)	08:56	08:56 (2)	08:72	08:40	09:06 (2)	08:19
Potential sun hours	250		273		367		420		494		510		512		460		382		328		259		233
Total, worst case		231		407																			917
Sun reduction		0.24		0.23																			0.21
Oper. time red.		1.00		1.00																			1.00
Wind dir. red.		0.63		0.62																			0.63
Total reduction		0.15		0.14																			0.13
Total, real		35		59																			119

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: KX - H310

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: KY - H311

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KZ - H312

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:28 (5)	07:16	17:17 (4)	07:01	05:52	20:01 (2)	05:03		
	16:15	17:06	6 16:34 (5)	18:02	17:34 (4)	20:00	20:55	25 20:26 (2)	21:45		
2	08:44	08:12	16:28 (5)	07:14	17:16 (4)	06:59	05:50	20:01 (2)	05:02		
	16:16	17:08	9 16:37 (5)	18:04	20 17:36 (4)	20:02	20:57	26 20:27 (2)	21:46		
3	08:43	08:10	16:28 (5)	07:11	17:15 (4)	06:56	05:48	20:00 (2)	05:01		
	16:17	17:10	11 16:39 (5)	18:06	23 17:38 (4)	20:04	20:59	29 20:29 (2)	21:48		
4	08:43	08:08	16:27 (5)	07:09	17:15 (4)	06:54	05:46	20:00 (2)	05:00		
	16:18	17:12	14 16:41 (5)	18:07	26 17:41 (4)	20:06	21:01	29 20:29 (2)	21:49		
5	08:43	08:07	16:27 (5)	07:07	17:14 (4)	06:51	05:44	20:00 (2)	04:59		
	16:19	17:14	16 16:43 (5)	18:09	28 17:42 (4)	20:07	21:03	29 20:29 (2)	21:50		
6	08:42	08:05	16:27 (5)	07:04	17:14 (4)	06:49	05:42	20:00 (2)	04:59		
	16:21	17:16	18 16:45 (5)	18:11	31 17:45 (4)	20:09	21:04	28 20:28 (2)	21:51		
7	08:42	08:03	16:27 (5)	07:02	17:13 (4)	06:47	05:40	20:01 (2)	04:58		
	16:22	17:18	20 16:47 (5)	18:13	33 17:46 (4)	20:11	21:06	27 20:28 (2)	21:52		
8	08:42	08:01	16:27 (5)	07:00	17:13 (4)	06:44	05:38	20:01 (2)	04:57		
	16:24	17:20	23 16:50 (5)	18:15	35 17:48 (4)	20:13	21:08	27 20:28 (2)	21:53		
9	08:41	07:59	16:28 (5)	06:57	17:13 (4)	06:42	05:36	20:02 (2)	04:57		
	16:25	17:22	22 16:50 (5)	18:17	34 17:47 (4)	20:15	21:10	25 20:27 (2)	21:54		
10	08:40	07:57	16:29 (5)	06:55	17:13 (4)	06:39	05:34	20:02 (2)	04:56		
	16:26	17:24	20 16:49 (5)	18:19	34 17:47 (4)	20:17	21:11	24 20:26 (2)	21:55		
11	08:40	07:55	16:29 (5)	06:52	17:14 (4)	06:37	05:33	20:04 (2)	04:56		
	16:28	17:26	20 16:49 (5)	18:21	33 17:47 (4)	20:19	21:13	21 20:25 (2)	21:55		
12	08:39	07:53	16:30 (5)	06:50	17:14 (4)	06:35	05:31	20:04 (2)	04:55		
	16:30	17:28	17 16:47 (5)	18:23	31 17:45 (4)	20:20	21:15	20 20:24 (2)	21:56		
13	08:38	07:51	16:31 (5)	06:48	17:15 (4)	06:32	05:29	20:05 (2)	04:55		
	16:31	17:30	15 16:46 (5)	18:25	30 17:45 (4)	20:22	21:17	17 20:22 (2)	21:57		
14	08:37	07:49	16:33 (5)	06:45	17:15 (4)	06:30	05:27	20:07 (2)	04:55		
	16:33	17:32	11 16:44 (5)	18:27	28 17:43 (4)	20:24	21:18	14 20:21 (2)	21:57		
15	08:36	07:47		06:43	17:17 (4)	06:28	05:26	20:09 (2)	04:54		
	16:34	17:34		18:28	29 18:02 (3)	20:26	21:20	10 20:19 (2)	21:58		
16	08:35	07:45		06:40	17:18 (4)	06:25	05:24		04:54		
	16:36	17:36		18:30	28 18:04 (3)	20:28	21:22		21:59		
17	08:34	07:43		06:38	17:20 (4)	06:23	05:22		04:54		
	16:38	17:38		18:32	27 18:06 (3)	20:30	21:23		21:59		
18	08:33	07:41		06:35	17:24 (4)	06:21	05:21		04:54		
	16:40	17:40		18:34	20 18:07 (3)	20:31	21:25		22:00		
19	08:32	07:39		06:33	17:55 (3)	06:18	05:19		04:54		
	16:41	17:42		18:36	15 18:10 (3)	20:33	21:27		22:00		
20	08:31	07:36		06:31	17:54 (3)	06:16	05:18		04:54		
	16:43	17:44		18:38	17 18:11 (3)	20:35	21:28		22:00		
21	08:30	07:34		06:28	17:55 (3)	06:14	05:16		04:54		
	16:45	17:46		18:40	18 18:13 (3)	20:37	21:30		22:01		
22	08:28	07:32		06:26	17:54 (3)	06:12	05:15		04:55		
	16:47	17:48		18:41	21 18:15 (3)	20:39	21:31		22:01		
23	08:27	07:30		06:23	17:55 (3)	06:09	05:13		04:55		
	16:49	17:50		18:43	19 18:14 (3)	20:41	3 20:12 (2)	21:33	22:01		
24	08:26	07:28		06:21	17:56 (3)	06:07	05:12		04:55		
	16:50	17:52		18:45	16 18:12 (3)	20:42	7 20:14 (2)	21:34	22:01		
25	08:24	07:25	17:24 (4)	06:18	17:58 (3)	06:05	05:11		04:55		
	16:52	17:54	2 17:26 (4)	18:47	13 18:11 (3)	20:44	9 20:15 (2)	21:36	22:01		
26	08:23	07:23	17:22 (4)	06:16	18:00 (3)	06:03	05:09		04:56		
	16:54	17:56	6 17:28 (4)	18:49	7 18:07 (3)	20:46	13 20:17 (2)	21:37	22:01		
27	08:22	07:21	17:20 (4)	06:13		06:01	05:08		04:56		
	16:56	17:58	11 17:31 (4)	18:51		20:48	16 20:19 (2)	21:39	22:01		
28	08:20	07:18	17:18 (4)	06:11		05:58	20:03 (2)	05:07	04:57		
	16:58	18:00	14 17:32 (4)	18:53		20:50	18 20:21 (2)	21:40	22:01		
29	08:18			07:08		05:56	20:02 (2)	05:06	04:57		
	17:00			19:54		20:52	20 20:22 (2)	21:41	22:01		
30	08:17			07:06		05:54	20:01 (2)	05:05	04:58		
	17:02			19:56		20:53	23 20:24 (2)	21:43	22:00		
31	08:15	16:29 (5)		07:04			05:04				
	17:04	3 16:32 (5)		19:58			21:44				
Potential sun hours	250		273	367		420		494		510	
Total, worst case		3	255	633		109		351			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	0		39	116		25		86			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: KZ - H312

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	05:39	20:14 (2)	06:33		07:26	17:53 (4)	07:24		15:58 (5)	08:19
	22:00	21:25	20:35 (2)	20:18		19:05	18:24 (4)	16:54	21	16:19 (5)	16:10
2	04:59	05:40	20:14 (2)	06:35		07:28	17:52 (4)	07:26		15:57 (5)	08:21
	22:00	21:23	20:36 (2)	20:16		19:02	18:25 (4)	16:52	23	16:20 (5)	16:09
3	05:00	05:42	20:12 (2)	06:36		07:30	17:51 (4)	07:28		15:57 (5)	08:22
	21:59	21:21	20:36 (2)	20:13		19:00	18:25 (4)	16:50	22	16:19 (5)	16:08
4	05:01	05:44	20:12 (2)	06:38		07:31	17:51 (4)	07:30		15:57 (5)	08:24
	21:59	21:19	20:37 (2)	20:11		18:57	18:25 (4)	16:48	20	16:17 (5)	16:08
5	05:02	05:45	20:11 (2)	06:40		07:33	17:50 (4)	07:32		15:57 (5)	08:25
	21:58	21:17	20:37 (2)	20:09		18:55	18:25 (4)	16:46	18	16:15 (5)	16:07
6	05:03	05:47	20:11 (2)	06:42		07:35	17:50 (4)	07:34		15:57 (5)	08:26
	21:58	21:15	20:38 (2)	20:06		18:52	18:24 (4)	16:44	15	16:12 (5)	16:07
7	05:04	05:49	20:10 (2)	06:43		07:37	17:49 (4)	07:36		15:57 (5)	08:28
	21:57	21:13	20:39 (2)	20:04		18:50	18:21 (4)	16:43	13	16:10 (5)	16:06
8	05:05	05:50	20:09 (2)	06:45		07:39	17:49 (4)	07:38		15:58 (5)	08:29
	21:56	21:11	20:38 (2)	20:01		18:48	18:18 (4)	16:41	10	16:08 (5)	16:06
9	05:06	05:52	20:10 (2)	06:47		07:41	17:49 (4)	07:40		15:58 (5)	08:30
	21:55	21:10	20:39 (2)	19:59		18:45	18:16 (4)	16:39	8	16:06 (5)	16:05
10	05:07	05:54	20:09 (2)	06:49		07:42	17:49 (4)	07:42		16:00 (5)	08:31
	21:55	21:07	20:37 (2)	19:56		18:43	18:14 (4)	16:37	5	16:05 (5)	16:05
11	05:08	05:56	20:09 (2)	06:50		07:44	17:50 (4)	07:44		16:01 (5)	08:33
	21:54	21:05	20:35 (2)	19:54		18:40	18:11 (4)	16:35	2	16:03 (5)	16:05
12	05:09	05:57	20:09 (2)	06:52		07:46	17:50 (4)	07:45			08:34
	21:53	21:03	20:34 (2)	19:51		18:38	18:09 (4)	16:34			16:05
13	05:10	05:59	20:09 (2)	06:54		07:48	17:51 (4)	07:47			08:35
	21:52	21:01	20:31 (2)	19:49		18:36	18:07 (4)	16:32			16:05
14	05:12	06:01	20:09 (2)	06:56		07:50	17:52 (4)	07:49			08:36
	21:51	20:59	20:29 (2)	19:47		18:33	18:04 (4)	16:31			16:04
15	05:13	06:03	20:10 (2)	06:58		07:52	17:53 (4)	07:51			08:37
	21:50	20:57	20:28 (2)	19:44		18:31	18:02 (4)	16:29			16:05
16	05:14	06:04	20:10 (2)	06:59		07:54	17:55 (4)	07:53			08:38
	21:49	20:55	20:25 (2)	19:42		18:29	17:59 (4)	16:27			16:05
17	05:16	06:06	20:11 (2)	07:01	18:50 (3)	07:55		07:55			08:38
	21:47	20:53	20:23 (2)	19:39	4	18:54 (3)	18:26	16:26			16:05
18	05:17	06:08	20:12 (2)	07:03		07:57	18:46 (3)	07:57			08:39
	21:46	20:50	20:22 (2)	19:37	11	18:57 (3)	18:24	16:24			16:05
19	05:18	06:10	20:13 (2)	07:05		07:59	18:44 (3)	07:59			08:40
	21:45	20:48	20:19 (2)	19:34	15	18:59 (3)	18:22	16:23			16:05
20	05:20	06:12	20:15 (2)	07:06		08:01	18:42 (3)	08:00			08:41
	21:44	20:46	20:17 (2)	19:32	18	19:00 (3)	18:20	16:22			16:06
21	05:21	06:13		07:08		08:03	18:40 (3)	08:02			08:41
	21:42	20:44		19:29	20	19:00 (3)	18:17	16:20			16:06
22	05:23	06:15		07:10		08:05	18:39 (3)	08:05			08:42
	21:41	20:42		19:27	19	18:58 (3)	18:15	16:19			16:06
23	05:24	06:17		07:12		08:07	18:39 (3)	08:07			08:42
	21:39	20:39		19:24	17	18:56 (3)	18:13	16:18			16:07
24	05:26	06:19		07:13		08:09	18:39 (3)	08:08			08:43
	21:38	20:37		19:22	15	18:54 (3)	18:11	16:17			16:08
25	05:27	06:20		07:15		07:11	18:09 (4)	08:09			08:43
	21:36	20:35		19:19	16	18:51 (3)	17:09	16:16			16:08
26	05:29	06:22		07:17		07:13	18:03 (4)	07:13			08:43
	21:35	20:32		19:17	25	18:48 (3)	17:06	16:14			16:09
27	05:30	06:24		07:19		07:14	18:00 (4)	07:14	16:06 (5)		08:44
	21:33	20:30		19:14	28	18:46 (3)	17:04	5	16:11 (5)	16:13	16:10
28	05:32	20:22 (2)	06:26	07:21		07:16	17:58 (4)	07:16	16:02 (5)	08:14	08:44
	21:32	20:28 (2)	20:28	19:12	29	18:44 (3)	17:02	12	16:14 (5)	16:12	16:11
29	05:34	20:19 (2)	06:27	07:22		07:18	17:56 (4)	07:18	16:00 (5)	08:16	08:44
	21:30	20:30 (2)	20:25	19:09	28	18:41 (3)	17:00	16	16:16 (5)	16:12	16:11
30	05:35	20:17 (2)	06:29	07:24		07:20	18:43 (4)	07:20	15:59 (5)	08:18	08:44
	21:28	20:32 (2)	20:23	19:07	29	18:23 (4)	16:58	18	16:17 (5)	16:11	16:12
31	05:37	20:16 (2)	06:31			07:22			15:58 (5)		08:44
	21:26	20:34 (2)	20:21			16:56	20	16:18 (5)			16:13
Potential sun hours	512	460		382		328		259			233
Total, worst case	50		416	274		466		157			
Sun reduction	0.32		0.34	0.32		0.29		0.27			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.65		0.65	0.68		0.67		0.66			
Total reduction	0.21		0.22	0.22		0.20		0.17			
Total, real	10		92	59		92		27			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LA - H313

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	19:08 (3)	05:52
	16:15	17:06	18:02	20:00	7 19:15 (3)	20:25 (2)
2	08:44	08:12	07:14	06:59	20:55	1 20:26 (2)
	16:16	17:08	18:04	20:02	05:50	20:22 (2)
3	08:43	08:10	07:11	06:56	20:57	5 20:27 (2)
	16:17	17:10	18:06	20:04	05:48	20:20 (2)
4	08:43	08:08	16:39 (5)	07:09	20:59	9 20:29 (2)
	16:18	17:12	2 16:41 (5)	18:07	05:46	20:18 (2)
5	08:43	08:07	16:37 (5)	07:07	20:06	12 20:30 (2)
	16:19	17:14	6 16:43 (5)	18:09	05:44	20:17 (2)
6	08:42	08:05	16:36 (5)	07:04	21:03	15 20:32 (2)
	16:21	17:16	9 16:45 (5)	18:11	05:42	20:16 (2)
7	08:42	08:03	16:36 (5)	07:02	21:04	17 20:33 (2)
	16:22	17:18	11 16:47 (5)	18:13	05:40	20:16 (2)
8	08:42	08:01	16:35 (5)	07:00	21:06	20 20:36 (2)
	16:24	17:20	15 16:50 (5)	18:15	05:38	20:15 (2)
9	08:41	07:59	16:35 (5)	06:57	21:08	22 20:37 (2)
	16:25	17:22	17 16:52 (5)	18:17	05:36	20:14 (2)
10	08:40	07:57	16:34 (5)	06:55	21:10	25 20:39 (2)
	16:26	17:24	20 16:54 (5)	18:19	05:34	20:14 (2)
11	08:40	07:55	16:34 (5)	06:52	21:11	26 20:40 (2)
	16:28	17:26	22 16:56 (5)	18:21	05:33	20:14 (2)
12	08:39	07:53	16:33 (5)	06:50	21:13	28 20:42 (2)
	16:30	17:28	24 16:57 (5)	18:23	05:31	20:13 (2)
13	08:38	07:51	16:34 (5)	06:48	21:15	30 20:43 (2)
	16:31	17:30	23 16:57 (5)	18:25	05:29	20:13 (2)
14	08:37	07:49	16:34 (5)	06:45	21:17	29 20:42 (2)
	16:33	17:32	23 16:57 (5)	18:27	05:27	20:14 (2)
15	08:36	07:47	16:35 (5)	06:43	21:18	29 20:43 (2)
	16:34	17:34	22 16:57 (5)	18:28	05:26	20:13 (2)
16	08:35	07:45	16:36 (5)	06:40	21:20	29 20:42 (2)
	16:36	17:36	20 16:56 (5)	18:30	05:24	20:14 (2)
17	08:34	07:43	16:37 (5)	06:38	21:22	29 20:43 (2)
	16:38	17:38	19 16:56 (5)	18:32	05:22	20:14 (2)
18	08:33	07:41	16:38 (5)	06:35	21:23	28 20:42 (2)
	16:40	17:40	15 16:53 (5)	18:34	05:21	20:14 (2)
19	08:32	07:39	16:40 (5)	06:33	21:25	28 20:42 (2)
	16:41	17:42	12 16:52 (5)	18:36	05:19	20:15 (2)
20	08:31	07:36	16:44 (5)	06:31	21:27	27 20:42 (2)
	16:43	17:44	4 16:48 (5)	18:38	05:18	20:15 (2)
21	08:30	07:34		06:28	21:28	26 20:41 (2)
	16:45	17:46		18:40	05:16	20:16 (2)
22	08:28	07:32		06:26	21:30	25 20:41 (2)
	16:47	17:48		18:41	05:15	20:17 (2)
23	08:27	07:30		06:23	21:31	24 20:41 (2)
	16:49	17:50		18:43	05:13	20:17 (2)
24	08:26	07:28		06:21	21:33	22 20:39 (2)
	16:50	17:52		18:45	05:12	20:18 (2)
25	08:24	07:25		06:18	21:34	21 20:39 (2)
	16:52	17:54		18:47	05:11	20:19 (2)
26	08:23	07:23		06:16	21:36	19 20:38 (2)
	16:54	17:56		18:49	05:09	20:20 (2)
27	08:22	07:21		06:13	21:37	18 20:38 (2)
	16:56	17:58		18:51	05:08	20:21 (2)
28	08:20	07:18		06:11	21:39	16 20:37 (2)
	16:58	18:00		18:53	05:07	20:22 (2)
29	08:18			07:08	21:40	14 20:36 (2)
	17:00			19:54	05:06	20:24 (2)
30	08:17			07:06	21:41	10 20:34 (2)
	17:02			19:56	05:05	20:26 (2)
31	08:15			07:04	21:43	6 20:32 (2)
	17:04			19:58	05:04	22:00
Potential sun hours	250	273	367	420	494	510
Total, worst case		264	789	7	610	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.66	0.67	0.68	0.64	
Total reduction		0.15	0.18	0.24	0.24	
Total, real		40	144	2	149	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LA - H313

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	29	20:24 (2) 20:53 (2)	06:33 20:18		07:26 19:05	18:05 (4) 18:36 (4)	07:24 16:54	16:04 (5) 16:23 (5)	08:19 16:10
2	04:59 22:00	05:40 21:23	28	20:24 (2) 20:52 (2)	06:35 20:16		07:28 19:02	18:05 (4) 18:33 (4)	07:26 16:52	16:04 (5) 16:21 (5)	08:21 16:09
3	05:00 21:59	05:42 21:21	26	20:24 (2) 20:50 (2)	06:36 20:13		07:30 19:00	18:06 (4) 18:31 (4)	07:28 16:50	16:05 (5) 16:19 (5)	08:22 16:08
4	05:01 21:59	05:44 21:19	23	20:25 (2) 20:48 (2)	06:38 20:11		07:31 18:57	18:07 (4) 18:29 (4)	07:30 16:48	16:05 (5) 16:17 (5)	08:24 16:08
5	05:02 21:58	05:45 21:17	21	20:25 (2) 20:46 (2)	06:40 20:09		07:33 18:55	18:08 (4) 18:26 (4)	07:32 16:46	16:06 (5) 16:15 (5)	08:25 16:07
6	05:03 21:58	05:47 21:15	20	20:25 (2) 20:45 (2)	06:42 20:06		07:35 18:52	18:09 (4) 18:24 (4)	07:34 16:44	16:07 (5) 16:12 (5)	08:26 16:07
7	05:04 21:57	05:49 21:13	17	20:26 (2) 20:43 (2)	06:43 20:04		07:37 18:50	18:10 (4) 18:21 (4)	07:36 16:43	16:09 (5) 16:10 (5)	08:28 16:06
8	05:05 21:56	05:50 21:11	14	20:27 (2) 20:41 (2)	06:45 20:01		07:39 18:48	18:12 (4) 18:18 (4)	07:38 16:41	08:29 16:06	
9	05:06 21:55	05:52 21:09	11	20:28 (2) 20:39 (2)	06:47 19:59		07:41 18:45		07:40 16:39	08:30 16:05	
10	05:07 21:55	05:54 21:07	8	20:29 (2) 20:37 (2)	06:49 19:56		07:42 18:43		07:42 16:37	08:31 16:05	
11	05:08 21:54	05:56 21:05	4	20:31 (2) 20:35 (2)	06:50 19:54	19:01 (3) 19:07 (3)	07:44 18:40		07:44 16:35	08:33 16:05	
12	05:09 21:53	05:57 21:03		06:52 19:51	18:58 (3) 19:10 (3)	07:46 18:38	07:45 16:34		07:45 16:33	08:34 16:05	
13	05:10 21:52	05:59 21:01		06:54 19:49	18:56 (3) 19:12 (3)	07:48 18:36	07:47 16:32		07:47 16:32	08:35 16:05	
14	05:12 21:51	20:34 (2) 20:42 (2)	8	06:01 20:59	06:56 19:47	18:53 (3) 19:12 (3)	07:50 18:33		07:49 16:31	08:36 16:04	
15	05:13 21:50	20:32 (2) 20:44 (2)	12	06:03 20:57	06:58 19:44	18:52 (3) 19:13 (3)	07:52 18:31		07:51 16:29	08:37 16:05	
16	05:14 21:49	20:30 (2) 20:45 (2)	15	06:04 20:55	06:59 19:42	18:23 (4) 19:13 (3)	07:54 18:29		07:53 16:27	08:38 16:05	
17	05:16 21:47	20:30 (2) 20:47 (2)	17	06:06 20:53	07:01 19:39	18:19 (4) 19:11 (3)	07:55 18:26		07:55 16:26	08:38 16:05	
18	05:17 21:46	20:29 (2) 20:48 (2)	19	06:08 20:50	07:03 19:37	18:16 (4) 19:08 (3)	07:57 18:24		07:57 16:24	08:39 16:05	
19	05:18 21:45	20:28 (2) 20:48 (2)	20	06:10 20:48	07:05 19:34	18:14 (4) 19:06 (3)	07:59 18:22		07:59 16:23	08:40 16:05	
20	05:20 21:44	20:28 (2) 20:50 (2)	22	06:12 20:46	07:06 19:32	18:13 (4) 19:04 (3)	08:01 18:20		08:00 16:22	08:41 16:06	
21	05:21 21:42	20:27 (2) 20:50 (2)	23	06:13 20:44	07:08 19:29	18:10 (4) 19:01 (3)	08:03 18:17		08:02 16:20	08:41 16:06	
22	05:23 21:41	20:26 (2) 20:50 (2)	24	06:15 20:42	07:10 19:27	18:09 (4) 18:58 (3)	08:05 18:15	17:13 (5) 17:20 (5)	08:04 16:19	08:42 16:06	
23	05:24 21:39	20:26 (2) 20:52 (2)	26	06:17 20:39	07:12 19:24	18:09 (4) 18:56 (3)	08:07 18:13	17:10 (5) 17:23 (5)	08:06 16:18	08:42 16:07	
24	05:26 21:38	20:25 (2) 20:52 (2)	27	06:19 20:37	07:13 19:22	18:08 (4) 18:54 (3)	08:09 18:11	17:08 (5) 17:24 (5)	08:08 16:17	08:43 16:08	
25	05:27 21:36	20:25 (2) 20:53 (2)	28	06:20 20:35	07:15 19:19	18:06 (4) 18:42 (4)	07:11 17:09	16:06 (5) 16:25 (5)	08:09 16:16	08:43 16:08	
26	05:29 21:35	20:25 (2) 20:53 (2)	29	06:22 20:32	07:17 19:17	18:06 (4) 18:43 (4)	07:13 17:06	16:05 (5) 16:26 (5)	08:11 16:14	08:43 16:09	
27	05:30 21:33	20:24 (2) 20:52 (2)	28	06:24 20:30	07:19 19:14	18:06 (4) 18:43 (4)	07:14 17:04	16:04 (5) 16:26 (5)	08:13 16:13	08:44 16:10	
28	05:32 21:32	20:24 (2) 20:53 (2)	29	06:26 20:28	07:21 19:12	18:05 (4) 18:42 (4)	07:16 17:02	16:04 (5) 16:27 (5)	08:14 16:12	08:44 16:11	
29	05:34 21:30	20:24 (2) 20:53 (2)	29	06:27 20:25	07:22 19:09	18:05 (4) 18:41 (4)	07:18 17:00	16:03 (5) 16:27 (5)	08:16 16:12	08:44 16:11	
30	05:35 21:28	20:24 (2) 20:53 (2)	30	06:29 20:23	07:24 19:07	18:05 (4) 18:38 (4)	07:20 16:58	16:03 (5) 16:27 (5)	08:18 16:11	08:44 16:12	
31	05:37 21:26	20:24 (2) 20:54 (2)	30	06:31 20:21			07:22 16:56	16:03 (5) 16:25 (5)		08:44 16:13	
Potential sun hours	512	460		382		328		259		233	
Total, worst case	414	201		649		347		77			
Sun reduction	0.32	0.34		0.32		0.29		0.27			
Oper. time red.	1.00	1.00		1.00		1.00		1.00			
Wind dir. red.	0.64	0.64		0.68		0.66		0.66			
Total reduction	0.21	0.22		0.22		0.19		0.17			
Total, real	86	44		140		67		13			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LB - H314

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14		07:16		07:01		18:44 (4)	05:52		05:03
	16:15	17:06		18:02		20:00	49	19:33 (3)	20:55		21:45
2	08:44	08:12		07:14		06:59		18:44 (4)	05:50		05:02
	16:16	17:08		18:04		20:02	51	19:35 (3)	20:57		21:46
3	08:43	08:10		07:11		06:56		18:46 (4)	05:48		05:01
	16:17	17:10		18:06		20:04	45	19:34 (3)	20:59		21:48
4	08:43	08:08		07:09		06:54		18:48 (4)	05:46		05:00
	16:18	17:12		18:07		20:06	40	19:33 (3)	21:01		21:49
5	08:43	08:07		07:07		06:51		18:49 (4)	05:44		04:59
	16:19	17:14		18:09		20:07	33	19:31 (3)	21:03		21:50
6	08:42	08:05		07:04		06:49		18:53 (4)	05:42		04:59
	16:21	17:16		18:11		20:09	22	19:29 (3)	21:04		21:51
7	08:42	08:03		07:02		06:47		19:20 (3)	05:40		04:58
	16:22	17:18		18:13		20:11	5	19:25 (3)	21:06		21:52
8	08:42	08:01		07:00		06:44			05:38		04:57
	16:24	17:20		18:15		20:13			21:08		21:53
9	08:41	07:59		06:57		06:42			05:36		04:57
	16:25	17:22		18:17		20:15		3	20:39 (2)	21:54	18
10	08:40	07:57		06:55		06:39			05:34	20:34 (2)	04:56
	16:26	17:24		18:19		20:17		6	20:40 (2)	21:55	17
11	08:40	07:55	16:52 (5)	06:52		06:37			05:33	20:33 (2)	04:56
	16:28	17:26	4	16:56 (5)	18:21	20:19		9	20:42 (2)	21:55	16
12	08:39	07:53	16:50 (5)	06:50		06:35			05:31	20:32 (2)	04:55
	16:30	17:28	8	16:58 (5)	18:23	20:20		11	20:43 (2)	21:56	15
13	08:38	07:51	16:49 (5)	06:48		06:32			05:29	20:31 (2)	04:55
	16:31	17:30	11	17:00 (5)	18:25	20:22		13	20:44 (2)	21:57	14
14	08:37	07:49	16:48 (5)	06:45		06:30			05:27	20:31 (2)	04:55
	16:33	17:32	14	17:02 (5)	18:27	20:24		16	20:47 (2)	21:57	13
15	08:36	07:47	16:48 (5)	06:43		06:28			05:26	20:30 (2)	04:55
	16:34	17:34	17	17:05 (5)	18:28	5	18:02 (4)	18	20:48 (2)	21:58	12
16	08:35	07:45	16:48 (5)	06:40		06:25	17:53 (4)		05:24	20:30 (2)	04:54
	16:36	17:36	19	17:07 (5)	18:30	11	18:04 (4)	20	20:50 (2)	21:59	12
17	08:34	07:43	16:48 (5)	06:38		06:23	17:51 (4)		05:22	20:29 (2)	04:54
	16:38	17:38	21	17:09 (5)	18:32	15	18:06 (4)	22	20:51 (2)	21:59	11
18	08:33	07:41	16:47 (5)	06:35		06:21	17:49 (4)		05:21	20:29 (2)	04:54
	16:40	17:40	24	17:11 (5)	18:34	18	18:07 (4)	24	20:53 (2)	22:00	10
19	08:32	07:39	16:47 (5)	06:33		06:18	17:48 (4)		05:19	20:29 (2)	04:54
	16:41	17:42	24	17:11 (5)	18:36	22	18:10 (4)	25	20:54 (2)	22:00	9
20	08:31	07:36	16:48 (5)	06:31		06:16	17:46 (4)		05:18	20:28 (2)	04:54
	16:43	17:44	23	17:11 (5)	18:38	25	18:11 (4)	27	20:55 (2)	22:00	9
21	08:30	07:34	16:48 (5)	06:28		06:14	17:46 (4)		05:16	20:29 (2)	04:54
	16:45	17:46	23	17:11 (5)	18:40	27	18:13 (4)	28	20:57 (2)	22:01	9
22	08:28	07:32	16:48 (5)	06:26		06:12	17:44 (4)		05:15	20:29 (2)	04:55
	16:47	17:48	21	17:09 (5)	18:41	31	18:15 (4)	28	20:57 (2)	22:01	9
23	08:27	07:30	16:49 (5)	06:23		06:09	17:44 (4)		05:13	20:28 (2)	04:55
	16:49	17:50	19	17:08 (5)	18:43	33	18:17 (4)	29	20:57 (2)	22:01	9
24	08:26	07:28	16:51 (5)	06:21		06:07	17:43 (4)		05:12	20:29 (2)	04:55
	16:50	17:52	16	17:07 (5)	18:45	35	18:18 (4)	28	20:57 (2)	22:01	9
25	08:24	07:25	16:53 (5)	06:18		06:05	17:43 (4)		05:11	20:29 (2)	04:55
	16:52	17:54	11	17:04 (5)	18:47	38	18:21 (3)	28	20:57 (2)	22:01	10
26	08:23	07:23	16:57 (5)	06:16		06:03	17:42 (4)		05:09	20:29 (2)	04:56
	16:54	17:56	3	17:00 (5)	18:49	40	18:22 (3)	28	20:57 (2)	22:01	11
27	08:22	07:21		06:13		06:01	17:42 (4)		05:08	20:30 (2)	04:56
	16:56	17:58		18:51		20:48	42	18:24 (3)	21:39	20:57 (2)	22:01
28	08:20	07:18		06:11		05:58		17:43 (4)	05:07	20:30 (2)	04:57
	16:58	18:00		18:53		20:50	43	18:26 (3)	21:40	20:57 (2)	22:01
29	08:18			07:08		05:56		18:42 (4)	05:06	20:31 (2)	04:57
	17:00			19:54		20:52	46	19:28 (3)	21:41	20:57 (2)	22:01
30	08:17			07:06		05:54		18:43 (4)	05:05	20:31 (2)	04:58
	17:02			19:56		20:53	47	19:30 (3)	21:43	20:56 (2)	22:00
31	08:15			07:04		05:54		18:43 (4)	05:04	20:31 (2)	
	17:04			19:58		20:53	48	19:31 (3)	21:44	20:56 (2)	
Potential sun hours	250	273		367		420			494		510
Total, worst case			258		526		245		493		435
Sun reduction			0.23		0.27		0.35		0.38		0.32
Oper. time red.			1.00		1.00		1.00		1.00		1.00
Wind dir. red.			0.67		0.68		0.67		0.63		0.63
Total reduction			0.15		0.18		0.24		0.24		0.20
Total, real			40		96		58		119		88

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LB - H314

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:43 (2)	05:39	20:43 (2)	06:33		07:26	07:24	08:19		
	22:00	15	20:58 (2)	21:25	10	20:53 (2)	20:18		16:54	16:10	
2	04:59	20:43 (2)	05:40	20:43 (2)	06:35		07:28	07:26	08:21		
	22:00	16	20:59 (2)	21:23	8	20:52 (2)	20:16		16:52	16:09	
3	05:00	20:42 (2)	05:42	20:42 (2)	06:36		07:30	07:28	08:22		
	21:59	17	20:59 (2)	21:21	5	20:50 (2)	20:13		16:50	16:08	
4	05:01	20:42 (2)	05:44	20:42 (2)	06:38		07:31	07:30	08:24		
	21:59	18	21:00 (2)	21:19		20:11	18:57		16:48	16:08	
5	05:02	20:42 (2)	05:45		06:40	19:17 (3)	07:33	07:32	08:25		
	21:58	18	21:00 (2)	21:17		20:09	18:55		16:46	16:07	
6	05:03	20:41 (2)	05:47		06:42	18:50 (4)	07:35	07:34	08:26		
	21:58	20	21:01 (2)	21:15		20:06	18:52		16:44	16:07	
7	05:04	20:41 (2)	05:49		06:43	18:45 (4)	07:37	07:36	08:28		
	21:57	21	21:02 (2)	21:13		20:04	18:50		16:43	16:06	
8	05:05	20:41 (2)	05:51		06:45	18:42 (4)	07:39	07:38	08:29		
	21:56	21	21:02 (2)	21:11		20:01	18:48		16:41	16:06	
9	05:06	20:41 (2)	05:52		06:47	18:40 (4)	07:41	07:40	08:30		
	21:55	22	21:03 (2)	21:09		19:59	18:45		16:39	16:05	
10	05:07	20:40 (2)	05:54		06:49	18:38 (4)	07:42	07:42	08:31		
	21:55	23	21:03 (2)	21:07		19:56	18:43		16:37	16:05	
11	05:08	20:40 (2)	05:56		06:50	18:36 (4)	07:44	07:44	08:33		
	21:54	24	21:04 (2)	21:05		19:54	18:40		16:35	16:05	
12	05:09	20:40 (2)	05:57		06:52	18:35 (4)	07:46	07:45	08:34		
	21:53	24	21:04 (2)	21:03		19:51	18:38		16:34	16:05	
13	05:10	20:40 (2)	05:59		06:54	18:34 (4)	07:48	07:47	08:35		
	21:52	25	21:05 (2)	21:01		19:49	18:36		16:32	16:05	
14	05:12	20:39 (2)	06:01		06:56	18:33 (4)	07:50	07:49	08:36		
	21:51	26	21:05 (2)	20:59		19:47	18:33		16:31	16:04	
15	05:13	20:39 (2)	06:03		06:58	18:32 (4)	07:52	07:51	08:37		
	21:50	26	21:05 (2)	20:57		19:44	18:31		16:29	16:05	
16	05:14	20:38 (2)	06:04		06:59	18:32 (4)	07:54	17:27 (5)	07:53	08:38	
	21:49	27	21:05 (2)	20:55		19:42	18:29	8	17:35 (5)	16:27	16:05
17	05:16	20:39 (2)	06:06		07:01	18:30 (4)	07:55	17:24 (5)	07:55	08:38	
	21:47	27	21:06 (2)	20:53		19:39	18:26	13	17:37 (5)	16:26	16:05
18	05:17	20:39 (2)	06:08		07:03	18:30 (4)	07:57	17:22 (5)	07:57	08:39	
	21:46	27	21:06 (2)	20:50		19:37	18:24	17	17:39 (5)	16:24	16:05
19	05:18	20:38 (2)	06:10		07:05	18:30 (4)	07:59	17:20 (5)	07:59	08:40	
	21:45	28	21:06 (2)	20:48		19:34	18:22	20	17:40 (5)	16:23	16:05
20	05:20	20:39 (2)	06:12		07:06	18:30 (4)	08:01	17:19 (5)	08:00	08:41	
	21:44	28	21:07 (2)	20:46		19:32	18:20	22	17:41 (5)	16:22	16:06
21	05:21	20:39 (2)	06:13		07:08	18:30 (4)	08:03	17:18 (5)	08:02	08:41	
	21:42	28	21:07 (2)	20:44		19:29	18:17	23	17:41 (5)	16:20	16:06
22	05:23	20:38 (2)	06:15		07:10	18:30 (4)	08:05	17:18 (5)	08:04	08:42	
	21:41	29	21:07 (2)	20:42		19:27	18:15	23	17:41 (5)	16:19	16:06
23	05:24	20:39 (2)	06:17		07:12	18:31 (4)	08:07	17:17 (5)	08:06	08:42	
	21:39	28	21:07 (2)	20:39		19:24	18:13	25	17:42 (5)	16:18	16:07
24	05:26	20:39 (2)	06:19		07:13	18:31 (4)	08:09	17:17 (5)	08:08	08:43	
	21:38	26	21:05 (2)	20:37		19:22	18:11	24	17:41 (5)	16:17	16:08
25	05:27	20:40 (2)	06:20		07:15	18:31 (4)	07:11	16:17 (5)	08:09	08:43	
	21:36	24	21:04 (2)	20:35		19:19	18:09	21	16:38 (5)	16:16	16:08
26	05:29	20:39 (2)	06:22		07:17	18:33 (4)	07:13	16:17 (5)	08:11	08:43	
	21:35	23	21:02 (2)	20:32		19:17	17:06	19	16:36 (5)	16:14	16:09
27	05:30	20:39 (2)	06:24		07:19	18:34 (4)	07:14	16:18 (5)	08:13	08:44	
	21:33	21	21:00 (2)	20:30		19:14	17:04	16	16:34 (5)	16:13	16:10
28	05:32	20:40 (2)	06:26		07:21	18:36 (4)	07:16	16:18 (5)	08:14	08:44	
	21:32	19	20:59 (2)	20:28		19:12	17:02	13	16:31 (5)	16:12	16:11
29	05:34	20:40 (2)	06:27		07:22	18:40 (4)	07:18	16:19 (5)	08:16	08:44	
	21:30	17	20:57 (2)	20:25		19:09	17:00	10	16:29 (5)	16:12	16:11
30	05:35	20:41 (2)	06:29		07:24		07:20		16:20 (5)	08:18	08:44
	21:28	15	20:56 (2)	20:23		19:07	16:58	7	16:27 (5)	16:11	16:12
31	05:37	20:42 (2)	06:31				07:22		16:21 (5)		08:44
	21:26	13	20:55 (2)	20:21			16:56	4	16:25 (5)		16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	696		23		783		265				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.63		0.63		0.67		0.67				
Total reduction	0.20		0.22		0.22		0.19				
Total, real	142		5		169		52				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LC - H315

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	05:52	20:02 (3) 05:03 20:08 (4)
	16:15	17:06	18:02	20:00	20:55	24 20:26 (4) 21:45 36 20:44 (4)
2	08:44	08:12	07:14	06:59	05:50	20:02 (3) 05:02 20:09 (4)
	16:16	17:08	18:04	20:02	20:57	25 20:27 (4) 21:46 35 20:44 (4)
3	08:43	08:10	07:11	06:56	05:48	20:02 (3) 05:01 20:10 (4)
	16:17	17:10	18:06	20:04	20:59	27 20:29 (4) 21:48 34 20:44 (4)
4	08:43	08:08	07:09	06:54	05:46	20:03 (3) 05:00 20:10 (4)
	16:18	17:12	18:07	20:06	21:01	27 20:30 (4) 21:49 33 20:43 (4)
5	08:43	08:07	07:07	06:51	05:44	20:03 (3) 04:59 20:11 (4)
	16:20	17:14	18:09	20:07	21:03	29 20:32 (4) 21:50 33 20:44 (4)
6	08:42	08:05	07:04	06:49	05:42	20:04 (3) 04:59 20:11 (4)
	16:21	17:16	18:11	20:09	21:04	29 20:33 (4) 21:51 32 20:43 (4)
7	08:42	08:03	07:02	06:47	05:40	20:06 (3) 04:58 20:11 (4)
	16:22	17:18	18:13	20:11	21:06	30 20:36 (4) 21:52 32 20:43 (4)
8	08:41	08:01	07:00	17:43 (5) 06:44	05:38	20:07 (3) 04:57 20:12 (4)
	16:24	17:20	18:15	5 17:48 (5) 20:13	21:08	30 20:37 (4) 21:53 31 20:43 (4)
9	08:41	07:59	06:57	17:39 (5) 06:42	05:36	20:07 (4) 04:57 20:12 (4)
	16:25	17:22	18:17	11 17:50 (5) 20:15	21:10	32 20:39 (4) 21:54 30 20:42 (4)
10	08:40	07:57	06:55	17:37 (5) 06:39	05:34	20:06 (4) 04:56 20:13 (4)
	16:27	17:24	18:19	15 17:52 (5) 20:17	21:11	34 20:40 (4) 21:55 29 20:42 (4)
11	08:40	07:55	06:52	17:36 (5) 06:37	05:33	20:06 (4) 04:56 20:14 (4)
	16:28	17:26	18:21	19 17:55 (5) 20:19	21:13	36 20:42 (4) 21:55 29 20:43 (4)
12	08:39	07:53	06:50	17:34 (5) 06:35	05:31	20:05 (4) 04:55 20:15 (4)
	16:30	17:28	18:23	22 17:56 (5) 20:20	21:15	38 20:43 (4) 21:56 28 20:43 (4)
13	08:38	07:51	06:48	17:34 (5) 06:32	05:29	20:04 (4) 04:55 20:15 (4)
	16:31	17:30	18:25	24 17:58 (5) 20:22	21:17	40 20:44 (4) 21:57 27 20:42 (4)
14	08:37	07:49	06:45	17:32 (5) 06:30	05:27	20:05 (4) 04:55 20:15 (4)
	16:33	17:32	18:27	28 18:00 (5) 20:24	21:18	40 20:45 (4) 21:57 27 20:42 (4)
15	08:36	07:47	06:43	17:32 (5) 06:28	05:26	20:04 (4) 04:55 20:16 (4)
	16:34	17:34	18:28	29 18:01 (5) 20:26	21:20	41 20:45 (4) 21:58 26 20:42 (4)
16	08:35	07:45	06:40	17:31 (5) 06:25	05:24	20:04 (4) 04:54 20:17 (4)
	16:36	17:36	18:30	29 18:00 (5) 20:28	21:22	42 20:46 (4) 21:59 25 20:42 (4)
17	08:34	07:43	06:38	17:31 (5) 06:23	05:22	20:04 (4) 04:54 20:17 (4)
	16:38	17:38	18:32	29 18:00 (5) 20:30	21:23	41 20:45 (4) 21:59 25 20:42 (4)
18	08:33	07:41	06:35	17:31 (5) 06:21	05:21	20:04 (4) 04:54 20:17 (4)
	16:40	17:40	18:34	28 17:59 (5) 20:31	21:25	42 20:46 (4) 22:00 25 20:42 (4)
19	08:32	07:39	06:33	17:31 (5) 06:18	05:19	20:05 (4) 04:54 20:18 (4)
	16:41	17:42	18:36	28 17:59 (5) 20:33	21:27	41 20:46 (4) 22:00 24 20:42 (4)
20	08:31	07:36	06:31	17:31 (5) 06:16	05:18	20:04 (4) 04:54 20:18 (4)
	16:43	17:44	18:38	27 17:58 (5) 20:35	21:28	41 20:45 (4) 22:00 25 20:43 (4)
21	08:30	07:34	06:28	17:32 (5) 06:14	05:16	20:05 (4) 04:54 20:18 (4)
	16:45	17:46	18:40	25 17:57 (5) 20:37	21:30	41 20:46 (4) 22:00 25 20:43 (4)
22	08:28	07:32	06:26	17:32 (5) 06:12	20:08 (3) 05:15	20:05 (4) 04:55 20:19 (4)
	16:47	17:48	18:42	23 17:55 (5) 20:39	2 20:10 (3) 21:31	41 20:46 (4) 22:01 25 20:44 (4)
23	08:27	07:30	06:23	17:34 (5) 06:09	20:06 (3) 05:13	20:04 (4) 04:55 20:19 (4)
	16:49	17:50	18:43	20 17:54 (5) 20:41	6 20:12 (3) 21:33	41 20:45 (4) 22:01 24 20:43 (4)
24	08:26	07:28	06:21	17:35 (5) 06:07	20:05 (3) 05:12	20:05 (4) 04:55 20:18 (4)
	16:51	17:52	18:45	17 17:52 (5) 20:42	9 20:14 (3) 21:34	40 20:45 (4) 22:01 25 20:43 (4)
25	08:24	07:25	06:18	17:38 (5) 06:05	20:04 (3) 05:11	20:05 (4) 04:56 20:19 (4)
	16:52	17:54	18:47	11 17:49 (5) 20:44	11 20:15 (3) 21:36	40 20:45 (4) 22:01 25 20:44 (4)
26	08:23	07:23	06:16	06:03	20:03 (3) 05:09	20:06 (4) 04:56 20:19 (4)
	16:54	17:56	18:49	20:46	14 20:17 (3) 21:37	39 20:45 (4) 22:01 25 20:44 (4)
27	08:22	07:21	06:13	06:01	20:03 (3) 05:08	20:06 (4) 04:56 20:18 (4)
	16:56	17:58	18:51	20:48	16 20:19 (3) 21:39	39 20:45 (4) 22:01 26 20:44 (4)
28	08:20	07:18	06:11	05:58	20:02 (3) 05:07	20:07 (4) 04:57 20:19 (4)
	16:58	18:00	18:53	20:50	19 20:21 (3) 21:40	38 20:45 (4) 22:01 26 20:45 (4)
29	08:18		07:08	05:56	20:02 (3) 05:06	20:07 (4) 04:57 20:19 (4)
	17:00		19:54	20:52	20 20:22 (3) 21:41	38 20:45 (4) 22:01 27 20:46 (4)
30	08:17		07:06	05:54	20:02 (3) 05:05	20:07 (4) 04:58 20:18 (4)
	17:02		19:56	20:53	22 20:24 (3) 21:43	37 20:44 (4) 22:00 28 20:46 (4)
31	08:15		07:04		05:04	20:08 (4)
	17:04		19:58		21:44	36 20:44 (4)
Potential sun hours	250	273	367	420	494	510
Total, worst case			390	119	1119	842
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.65	0.64	0.64
Total reduction			0.18	0.23	0.24	0.20
Total, real			71	27	273	172

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LC - H315

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:19 (4)	05:39	20:16 (4)	06:33	07:26	18:13 (5)	07:24	08:19		
	22:00	28	20:47 (4)	21:25	37	20:53 (4)	20:18			16:10	
2	05:00	20:19 (4)	05:40	20:16 (4)	06:35	07:28	18:14 (5)	07:26	08:21		
	22:00	29	20:48 (4)	21:23	36	20:52 (4)	20:16	19:02	19	18:33 (5)	16:52
3	05:00	20:18 (4)	05:42	20:16 (4)	06:36	07:30	18:15 (5)	07:28	08:22		
	21:59	29	20:47 (4)	21:21	34	20:50 (4)	20:13	19:00	16	18:31 (5)	16:50
4	05:01	20:18 (4)	05:44	20:17 (4)	06:38	07:31	18:16 (5)	07:30	08:24		
	21:59	30	20:48 (4)	21:19	31	20:48 (4)	20:11	18:57	13	18:29 (5)	16:48
5	05:02	20:18 (4)	05:45	20:16 (3)	06:40	07:33	18:18 (5)	07:32	08:25		
	21:58	31	20:49 (4)	21:17	30	20:46 (4)	20:09	18:55	8	18:26 (5)	16:46
6	05:03	20:18 (4)	05:47	20:15 (3)	06:42	07:35	18:23 (5)	07:34	08:26		
	21:57	31	20:49 (4)	21:15	30	20:45 (4)	20:06	18:52	1	18:24 (5)	16:44
7	05:04	20:18 (4)	05:49	20:14 (3)	06:43	07:37		07:36		08:28	
	21:57	32	20:50 (4)	21:13	29	20:43 (4)	20:04	18:50		16:43	16:06
8	05:05	20:17 (4)	05:51	20:12 (3)	06:45	07:39		07:38		08:29	
	21:56	34	20:51 (4)	21:11	29	20:41 (4)	20:01	18:48		16:41	16:06
9	05:06	20:17 (4)	05:52	20:12 (3)	06:47	07:41		07:40		08:30	
	21:55	34	20:51 (4)	21:09	27	20:39 (4)	19:59	18:45		16:39	16:05
10	05:07	20:17 (4)	05:54	20:10 (3)	06:49	07:42		07:42		08:31	
	21:55	35	20:52 (4)	21:07	27	20:37 (4)	19:56	18:43		16:37	16:05
11	05:08	20:17 (4)	05:56	20:10 (3)	06:50	07:44		07:44		08:33	
	21:54	35	20:52 (4)	21:05	25	20:35 (4)	19:54	18:40		16:36	16:05
12	05:09	20:16 (4)	05:57	20:10 (3)	06:52	07:46		07:45		08:34	
	21:53	36	20:52 (4)	21:03	24	20:34 (3)	19:51	18:38		16:34	16:05
13	05:11	20:16 (4)	05:59	20:09 (3)	06:54	07:48		07:47		08:35	
	21:52	37	20:53 (4)	21:01	22	20:31 (3)	19:49	18:36		16:32	16:05
14	05:12	20:16 (4)	06:01	20:09 (3)	06:56	07:50		07:49		08:36	
	21:51	37	20:53 (4)	20:59	20	20:29 (3)	19:47	18:33		16:31	16:05
15	05:13	20:15 (4)	06:03	20:10 (3)	06:58	07:52		07:51		08:37	
	21:50	38	20:53 (4)	20:57	18	20:28 (3)	19:44	18:31		16:29	16:05
16	05:14	20:16 (4)	06:05	20:09 (3)	06:59	07:54		07:53		08:38	
	21:49	39	20:55 (4)	20:55	16	20:25 (3)	19:42	18:29		16:27	16:05
17	05:16	20:16 (4)	06:06	20:10 (3)	07:01	07:55		07:55		08:38	
	21:47	39	20:55 (4)	20:53	13	20:23 (3)	19:39	18:26		16:26	16:05
18	05:17	20:15 (4)	06:08	20:11 (3)	07:03	18:26 (5)	07:57	07:57		08:39	
	21:46	40	20:55 (4)	20:50	11	20:22 (3)	19:37	18:36 (5)	10	18:36 (5)	18:24
19	05:18	20:15 (4)	06:10	20:11 (3)	07:05	18:23 (5)	07:59	07:59		08:40	
	21:45	40	20:55 (4)	20:48	8	20:19 (3)	19:34	18:39 (5)	16	18:39 (5)	18:22
20	05:20	20:15 (4)	06:12	20:12 (3)	07:06	18:21 (5)	08:01	08:00		08:41	
	21:44	41	20:56 (4)	20:46	5	20:17 (3)	19:32	18:40 (5)	19	18:40 (5)	18:20
21	05:21	20:15 (4)	06:13	20:14 (3)	07:08	18:18 (5)	08:03	08:02		08:41	
	21:42	41	20:56 (4)	20:44	1	20:15 (3)	19:29	18:41 (5)	23	18:41 (5)	18:17
22	05:23	20:14 (4)	06:15		07:10	18:17 (5)	08:05	08:04		08:42	
	21:41	41	20:55 (4)	20:42		19:27	25	18:42 (5)		18:15	16:19
23	05:24	20:15 (4)	06:17		07:12	18:16 (5)	08:07	08:06		08:42	
	21:39	41	20:56 (4)	20:39		19:24	26	18:42 (5)		18:13	16:18
24	05:26	20:14 (4)	06:19		07:13	18:15 (5)	08:09	08:08		08:43	
	21:38	42	20:56 (4)	20:37		19:22	28	18:43 (5)		18:11	16:17
25	05:27	20:15 (4)	06:20		07:15	18:14 (5)	07:11	08:09		08:43	
	21:36	41	20:56 (4)	20:35		19:19	28	18:42 (5)		17:09	16:18
26	05:29	20:15 (4)	06:22		07:17	18:13 (5)	07:13	08:11		08:43	
	21:35	41	20:56 (4)	20:32		19:17	29	18:42 (5)		17:06	16:15
27	05:30	20:15 (4)	06:24		07:19	18:13 (5)	07:14	08:13		08:44	
	21:33	42	20:57 (4)	20:30		19:14	29	18:42 (5)		17:04	16:13
28	05:32	20:15 (4)	06:26		07:21	18:13 (5)	07:16	08:14		08:44	
	21:32	41	20:56 (4)	20:28		19:12	29	18:42 (5)		17:02	16:11
29	05:34	20:15 (4)	06:28		07:22	18:13 (5)	07:18	08:16		08:44	
	21:30	41	20:56 (4)	20:25		19:09	28	18:41 (5)		17:00	16:12
30	05:35	20:15 (4)	06:29		07:24	18:12 (5)	07:20	08:17		08:44	
	21:28	41	20:56 (4)	20:23		19:07	26	18:38 (5)		16:58	16:11
31	05:37	20:16 (4)	06:31					07:22		08:44	
	21:26	39	20:55 (4)	20:21				16:56		16:13	
Potential sun hours	512		460		382		328		259		233
Total, worst case	1146		473		316		80				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.64		0.64		0.67		0.67				
Total reduction	0.21		0.22		0.22		0.20				
Total, real	237		104		68		16				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LD - H316

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	05:52	20:14 (3) 05:03
	16:15	17:06	18:02	20:00	20:55	12 20:26 (3) 21:45
2	08:44	08:12	07:14	06:59	05:50	20:14 (3) 05:02
	16:16	17:08	18:04	20:02	20:57	13 20:27 (3) 21:46
3	08:43	08:10	07:11	06:56	05:48	20:13 (3) 05:01
	16:17	17:10	18:06	20:04	20:59	16 20:29 (3) 21:48
4	08:43	08:08	07:09	06:54	05:46	20:13 (3) 05:00
	16:18	17:12	18:07	20:06	21:01	17 20:30 (3) 21:49
5	08:43	08:07	07:07	06:51	05:44	20:12 (3) 04:59
	16:20	17:14	18:09	20:07	21:03	20 20:32 (3) 21:50
6	08:42	08:05	07:04	06:49	05:42	20:12 (3) 04:59
	16:21	17:16	18:11	20:09	21:04	21 20:33 (3) 21:51
7	08:42	08:03	07:02	06:47	05:40	20:13 (3) 04:58
	16:22	17:18	18:13	20:11	21:06	23 20:36 (3) 21:52
8	08:41	08:01	07:00	06:44	05:38	20:13 (3) 04:57
	16:24	17:20	18:15	20:13	21:08	23 20:36 (3) 21:53
9	08:41	07:59	06:57	06:42	05:36	20:13 (3) 04:57
	16:25	17:22	18:17	20:15	21:10	23 20:36 (3) 21:54
10	08:40	07:57	06:55	06:39	05:34	20:13 (3) 04:56
	16:27	17:24	18:19	20:17	21:11	22 20:35 (3) 21:55
11	08:40	07:55	06:52	06:37	05:33	20:14 (3) 04:56
	16:28	17:26	18:21	20:19	21:13	25 20:42 (4) 21:55
12	08:39	07:53	06:50	06:35	05:31	20:15 (3) 04:55
	16:30	17:28	18:23	20:20	21:15	27 20:43 (4) 21:56
13	08:38	07:51	06:48	17:55 (5) 06:32	05:29	20:15 (3) 04:55
	16:31	17:30	18:25	17:58 (5) 20:22	21:17	28 20:44 (4) 21:57
14	08:37	07:49	06:45	17:51 (5) 06:30	05:27	20:17 (3) 04:55
	16:33	17:32	18:27	18:00 (5) 20:24	21:18	30 20:47 (4) 21:57
15	08:36	07:47	06:43	17:49 (5) 06:28	05:26	20:18 (3) 04:55
	16:34	17:34	18:28	18:02 (5) 20:26	21:20	29 20:48 (4) 21:58
16	08:35	07:45	06:40	17:46 (5) 06:25	05:24	20:21 (3) 04:54
	16:36	17:36	18:30	18:04 (5) 20:28	21:22	27 20:50 (4) 21:59
17	08:34	07:43	06:38	17:45 (5) 06:23	05:22	20:29 (4) 04:54
	16:38	17:38	18:32	18:06 (5) 20:30	21:23	22 20:51 (4) 21:59
18	08:33	07:41	06:35	17:44 (5) 06:21	05:21	20:29 (4) 04:54
	16:40	17:40	18:34	18:07 (5) 20:31	21:25	24 20:53 (4) 22:00
19	08:32	07:39	06:33	17:43 (5) 06:18	05:19	20:28 (4) 04:54
	16:41	17:42	18:36	18:10 (5) 20:33	21:27	26 20:54 (4) 22:00
20	08:31	07:36	06:31	17:42 (5) 06:16	05:18	20:27 (4) 04:54
	16:43	17:44	18:38	18:11 (5) 20:35	21:28	28 20:55 (4) 22:00
21	08:30	07:34	06:28	17:42 (5) 06:14	05:16	20:27 (4) 04:54
	16:45	17:46	18:40	18:12 (5) 20:37	21:30	30 20:57 (4) 22:00
22	08:28	07:32	06:26	17:41 (5) 06:12	05:15	20:27 (4) 04:55
	16:47	17:48	18:42	18:11 (5) 20:39	21:31	32 20:59 (4) 22:01
23	08:27	07:30	06:23	17:41 (5) 06:09	05:13	20:26 (4) 04:55
	16:49	17:50	18:43	18:11 (5) 20:41	21:33	33 20:59 (4) 22:01
24	08:26	07:28	06:21	17:41 (5) 06:07	05:12	20:26 (4) 04:55
	16:51	17:52	18:45	18:10 (5) 20:42	21:34	35 21:01 (4) 22:01
25	08:24	07:25	06:18	17:41 (5) 06:05	05:11	20:26 (4) 04:56
	16:52	17:54	18:47	18:10 (5) 20:44	21:36	36 21:02 (4) 22:01
26	08:23	07:23	06:16	17:42 (5) 06:03	05:09	20:26 (4) 04:56
	16:54	17:56	18:49	18:09 (5) 20:46	21:37	38 21:04 (4) 22:01
27	08:22	07:21	06:13	17:42 (5) 06:01	05:08	20:26 (4) 04:56
	16:56	17:58	18:51	18:07 (5) 20:48	21:39	39 21:05 (4) 22:01
28	08:20	07:18	06:11	17:43 (5) 05:58	20:18 (3) 05:07	20:26 (4) 04:57
	16:58	18:00	18:53	18:06 (5) 20:50	3 20:21 (3) 21:40	40 21:06 (4) 22:01
29	08:18		07:09	18:44 (5) 05:56	20:16 (3) 05:06	20:26 (4) 04:58
	17:00		19:54	19:04 (5) 20:52	6 20:22 (3) 21:41	41 21:07 (4) 22:01
30	08:17		07:06	18:46 (5) 05:54	20:15 (3) 05:05	20:26 (4) 04:58
	17:02		19:56	19:02 (5) 20:53	9 20:24 (3) 21:43	41 21:07 (4) 22:00
31	08:15		07:04	18:48 (5)	05:04	20:25 (4)
	17:04		19:58	18:59 (5)	21:44	42 21:07 (4)
Potential sun hours	250	273	367	420	494	510
Total, worst case			413	18	863	1238
Sun reduction			0.27	0.35	0.38	0.32
Oper. time red.			1.00	1.00	1.00	1.00
Wind dir. red.			0.67	0.64	0.63	0.63
Total reduction			0.18	0.23	0.24	0.20
Total, real			76	4	208	248

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LD - H316

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July			August			September			October		November		December	
1	04:59		20:32 (4)	05:39		20:25 (3)	06:33			07:26		07:24		08:19	
	22:00	41	21:13 (4)	21:25	25	20:53 (4)	20:18			19:05		16:54		16:10	
2	05:00		20:33 (4)	05:40		20:25 (3)	06:35			07:28		07:26		08:21	
	22:00	41	21:14 (4)	21:23	22	20:52 (4)	20:16			19:02		16:52		16:09	
3	05:00		20:32 (4)	05:42		20:23 (3)	06:36			07:30		07:28		08:22	
	21:59	41	21:13 (4)	21:21	22	20:45 (3)	20:13			19:00		16:50		16:08	
4	05:01		20:32 (4)	05:44		20:23 (3)	06:38			07:31		07:30		08:24	
	21:59	42	21:14 (4)	21:19	23	20:46 (3)	20:11			18:57		16:48		16:08	
5	05:02		20:33 (4)	05:45		20:22 (3)	06:40			07:33		07:32		08:25	
	21:58	41	21:14 (4)	21:17	24	20:46 (3)	20:09			18:55		16:46		16:07	
6	05:03		20:33 (4)	05:47		20:22 (3)	06:42			07:35		07:34		08:26	
	21:57	42	21:15 (4)	21:15	23	20:45 (3)	20:06			18:52		16:44		16:07	
7	05:04		20:33 (4)	05:49		20:23 (3)	06:43			07:37		07:36		08:28	
	21:57	42	21:15 (4)	21:13	20	20:43 (3)	20:04			18:50		16:43		16:06	
8	05:05		20:33 (4)	05:51		20:22 (3)	06:45			07:39		07:38		08:29	
	21:56	42	21:15 (4)	21:11	19	20:41 (3)	20:01			18:48		16:41		16:06	
9	05:06		20:34 (4)	05:52		20:22 (3)	06:47			07:41		07:40		08:30	
	21:55	41	21:15 (4)	21:09	17	20:39 (3)	19:59			18:45		16:39		16:05	
10	05:07		20:34 (4)	05:54		20:22 (3)	06:49			07:42		07:42		08:31	
	21:55	41	21:15 (4)	21:07	15	20:37 (3)	19:56			18:43		16:37		16:05	
11	05:08		20:34 (4)	05:56		20:22 (3)	06:50			07:44		07:44		08:33	
	21:54	42	21:16 (4)	21:05	13	20:35 (3)	19:54			18:40		16:36		16:05	
12	05:09		20:34 (4)	05:57		20:23 (3)	06:52		18:41 (5)	07:46		07:45		08:34	
	21:53	42	21:16 (4)	21:03	11	20:34 (3)	19:51	9	18:50 (5)	18:38		16:34		16:05	
13	05:11		20:34 (4)	05:59		20:23 (3)	06:54		18:38 (5)	07:48		07:47		08:35	
	21:52	41	21:15 (4)	21:01	8	20:31 (3)	19:49	15	18:53 (5)	18:36		16:32		16:05	
14	05:12		20:34 (4)	06:01		20:24 (3)	06:56		18:35 (5)	07:50		07:49		08:36	
	21:51	41	21:15 (4)	20:59	5	20:29 (3)	19:47	19	18:54 (5)	18:33		16:31		16:05	
15	05:13		20:34 (4)	06:03		20:26 (3)	06:58		18:33 (5)	07:52		07:51		08:37	
	21:50	41	21:15 (4)	20:57	2	20:28 (3)	19:44	23	18:56 (5)	18:31		16:29		16:05	
16	05:14		20:35 (4)	06:05		06:59			18:32 (5)	07:54		07:53		08:38	
	21:49	40	21:15 (4)	20:55		19:42	25	18:57 (5)	18:29	16:27		16:05			
17	05:16		20:35 (4)	06:06		07:01			18:30 (5)	07:55		07:55		08:38	
	21:47	39	21:14 (4)	20:53		19:39	26	18:56 (5)	18:26	16:26		16:05			
18	05:17		20:35 (4)	06:08		07:03			18:29 (5)	07:57		07:57		08:39	
	21:46	37	21:12 (4)	20:50		19:37	28	18:57 (5)	18:24	16:25		16:05			
19	05:18		20:35 (4)	06:10		07:05			18:28 (5)	07:59		07:59		08:40	
	21:45	36	21:11 (4)	20:48		19:34	29	18:57 (5)	18:22	16:23		16:05			
20	05:20		20:36 (4)	06:12		07:06			18:28 (5)	08:01		08:00		08:41	
	21:44	34	21:10 (4)	20:46		19:32	29	18:57 (5)	18:20	16:22		16:06			
21	05:21		20:36 (4)	06:13		07:08			18:26 (5)	08:03		08:02		08:41	
	21:42	33	21:09 (4)	20:44		19:29	30	18:56 (5)	18:17	16:20		16:06			
22	05:23		20:37 (4)	06:15		07:10			18:26 (5)	08:05		08:04		08:42	
	21:41	30	21:07 (4)	20:42		19:27	30	18:56 (5)	18:15	16:19		16:06			
23	05:24		20:38 (4)	06:17		07:12			18:26 (5)	08:07		08:06		08:42	
	21:39	29	21:07 (4)	20:39		19:24	30	18:56 (5)	18:13	16:18		16:07			
24	05:26		20:38 (4)	06:19		07:13			18:27 (5)	08:09		08:08		08:43	
	21:38	27	21:05 (4)	20:37		19:22	27	18:54 (5)	18:11	16:17		16:08			
25	05:27		20:39 (4)	06:20		07:15			18:26 (5)	07:11		08:09		08:43	
	21:36	25	21:04 (4)	20:35		19:19	25	18:51 (5)	17:09	16:16		16:08			
26	05:29		20:39 (4)	06:22		07:17			18:27 (5)	07:13		08:11		08:43	
	21:35	23	21:02 (4)	20:32		19:17	21	18:48 (5)	17:06	16:15		16:09			
27	05:30		20:41 (4)	06:24		07:19			18:28 (5)	07:14		08:13		08:44	
	21:33	20	21:01 (4)	20:30		19:14	18	18:46 (5)	17:04	16:13		16:10			
28	05:32		20:30 (3)	06:26		07:21			18:29 (5)	07:16		08:14		08:44	
	21:32	27	20:59 (4)	20:28		19:12	15	18:44 (5)	17:02	16:12		16:11			
29	05:34		20:29 (3)	06:28		07:22			18:31 (5)	07:18		08:16		08:44	
	21:30	28	20:58 (4)	20:25		19:09	10	18:41 (5)	17:00	16:12		16:11			
30	05:35		20:27 (3)	06:29		07:24			18:32 (5)	07:20		08:17		08:44	
	21:28	29	20:56 (4)	20:23		19:07	6	18:38 (5)	16:58	16:11		16:12			
31	05:37		20:26 (3)	06:31					07:22			08:44			
	21:26	28	20:55 (4)	20:21					16:56			16:13			
Potential sun hours	512			460			382			328		259		233	
Total, worst case		1106			249			415							
Sun reduction		0.32			0.34			0.32							
Oper. time red.		1.00			1.00			1.00							
Wind dir. red.		0.63			0.64			0.67							
Total reduction		0.20			0.22			0.22							
Total, real		225			55			90							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LE - H317

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01		18:50 (5)	05:52			05:03		20:43 (4)
	16:15	17:06	18:02						20:00	25	19:15 (5)	20:55			21:45	27	21:10 (4)
2	08:44	08:12	07:14						06:59		18:50 (5)	05:50		20:26 (3)	05:02		20:44 (4)
	16:16	17:08	18:04						20:02	23	19:13 (5)	20:57	1	20:27 (3)	21:46	28	21:12 (4)
3	08:43	08:10	07:12						06:56		18:52 (5)	05:48		20:25 (3)	05:01		20:44 (4)
	16:17	17:10	18:06						20:04	19	19:11 (5)	20:59	4	20:29 (3)	21:48	29	21:13 (4)
4	08:43	08:08	07:09						06:54		18:54 (5)	05:46		20:23 (3)	05:00		20:43 (4)
	16:18	17:12	18:07						20:06	15	19:09 (5)	21:01	7	20:30 (3)	21:49	31	21:14 (4)
5	08:43	08:07	07:07						06:51		18:57 (5)	05:44		20:22 (3)	04:59		20:44 (4)
	16:20	17:14	18:09						20:07	8	19:05 (5)	21:03	10	20:32 (3)	21:50	31	21:15 (4)
6	08:42	08:05	07:04						06:49			05:42		20:22 (3)	04:59		20:43 (4)
	16:21	17:16	18:11						20:09			21:04	11	20:33 (3)	21:51	33	21:16 (4)
7	08:42	08:03	07:02						06:47			05:40		20:22 (3)	04:58		20:43 (4)
	16:22	17:18	18:13						20:11			21:06	14	20:36 (3)	21:52	33	21:16 (4)
8	08:41	08:01	07:00						06:44			05:38		20:21 (3)	04:57		20:43 (4)
	16:24	17:20	18:15						20:13			21:08	16	20:37 (3)	21:53	35	21:18 (4)
9	08:41	07:59	06:57						06:42			05:36		20:21 (3)	04:57		20:43 (4)
	16:25	17:22	18:17						20:15			21:10	17	20:38 (3)	21:54	35	21:18 (4)
10	08:40	07:57	06:55						06:39			05:34		20:20 (3)	04:56		20:43 (4)
	16:27	17:24	18:19						20:17			21:11	20	20:40 (3)	21:55	36	21:19 (4)
11	08:40	07:55	06:52						06:37			05:33		20:21 (3)	04:56		20:44 (4)
	16:28	17:26	18:21						20:19			21:13	21	20:42 (3)	21:55	36	21:20 (4)
12	08:39	07:53	06:50						06:35			05:31		20:21 (3)	04:55		20:44 (4)
	16:30	17:28	18:23						20:20			21:15	22	20:43 (3)	21:56	37	21:21 (4)
13	08:38	07:51	06:48						06:32			05:29		20:21 (3)	04:55		20:43 (4)
	16:31	17:30	18:25						20:22			21:17	23	20:44 (3)	21:57	38	21:21 (4)
14	08:37	07:49	06:45						06:30			05:27		20:21 (3)	04:55		20:44 (4)
	16:33	17:32	18:27						20:24			21:18	23	20:44 (3)	21:57	38	21:22 (4)
15	08:36	07:47	06:43						06:28			05:26		20:21 (3)	04:55		20:44 (4)
	16:34	17:34	18:28						20:26			21:20	23	20:44 (3)	21:58	38	21:22 (4)
16	08:35	07:45	06:40						06:25			05:24		20:22 (3)	04:54		20:44 (4)
	16:36	17:36	18:30						20:28			21:22	22	20:44 (3)	21:59	39	21:23 (4)
17	08:34	07:43	06:38		18:03 (5)	06:23			06:23			05:22		20:23 (3)	04:54		20:44 (4)
	16:38	17:38	18:32	3	18:06 (5)	20:30			20:30			21:23	19	20:42 (3)	21:59	39	21:23 (4)
18	08:33	07:41	06:35		17:58 (5)	06:21			06:21			05:21		20:24 (3)	04:54		20:45 (4)
	16:40	17:40	18:34	9	18:07 (5)	20:31			20:31			21:25	18	20:42 (3)	22:00	39	21:24 (4)
19	08:32	07:39	06:33		17:56 (5)	06:18			06:18			05:19		20:25 (3)	04:54		20:45 (4)
	16:41	17:42	18:36	14	18:10 (5)	20:33			20:33			21:27	17	20:42 (3)	22:00	39	21:24 (4)
20	08:31	07:36	06:31		17:54 (5)	06:16			06:16			05:18		20:26 (3)	04:54		20:45 (4)
	16:43	17:44	18:38	17	18:11 (5)	20:35			20:35			21:28	16	20:55 (4)	22:00	39	21:24 (4)
21	08:30	07:34	06:28		17:53 (5)	06:14			06:14			05:16		20:27 (3)	04:54		20:45 (4)
	16:45	17:46	18:40	20	18:13 (5)	20:37			20:37			21:30	18	20:57 (4)	22:00	39	21:24 (4)
22	08:28	07:32	06:26		17:51 (5)	06:12			06:12			05:15		20:30 (3)	04:55		20:46 (4)
	16:47	17:48	18:42	24	18:15 (5)	20:39			20:39			21:31	17	20:59 (4)	22:01	39	21:25 (4)
23	08:27	07:30	06:23		17:50 (5)	06:09			06:09			05:13		20:48 (4)	04:55		20:46 (4)
	16:49	17:50	18:43	27	18:17 (5)	20:41			20:41			21:33	11	20:59 (4)	22:01	39	21:25 (4)
24	08:26	07:28	06:21		17:49 (5)	06:07			06:07			05:12		20:47 (4)	04:55		20:46 (4)
	16:51	17:52	18:45	29	18:18 (5)	20:42			20:42			21:34	14	21:01 (4)	22:01	39	21:25 (4)
25	08:24	07:25	06:18		17:49 (5)	06:05			06:05			05:11		20:47 (4)	04:56		20:46 (4)
	16:52	17:54	18:47	31	18:20 (5)	20:44			20:44			21:36	15	21:02 (4)	22:01	39	21:25 (4)
26	08:23	07:23	06:16		17:49 (5)	06:03			06:03			05:09		20:46 (4)	04:56		20:46 (4)
	16:54	17:56	18:49	31	18:20 (5)	20:46			20:46			21:37	18	21:04 (4)	22:01	39	21:25 (4)
27	08:22	07:21	06:13		17:48 (5)	06:01			06:01			05:08		20:45 (4)	04:56		20:46 (4)
	16:56	17:58	18:51	31	18:19 (5)	20:48			20:48			21:39	20	21:05 (4)	22:01	38	21:24 (4)
28	08:20	07:18	06:11		17:48 (5)	05:58			05:58			05:07		20:45 (4)	04:57		20:47 (4)
	16:58	18:00	18:53	31	18:19 (5)	20:50			20:50			21:40	21	21:06 (4)	22:01	38	21:25 (4)
29	08:18		07:09		18:48 (5)	05:56			05:56			05:06		20:45 (4)	04:58		20:47 (4)
	17:00		19:54	30	19:18 (5)	20:52			20:52			21:41	22	21:07 (4)	22:01	38	21:25 (4)
30	08:17		07:06		18:49 (5)	05:54			05:54			05:05		20:44 (4)	04:58		20:47 (4)
	17:02		19:56	28	19:17 (5)	20:53			20:53			21:43	24	21:08 (4)	22:00	37	21:24 (4)
31	08:15		07:04		18:48 (5)							05:04		20:44 (4)			
	17:04		19:58	28	19:16 (5)							21:44	25	21:09 (4)			
Potential sun hours	250	273	367		420				494			510					
Total, worst case			353		90				509			1085					
Sun reduction			0.27		0.35				0.38			0.32					
Oper. time red.			1.00		1.00				1.00			1.00					
Wind dir. red.			0.68		0.68				0.63			0.61					
Total reduction			0.18		0.24				0.24			0.20					
Total, real			65		21				122			213					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LE - H317

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:48 (4)	05:39	20:31 (3)	06:33		07:26	07:24	08:19		
	22:00	36	21:24 (4)	21:25	22	20:53 (3)	20:18		19:05	16:54	16:10
2	05:00		20:48 (4)	05:40		20:31 (3)	06:35		07:28	07:26	08:21
	22:00	36	21:24 (4)	21:23	21	20:52 (3)	20:16		19:02	16:52	16:09
3	05:00		20:48 (4)	05:42		20:31 (3)	06:36		07:30	07:28	08:22
	21:59	35	21:23 (4)	21:21	19	20:50 (3)	20:13		19:00	16:50	16:08
4	05:01		20:48 (4)	05:44		20:31 (3)	06:38		07:31	07:30	08:24
	21:59	35	21:23 (4)	21:19	17	20:48 (3)	20:11		18:57	16:48	16:08
5	05:02		20:49 (4)	05:45		20:31 (3)	06:40		07:33	07:32	08:25
	21:58	34	21:23 (4)	21:17	15	20:46 (3)	20:09		18:55	16:46	16:07
6	05:03		20:49 (4)	05:47		20:31 (3)	06:42		07:35	07:34	08:26
	21:57	33	21:22 (4)	21:15	14	20:45 (3)	20:06		18:52	16:44	16:07
7	05:04		20:50 (4)	05:49		20:32 (3)	06:43		18:52 (5)	07:37	08:28
	21:57	32	21:22 (4)	21:13	11	20:43 (3)	20:04	8	19:00 (5)	18:50	16:43
8	05:05		20:50 (4)	05:51		20:32 (3)	06:45		18:48 (5)	07:39	08:29
	21:56	31	21:21 (4)	21:11	9	20:41 (3)	20:01	15	19:03 (5)	18:48	16:41
9	05:06		20:51 (4)	05:52		20:33 (3)	06:47		18:46 (5)	07:41	08:30
	21:55	30	21:21 (4)	21:09	6	20:39 (3)	19:59	19	19:05 (5)	18:45	16:05
10	05:07		20:51 (4)	05:54		20:33 (3)	06:49		18:43 (5)	07:42	08:31
	21:55	29	21:20 (4)	21:07	4	20:37 (3)	19:56	23	19:06 (5)	18:43	16:05
11	05:08		20:52 (4)	05:56		06:50	18:42 (5)	07:44	07:44	08:33	
	21:54	27	21:19 (4)	21:05		19:54	25	19:07 (5)	18:40	16:36	16:05
12	05:09		20:52 (4)	05:57		06:52	18:41 (5)	07:46	07:45	08:34	
	21:53	26	21:18 (4)	21:03		19:51	27	19:08 (5)	18:38	16:34	16:05
13	05:11		20:52 (4)	05:59		06:54	18:40 (5)	07:48	07:47	08:35	
	21:52	25	21:17 (4)	21:01		19:49	29	19:09 (5)	18:36	16:32	16:05
14	05:12		20:53 (4)	06:01		06:56	18:38 (5)	07:50	07:49	08:36	
	21:51	23	21:16 (4)	20:59		19:47	30	19:08 (5)	18:33	16:31	16:05
15	05:13		20:53 (4)	06:03		06:58	18:38 (5)	07:52	07:51	08:37	
	21:50	22	21:15 (4)	20:57		19:44	30	19:08 (5)	18:31	16:29	16:05
16	05:14		20:55 (4)	06:05		06:59	18:38 (5)	07:54	07:53	08:38	
	21:48	20	21:15 (4)	20:55		19:42	30	19:08 (5)	18:29	16:27	16:05
17	05:16		20:55 (4)	06:06		07:01	18:36 (5)	07:55	07:55	08:38	
	21:47	19	21:14 (4)	20:53		19:39	31	19:07 (5)	18:26	16:26	16:05
18	05:17		20:56 (4)	06:08		07:03	18:36 (5)	07:57	07:57	08:39	
	21:46	16	21:12 (4)	20:50		19:37	31	19:07 (5)	18:24	16:25	16:05
19	05:18		20:56 (4)	06:10		07:05	18:37 (5)	07:59	07:59	08:40	
	21:45	15	21:11 (4)	20:48		19:34	29	19:06 (5)	18:22	16:23	16:05
20	05:20		20:58 (4)	06:12		07:06	18:37 (5)	08:01	08:00	08:41	
	21:44	12	21:10 (4)	20:46		19:32	27	19:04 (5)	18:20	16:22	16:06
21	05:21		20:41 (3)	06:13		07:08	18:36 (5)	08:03	08:02	08:41	
	21:42	15	21:09 (4)	20:44		19:29	25	19:01 (5)	18:17	16:20	16:06
22	05:23		20:38 (3)	06:15		07:10	18:37 (5)	08:05	08:04	08:42	
	21:41	17	21:07 (4)	20:42		19:27	22	18:59 (5)	18:15	16:19	16:06
23	05:24		20:37 (3)	06:17		07:12	18:38 (5)	08:07	08:06	08:42	
	21:39	18	21:07 (4)	20:39		19:24	18	18:56 (5)	18:13	16:18	16:07
24	05:26		20:35 (3)	06:19		07:13	18:39 (5)	08:09	08:08	08:43	
	21:38	17	21:05 (4)	20:37		19:22	15	18:54 (5)	18:11	16:17	16:08
25	05:27		20:35 (3)	06:20		07:15	18:40 (5)	07:11	08:09	08:43	
	21:36	17	20:52 (3)	20:35		19:19	11	18:51 (5)	17:09	16:16	16:08
26	05:29		20:34 (3)	06:22		07:17	18:43 (5)	07:13	08:11	08:43	
	21:35	19	20:53 (3)	20:32		19:17	5	18:48 (5)	17:06	16:15	16:09
27	05:30		20:34 (3)	06:24		07:19		07:14	08:13	08:44	
	21:33	20	20:54 (3)	20:30		19:14		17:04	16:13	16:10	
28	05:32		20:33 (3)	06:26		07:21		07:16	08:14	08:44	
	21:32	21	20:54 (3)	20:28		19:12		17:02	16:13	16:11	
29	05:34		20:33 (3)	06:28		07:22		07:18	08:16	08:44	
	21:30	22	20:55 (3)	20:25		19:09		17:00	16:12	16:11	
30	05:35		20:32 (3)	06:29		07:24		07:20	08:17	08:44	
	21:28	23	20:55 (3)	20:23		19:07		16:58	16:11	16:12	
31	05:37		20:32 (3)	06:31				07:22		08:44	
	21:26	23	20:55 (3)	20:21				16:56		16:13	
Potential sun hours	512		460		382		328		259		233
Total, worst case	748		138		450						
Sun reduction	0.32		0.34		0.32						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.62		0.64		0.68						
Total reduction	0.20		0.22		0.22						
Total, real	150		30		97						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LF - H318

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01			19:01 (5)	05:52		05:03		21:02 (4)
	16:15	17:06	18:02						20:00	30		19:31 (5)	20:55		21:45	8	21:10 (4)
2	08:44	08:12	07:14						06:59			19:00 (5)	05:50		05:02		21:02 (4)
	16:16	17:08	18:04						20:02	30		19:30 (5)	20:57		21:46	10	21:12 (4)
3	08:43	08:10	07:11						06:56			19:00 (5)	05:48		05:01		21:01 (4)
	16:17	17:10	18:06						20:04	30		19:30 (5)	20:59		21:48	12	21:13 (4)
4	08:43	08:08	07:09						06:54			19:01 (5)	05:46		05:00		21:01 (4)
	16:18	17:12	18:07						20:06	29		19:30 (5)	21:01		21:49	13	21:14 (4)
5	08:43	08:07	07:07						06:51			19:00 (5)	05:44		04:59		21:01 (4)
	16:20	17:14	18:09						20:07	28		19:28 (5)	21:03		21:50	14	21:15 (4)
6	08:42	08:05	07:04						06:49			19:01 (5)	05:42		04:59		21:00 (4)
	16:21	17:16	18:11						20:09	27		19:28 (5)	21:04		21:51	16	21:16 (4)
7	08:42	08:03	07:02						06:47			19:01 (5)	05:40		04:58		21:00 (4)
	16:22	17:18	18:13						20:11	25		19:26 (5)	21:06	3	20:36 (3)	16	21:16 (4)
8	08:41	08:01	07:00						06:44			19:03 (5)	05:38		04:57		21:00 (4)
	16:24	17:20	18:15						20:13	21		19:24 (5)	21:08	5	20:37 (3)	18	21:18 (4)
9	08:41	07:59	06:57						06:42			19:05 (5)	05:36		04:57		21:00 (4)
	16:25	17:22	18:17						20:15	18		19:23 (5)	21:10	7	20:38 (3)	19	21:19 (4)
10	08:40	07:57	06:55						06:39			19:06 (5)	05:34		04:56		21:00 (4)
	16:27	17:24	18:19						20:17	13		19:19 (5)	21:11	10	20:40 (3)	19	21:19 (4)
11	08:40	07:55	06:52						06:37			19:11 (5)	05:33		04:56		21:00 (4)
	16:28	17:26	18:21						20:19	3		19:14 (5)	21:13	12	20:42 (3)	20	21:20 (4)
12	08:39	07:53	06:50						06:35				05:31		04:55		21:00 (4)
	16:30	17:28	18:23						20:20				21:15	13	20:43 (3)	21	21:21 (4)
13	08:38	07:51	06:48						06:32				05:29		04:55		21:00 (4)
	16:31	17:30	18:25						20:22				21:17	15	20:44 (3)	21	21:21 (4)
14	08:37	07:49	06:45						06:30				05:27		04:55		21:00 (4)
	16:33	17:32	18:27						20:24				21:18	17	20:47 (3)	22	21:22 (4)
15	08:36	07:47	06:43						06:28				05:26		04:55		21:00 (4)
	16:34	17:34	18:28						20:26				21:20	19	20:48 (3)	22	21:22 (4)
16	08:35	07:45	06:40						06:25				05:24		04:54		21:00 (4)
	16:36	17:36	18:30						20:28				21:22	20	20:50 (3)	23	21:23 (4)
17	08:34	07:43	06:38						06:23				05:22		04:54		21:00 (4)
	16:38	17:38	18:32						20:30				21:23	22	20:51 (3)	23	21:23 (4)
18	08:33	07:41	06:35						06:21				05:21		04:54		21:00 (4)
	16:40	17:40	18:34						20:31				21:25	23	20:53 (3)	24	21:24 (4)
19	08:32	07:39	06:33						06:18				05:19		04:54		21:01 (4)
	16:41	17:42	18:36						20:33				21:27	22	20:53 (3)	23	21:24 (4)
20	08:31	07:36	06:31						06:16				05:18		04:54		21:01 (4)
	16:43	17:44	18:38						20:35				21:28	21	20:52 (3)	22	21:24 (4)
21	08:30	07:34	06:28						06:14				05:16		04:54		21:01 (4)
	16:45	17:46	18:40						20:37				21:30	20	20:52 (3)	23	21:24 (4)
22	08:28	07:32	06:26						06:12				05:15		04:55		21:02 (4)
	16:47	17:48	18:42						20:39				21:31	19	20:51 (3)	23	21:25 (4)
23	08:27	07:30	06:23					18:14 (5)	06:09				05:13		04:55		21:02 (4)
	16:49	17:50	18:43	3				18:17 (5)	20:41				21:33	18	20:50 (3)	23	21:25 (4)
24	08:26	07:28	06:21					18:10 (5)	06:07				05:12		04:55		21:02 (4)
	16:51	17:52	18:45	8				18:18 (5)	20:42				21:34	15	20:49 (3)	23	21:25 (4)
25	08:24	07:25	06:18					18:08 (5)	06:05				05:11		04:56		21:02 (4)
	16:52	17:54	18:47	13				18:21 (5)	20:44				21:36	14	20:49 (3)	23	21:25 (4)
26	08:23	07:23	06:16					18:06 (5)	06:03				05:09		04:56		21:02 (4)
	16:54	17:56	18:49	17				18:23 (5)	20:46				21:37	12	20:48 (3)	23	21:25 (4)
27	08:22	07:21	06:13					18:04 (5)	06:01				05:08		04:56		21:02 (4)
	16:56	17:58	18:51	20				18:24 (5)	20:48				21:39	9	20:47 (3)	22	21:24 (4)
28	08:20	07:18	06:11					18:04 (5)	05:58				05:07		04:57		21:03 (4)
	16:58	18:00	18:53	22				18:26 (5)	20:50				21:40	4	20:44 (3)	22	21:25 (4)
29	08:18		07:09					19:02 (5)	05:56				05:06		21:05 (4)		21:04 (4)
	17:00		19:54	26				19:28 (5)	20:52				21:41	2	21:07 (4)	21	21:25 (4)
30	08:17		07:06					19:02 (5)	05:54				05:05		21:04 (4)		21:03 (4)
	17:02		19:56	28				19:30 (5)	20:53				21:43	4	21:08 (4)	21	21:24 (4)
31	08:15		07:04					19:01 (5)					05:04		21:03 (4)		
	17:04		19:58	30				19:31 (5)					21:44	6	21:09 (4)		
Potential sun hours	250	273	367					420					494		510		
Total, worst case				167				254				332			591		
Sun reduction				0.27				0.35				0.38			0.32		
Oper. time red.				1.00				1.00				1.00			1.00		
Wind dir. red.				0.67				0.67				0.63			0.61		
Total reduction				0.18				0.24				0.24			0.19		
Total, real				31				60				80			115		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LF - H318

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	21:04 (4)	05:39	20:40 (3)	06:33	19:10 (5)	07:26	07:24	08:19		
	22:00	21:24 (4)	21:25	20:53 (3)	20:18	19:14 (5)	19:05	16:54	16:10		
2	05:00	21:05 (4)	05:40	20:41 (3)	06:35	19:05 (5)	07:28	07:26	08:21		
	22:00	21:24 (4)	21:23	20:52 (3)	20:16	19:19 (5)	19:02	16:52	16:09		
3	05:00	21:05 (4)	05:42	20:41 (3)	06:36	19:02 (5)	07:30	07:28	08:22		
	21:59	21:23 (4)	21:21	20:50 (3)	20:13	19:20 (5)	19:00	16:50	16:08		
4	05:01	21:05 (4)	05:44	20:42 (3)	06:38	19:00 (5)	07:31	07:30	08:24		
	21:59	21:23 (4)	21:19	20:48 (3)	20:11	19:21 (5)	18:57	16:48	16:08		
5	05:02	21:06 (4)	05:45	20:42 (3)	06:40	18:59 (5)	07:33	07:32	08:25		
	21:58	21:23 (4)	21:17	20:46 (3)	20:09	19:23 (5)	18:55	16:46	16:07		
6	05:03	21:07 (4)	05:47	20:43 (3)	06:42	18:58 (5)	07:35	07:34	08:26		
	21:57	21:22 (4)	21:15	20:45 (3)	20:06	19:24 (5)	18:52	16:44	16:07		
7	05:04	21:07 (4)	05:49		06:43	18:56 (5)	07:37	07:36	08:28		
	21:57	21:22 (4)	21:13		20:04	19:23 (5)	18:50	16:43	16:06		
8	05:05	21:08 (4)	05:51		06:45	18:55 (5)	07:39	07:38	08:29		
	21:56	21:21 (4)	21:11		20:01	19:24 (5)	18:48	16:41	16:06		
9	05:06	21:09 (4)	05:52		06:47	18:55 (5)	07:41	07:40	08:30		
	21:55	21:21 (4)	21:09		19:59	19:24 (5)	18:45	16:39	16:05		
10	05:07	21:09 (4)	05:54		06:49	18:53 (5)	07:42	07:42	08:31		
	21:55	21:20 (4)	21:07		19:56	19:23 (5)	18:43	16:37	16:05		
11	05:08	21:10 (4)	05:56		06:50	18:53 (5)	07:44	07:44	08:33		
	21:54	21:19 (4)	21:05		19:54	19:23 (5)	18:40	16:36	16:05		
12	05:09	21:11 (4)	05:57		06:52	18:53 (5)	07:46	07:45	08:34		
	21:53	21:18 (4)	21:03		19:51	19:23 (5)	18:38	16:34	16:05		
13	05:11	21:12 (4)	05:59		06:54	18:53 (5)	07:48	07:47	08:35		
	21:52	21:17 (4)	21:01		19:49	19:22 (5)	18:36	16:32	16:05		
14	05:12	21:13 (4)	06:01		06:56	18:52 (5)	07:50	07:49	08:36		
	21:51	21:16 (4)	20:59		19:47	19:18 (5)	18:33	16:31	16:05		
15	05:13	21:14 (4)	06:03		06:58	18:53 (5)	07:52	07:51	08:37		
	21:50	21:15 (4)	20:57		19:44	19:16 (5)	18:31	16:29	16:05		
16	05:14	20:48 (3)	06:05		06:59	18:54 (5)	07:54	07:53	08:38		
	21:48	20:55 (3)	20:55		19:42	19:14 (5)	18:29	16:27	16:05		
17	05:16	20:46 (3)	06:06		07:01	18:54 (5)	07:55	07:55	08:38		
	21:47	20:57 (3)	20:53		19:39	19:11 (5)	18:26	16:26	16:05		
18	05:17	20:45 (3)	06:08		07:03	18:55 (5)	07:57	07:57	08:39		
	21:46	20:58 (3)	20:50		19:37	19:08 (5)	18:24	16:25	16:05		
19	05:18	20:44 (3)	06:10		07:05	18:57 (5)	07:59	07:59	08:40		
	21:45	20:59 (3)	20:48		19:34	19:06 (5)	18:22	16:23	16:05		
20	05:20	20:44 (3)	06:12		07:06	18:59 (5)	08:01	08:00	08:41		
	21:44	21:00 (3)	20:46		19:32	19:04 (5)	18:20	16:22	16:06		
21	05:21	20:43 (3)	06:13		07:08		08:03	08:02	08:41		
	21:42	21:01 (3)	20:44		19:29		18:17	16:20	16:06		
22	05:23	20:42 (3)	06:15		07:10		08:05	08:04	08:42		
	21:41	21:01 (3)	20:42		19:27		18:15	16:19	16:07		
23	05:24	20:42 (3)	06:17		07:12		08:07	08:06	08:42		
	21:39	21:02 (3)	20:39		19:24		18:13	16:18	16:07		
24	05:26	20:41 (3)	06:19		07:13		08:09	08:08	08:43		
	21:38	21:02 (3)	20:37		19:22		18:11	16:17	16:08		
25	05:27	20:41 (3)	06:20		07:15		07:11	08:09	08:43		
	21:36	21:03 (3)	20:35		19:19		17:09	16:16	16:08		
26	05:29	20:40 (3)	06:22		07:17		07:13	08:11	08:43		
	21:35	21:02 (3)	20:32		19:17		17:06	16:15	16:09		
27	05:30	20:41 (3)	06:24		07:19		07:14	08:13	08:44		
	21:33	21:01 (3)	20:30		19:14		17:04	16:13	16:10		
28	05:32	20:40 (3)	06:26		07:21		07:16	08:14	08:44		
	21:32	20:59 (3)	20:28		19:12		17:02	16:13	16:11		
29	05:34	20:40 (3)	06:28		07:22		07:18	08:16	08:44		
	21:30	20:58 (3)	20:25		19:09		17:00	16:12	16:11		
30	05:35	20:40 (3)	06:29		07:24		07:20	08:17	08:44		
	21:28	20:56 (3)	20:23		19:07		16:58	16:11	16:12		
31	05:37	20:41 (3)	06:31				07:22		08:44		
	21:26	20:55 (3)	20:21				16:56		16:13		
Potential sun hours	512		460		382		328	259	233		
Total, worst case	454		45		424						
Sun reduction	0.32		0.34		0.32						
Oper. time red.	1.00		1.00		1.00						
Wind dir. red.	0.62		0.63		0.67						
Total reduction	0.20		0.22		0.22						
Total, real	92		10		92						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LG - H319

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January			February			March			April			May			June		
1	08:44	08:14	07:16						07:01			19:01 (5)	05:52		05:03		20:41 (3)
	16:15	17:06	18:02						20:00	32		19:33 (5)	20:55		21:45	12	20:53 (3)
2	08:44	08:12	07:14						06:59			19:00 (5)	05:50		05:02		20:43 (3)
	16:16	17:08	18:04						20:02	32		19:32 (5)	20:57		21:46	9	20:52 (3)
3	08:43	08:10	07:12						06:56			19:00 (5)	05:48		05:01		20:45 (3)
	16:17	17:10	18:06						20:04	32		19:32 (5)	20:59		21:48	6	20:51 (3)
4	08:43	08:08	07:09						06:54			19:01 (5)	05:46		05:00		
	16:18	17:12	18:07						20:06	31		19:32 (5)	21:01		21:49		
5	08:43	08:07	07:07						06:51			19:00 (5)	05:44		04:59		
	16:20	17:14	18:09						20:07	31		19:31 (5)	21:03		21:50		
6	08:42	08:05	07:04						06:49			19:01 (5)	05:42		04:59		
	16:21	17:16	18:11						20:09	30		19:31 (5)	21:04		21:51		
7	08:42	08:03	07:02						06:47			19:00 (5)	05:40		04:58		
	16:22	17:18	18:13						20:11	29		19:29 (5)	21:06		21:52		
8	08:41	08:01	07:00						06:44			19:01 (5)	05:38		04:57		21:16 (4)
	16:24	17:20	18:15						20:13	27		19:28 (5)	21:08		21:53	2	21:18 (4)
9	08:41	07:59	06:57						06:42			19:03 (5)	05:36		04:57		21:16 (4)
	16:25	17:22	18:17						20:15	24		19:27 (5)	21:10		21:54	3	21:19 (4)
10	08:40	07:57	06:55						06:39			19:03 (5)	05:34		04:56		21:15 (4)
	16:27	17:24	18:19						20:17	22		19:25 (5)	21:11	4	20:40 (3)	4	21:19 (4)
11	08:40	07:55	06:52						06:37			19:05 (5)	05:33		04:56		21:15 (4)
	16:28	17:26	18:21						20:19	18		19:23 (5)	21:13	6	20:42 (3)	5	21:20 (4)
12	08:39	07:53	06:50						06:35			19:08 (5)	05:31		04:55		21:15 (4)
	16:30	17:28	18:23						20:20	13		19:21 (5)	21:15	8	20:43 (3)	6	21:21 (4)
13	08:38	07:51	06:48						06:32			19:12 (5)	05:29		04:55		21:14 (4)
	16:31	17:30	18:25						20:22	3		19:15 (5)	21:17	10	20:44 (3)	7	21:21 (4)
14	08:37	07:49	06:45						06:30			05:27	20:34 (3)		04:55		21:14 (4)
	16:33	17:32	18:27						20:24			21:18	13	20:47 (3)	21:57	8	21:22 (4)
15	08:36	07:47	06:43						06:28			05:26	20:34 (3)		04:55		21:14 (4)
	16:34	17:34	18:28						20:26			21:20	14	20:48 (3)	21:58	8	21:22 (4)
16	08:35	07:45	06:40						06:25			05:24	20:34 (3)		04:54		21:14 (4)
	16:36	17:36	18:30						20:28			21:22	16	20:50 (3)	21:59	9	21:23 (4)
17	08:34	07:43	06:38						06:23			05:22	20:33 (3)		04:54		21:14 (4)
	16:38	17:38	18:32						20:30			21:23	18	20:51 (3)	21:59	9	21:23 (4)
18	08:33	07:41	06:35						06:21			05:21	20:34 (3)		04:54		21:14 (4)
	16:40	17:40	18:34						20:31			21:25	19	20:53 (3)	22:00	10	21:24 (4)
19	08:32	07:39	06:33						06:18			05:19	20:34 (3)		04:54		21:14 (4)
	16:41	17:42	18:36						20:33			21:27	20	20:54 (3)	22:00	10	21:24 (4)
20	08:31	07:36	06:31						06:16			05:18	20:34 (3)		04:54		21:15 (4)
	16:43	17:44	18:38						20:35			21:28	21	20:55 (3)	22:00	9	21:24 (4)
21	08:30	07:34	06:28						06:14			05:16	20:34 (3)		04:54		21:15 (4)
	16:45	17:46	18:40						20:37			21:30	23	20:57 (3)	22:00	9	21:24 (4)
22	08:28	07:32	06:26						06:12			05:15	20:35 (3)		04:55		21:16 (4)
	16:47	17:48	18:42						20:39			21:31	23	20:58 (3)	22:01	9	21:25 (4)
23	08:27	07:30	06:23						06:09			05:13	20:34 (3)		04:55		21:15 (4)
	16:49	17:50	18:43						20:41			21:33	23	20:57 (3)	22:01	10	21:25 (4)
24	08:26	07:28	06:21					18:13 (5)	06:07			05:12	20:35 (3)		04:55		21:15 (4)
	16:51	17:52	18:45	5				18:18 (5)	20:42			21:34	22	20:57 (3)	22:01	10	21:25 (4)
25	08:24	07:25	06:18					18:10 (5)	06:05			05:11	20:36 (3)		04:56		21:16 (4)
	16:52	17:54	18:47	11				18:21 (5)	20:44			21:36	21	20:57 (3)	22:01	9	21:25 (4)
26	08:23	07:23	06:16					18:09 (5)	06:03			05:09	20:36 (3)		04:56		21:16 (4)
	16:54	17:56	18:49	14				18:23 (5)	20:46			21:37	21	20:57 (3)	22:01	9	21:25 (4)
27	08:22	07:21	06:13					18:06 (5)	06:01			05:08	20:37 (3)		04:56		21:16 (4)
	16:56	17:58	18:51	18				18:24 (5)	20:48			21:39	19	20:56 (3)	22:01	8	21:24 (4)
28	08:20	07:18	06:11					18:05 (5)	05:58			05:07	20:38 (3)		04:57		21:17 (4)
	16:58	18:00	18:53	21				18:26 (5)	20:50			21:40	18	20:56 (3)	22:01	8	21:25 (4)
29	08:18		07:09					19:04 (5)	05:56			05:06	20:39 (3)		04:58		21:18 (4)
	17:00		19:54	24				19:28 (5)	20:52			21:41	16	20:55 (3)	22:01	7	21:25 (4)
30	08:17		07:06					19:03 (5)	05:54			05:05	20:39 (3)		04:58		21:18 (4)
	17:02		19:56	27				19:30 (5)	20:53			21:43	16	20:55 (3)	22:00	6	21:24 (4)
31	08:15		07:04					19:02 (5)				05:04		20:40 (3)			
	17:04		19:58	29				19:31 (5)				21:44	14	20:54 (3)			
Potential sun hours	250	273	367					420				494		510			
Total, worst case				149				324				365		202			
Sun reduction				0.27				0.35				0.38		0.32			
Oper. time red.				1.00				1.00				1.00		1.00			
Wind dir. red.				0.67				0.67				0.63		0.61			
Total reduction				0.18				0.24				0.24		0.20			
Total, real				27				77				88		39			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LG - H319

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	21:19 (4)	05:39	20:46 (3)	06:33	19:04 (5)	07:26	07:24	08:19		
	22:00	5	21:24 (4)	21:25	7	20:53 (3)	20:18	18	19:22 (5)	19:05	16:54
2	05:00		21:20 (4)	05:40		20:47 (3)	06:35		19:02 (5)	07:28	07:26
	22:00	4	21:24 (4)	21:23	5	20:52 (3)	20:16	22	19:24 (5)	19:02	16:52
3	05:00		21:20 (4)	05:42		20:47 (3)	06:36		19:01 (5)	07:30	07:28
	21:59	3	21:23 (4)	21:21	3	20:50 (3)	20:13	24	19:25 (5)	19:00	16:50
4	05:01		21:21 (4)	05:44			06:38		18:58 (5)	07:31	07:30
	21:59	2	21:23 (4)	21:19			20:11	27	19:25 (5)	18:57	16:48
5	05:02			05:45			06:40		18:58 (5)	07:33	07:32
	21:58			21:17			20:09	28	19:26 (5)	18:55	16:46
6	05:03			05:47			06:42		18:57 (5)	07:35	07:34
	21:57			21:15			20:06	30	19:27 (5)	18:52	16:44
7	05:04			05:49			06:43		18:55 (5)	07:37	07:36
	21:57			21:13			20:04	31	19:26 (5)	18:50	16:43
8	05:05			05:51			06:45		18:55 (5)	07:39	07:38
	21:56			21:11			20:01	31	19:26 (5)	18:48	16:41
9	05:06		20:54 (3)	05:52			06:47		18:55 (5)	07:41	07:40
	21:55	3	20:57 (3)	21:09			19:59	31	19:26 (5)	18:45	16:39
10	05:07		20:52 (3)	05:54			06:49		18:54 (5)	07:42	07:42
	21:55	7	20:59 (3)	21:07			19:56	31	19:25 (5)	18:43	16:37
11	05:08		20:50 (3)	05:56			06:50		18:54 (5)	07:44	07:44
	21:54	11	21:01 (3)	21:05			19:54	31	19:25 (5)	18:40	16:36
12	05:09		20:49 (3)	05:57			06:52		18:54 (5)	07:46	07:45
	21:53	13	21:02 (3)	21:03			19:51	30	19:24 (5)	18:38	16:34
13	05:11		20:48 (3)	05:59			06:54		18:54 (5)	07:48	07:47
	21:52	15	21:03 (3)	21:01			19:49	28	19:22 (5)	18:36	16:32
14	05:12		20:47 (3)	06:01			06:56		18:54 (5)	07:50	07:49
	21:51	16	21:03 (3)	20:59			19:47	24	19:18 (5)	18:33	16:31
15	05:13		20:47 (3)	06:03			06:58		18:54 (5)	07:52	07:51
	21:50	17	21:04 (3)	20:57			19:44	22	19:16 (5)	18:31	16:29
16	05:14		20:47 (3)	06:05			06:59		18:55 (5)	07:54	07:53
	21:48	19	21:06 (3)	20:55			19:42	19	19:14 (5)	18:29	16:27
17	05:16		20:46 (3)	06:06			07:01		18:56 (5)	07:55	07:55
	21:47	20	21:06 (3)	20:53			19:39	15	19:11 (5)	18:26	16:26
18	05:17		20:45 (3)	06:08			07:03		18:57 (5)	07:57	07:57
	21:46	21	21:06 (3)	20:50			19:37	11	19:08 (5)	18:24	16:25
19	05:18		20:45 (3)	06:10			07:05		19:00 (5)	07:59	07:59
	21:45	21	21:06 (3)	20:48			19:34	6	19:06 (5)	18:22	16:23
20	05:20		20:45 (3)	06:12			07:06			08:01	08:00
	21:44	23	21:08 (3)	20:46			19:32			18:20	16:22
21	05:21		20:45 (3)	06:13			07:08			08:03	08:02
	21:42	23	21:08 (3)	20:44			19:29			18:17	16:20
22	05:23		20:44 (3)	06:15			07:10			08:05	08:04
	21:41	23	21:07 (3)	20:42			19:27			18:15	16:19
23	05:24		20:44 (3)	06:17			07:12			08:07	08:06
	21:39	23	21:07 (3)	20:39			19:24			18:13	16:18
24	05:26		20:44 (3)	06:19			07:13			08:09	08:08
	21:38	21	21:05 (3)	20:37			19:22			18:11	16:17
25	05:27		20:44 (3)	06:20			07:15			07:11	08:09
	21:36	20	21:04 (3)	20:35			19:19			17:09	16:16
26	05:29		20:44 (3)	06:22			07:17			07:13	08:11
	21:35	18	21:02 (3)	20:32			19:17			17:06	16:15
27	05:30		20:45 (3)	06:24			07:19			07:14	08:13
	21:33	16	21:01 (3)	20:30			19:14			17:04	16:13
28	05:32		20:44 (3)	06:26			07:21			07:16	08:14
	21:32	15	20:59 (3)	20:28			19:12			17:02	16:13
29	05:34		20:45 (3)	06:28			07:22			07:18	08:16
	21:30	13	20:58 (3)	20:25			19:09			17:00	16:12
30	05:35		20:45 (3)	06:29			19:12 (5)			07:20	08:17
	21:28	11	20:56 (3)	20:23	4		19:16 (5)			16:58	16:11
31	05:37		20:46 (3)	06:31			19:06 (5)			07:22	08:44
	21:26	9	20:55 (3)	20:21	14		19:20 (5)			16:56	16:13
Potential sun hours	512		460		382				328	259	233
Total, worst case		392		33	459						
Sun reduction		0.32		0.34	0.32						
Oper. time red.		1.00		1.00	1.00						
Wind dir. red.		0.63		0.65	0.67						
Total reduction		0.20		0.22	0.22						
Total, real		80		7	99						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: LH - H320

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:53	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: LI - H321

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: LJ - H322

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: LK - H323

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Sun reduction												
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Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: LL - H324

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:35 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LM - H325

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:23 (5)	07:16	17:06 (4)	07:01	05:52	19:51 (2)	05:03		
	16:15	17:06	11 16:34 (5)	18:02	28 17:34 (4)	20:00	20:55	24 20:15 (2)	21:45		
2	08:44	08:12	16:24 (5)	07:14	17:06 (4)	06:59	05:50	19:52 (2)	05:02		
	16:16	17:08	13 16:37 (5)	18:04	30 17:36 (4)	20:02	20:57	22 20:14 (2)	21:46		
3	08:43	08:10	16:23 (5)	07:11	17:06 (4)	06:56	05:48	19:53 (2)	05:01		
	16:17	17:10	16 16:39 (5)	18:06	32 17:38 (4)	20:04	20:59	20 20:13 (2)	21:48		
4	08:43	08:08	16:24 (5)	07:09	17:06 (4)	06:54	05:46	19:54 (2)	05:00		
	16:18	17:12	17 16:41 (5)	18:07	33 17:39 (4)	20:06	21:01	17 20:11 (2)	21:49		
5	08:43	08:07	16:24 (5)	07:07	17:06 (4)	06:51	05:44	19:56 (2)	04:59		
	16:19	17:14	19 16:43 (5)	18:09	32 17:38 (4)	20:07	21:03	13 20:09 (2)	21:50		
6	08:42	08:05	16:24 (5)	07:04	17:07 (4)	06:49	05:42	19:59 (2)	04:59		
	16:21	17:16	21 16:45 (5)	18:11	30 17:37 (4)	20:09	21:04	7 20:06 (2)	21:51		
7	08:42	08:03	16:25 (5)	07:02	17:07 (4)	06:47	05:40		04:58		
	16:22	17:18	20 16:45 (5)	18:13	29 17:36 (4)	20:11	21:06		21:52		
8	08:42	08:01	16:25 (5)	07:00	17:08 (4)	06:44	05:38		04:57		
	16:24	17:20	19 16:44 (5)	18:15	27 17:35 (4)	20:13	21:08		21:53		
9	08:41	07:59	16:27 (5)	06:57	17:09 (4)	06:42	05:36		04:57		
	16:25	17:22	17 16:44 (5)	18:17	24 17:33 (4)	20:15	21:10		21:54		
10	08:40	07:57	16:28 (5)	06:55	17:11 (4)	06:39	05:34		04:56		
	16:26	17:24	14 16:42 (5)	18:19	20 17:31 (4)	20:17	21:11		21:55		
11	08:40	07:55	16:30 (5)	06:52	17:14 (4)	06:37	05:33		04:56		
	16:28	17:26	11 16:41 (5)	18:21	17 17:55 (3)	20:19	21:13		21:55		
12	08:39	07:53	16:34 (5)	06:50	17:17 (4)	06:35	05:31		04:55		
	16:30	17:28	1 16:35 (5)	18:23	12 17:56 (3)	20:20	21:15		21:56		
13	08:38	07:51		06:48	17:51 (3)	06:32	05:29		04:55		
	16:31	17:30		18:25	7 17:58 (3)	20:22	21:17		21:57		
14	08:37	07:49		06:45	17:49 (3)	06:30	05:27		04:55		
	16:33	17:32		18:27	11 18:00 (3)	20:24	21:18		21:57		
15	08:36	07:47		06:43	17:49 (3)	06:28	05:26		04:54		
	16:34	17:34		18:28	13 18:02 (3)	20:26	21:20		21:58		
16	08:35	07:45		06:40	17:49 (3)	06:25	05:24		04:54		
	16:36	17:36		18:30	15 18:04 (3)	20:28	21:22		21:59		
17	08:34	07:43		06:38	17:49 (3)	06:23	19:57 (2)	05:22	04:54		
	16:38	17:38		18:32	17 18:06 (3)	20:30	20:01 (2)	21:23	21:59		
18	08:33	07:41		06:35	17:49 (3)	06:21	19:55 (2)	05:21	04:54		
	16:40	17:40		18:34	18 18:07 (3)	20:31	8 20:03 (2)	21:25	22:00		
19	08:32	07:39		06:33	17:50 (3)	06:18	19:54 (2)	05:19	04:54		
	16:41	17:42		18:36	18 18:08 (3)	20:33	11 20:05 (2)	21:27	22:00		
20	08:31	07:36		06:31	17:50 (3)	06:16	19:53 (2)	05:18	04:54		
	16:43	17:44		18:38	16 18:06 (3)	20:35	14 20:07 (2)	21:28	22:00		
21	08:30	07:34	17:14 (4)	06:28	17:53 (3)	06:14	19:51 (2)	05:16	04:54		
	16:45	17:46	4 17:18 (4)	18:40	11 18:04 (3)	20:37	17 20:08 (2)	21:30	22:01		
22	08:28	07:32	17:12 (4)	06:26	17:56 (3)	06:12	19:51 (2)	05:15	04:55		
	16:47	17:48	7 17:19 (4)	18:41	3 17:59 (3)	20:39	19 20:10 (2)	21:31	22:01		
23	08:27	07:30	17:11 (4)	06:23		06:09	19:50 (2)	05:13	04:55		
	16:49	17:50	11 17:22 (4)	18:43		20:41	22 20:12 (2)	21:33	22:01		
24	08:26	07:28	17:10 (4)	06:21		06:07	19:50 (2)	05:12	04:55		
	16:50	17:52	14 17:24 (4)	18:45		20:42	24 20:14 (2)	21:34	22:01		
25	08:24	07:25	17:08 (4)	06:18		06:05	19:50 (2)	05:11	04:55		
	16:52	17:54	18 17:26 (4)	18:47		20:44	25 20:15 (2)	21:36	22:01		
26	08:23	07:23	17:08 (4)	06:16		06:03	19:50 (2)	05:09	04:56		
	16:54	17:56	20 17:28 (4)	18:49		20:46	27 20:17 (2)	21:37	22:01		
27	08:22	07:21	17:07 (4)	06:13		06:00	19:50 (2)	05:08	04:56		
	16:56	17:58	24 17:31 (4)	18:51		20:48	28 20:18 (2)	21:39	22:01		
28	08:20	07:18	17:06 (4)	06:11		05:58	19:50 (2)	05:07	04:57		
	16:58	18:00	26 17:32 (4)	18:53		20:50	27 20:17 (2)	21:40	22:01		
29	08:18	16:25 (5)		07:08		05:56	19:50 (2)	05:06	04:57		
	17:00	3 16:28 (5)		19:54		20:52	27 20:17 (2)	21:41	22:01		
30	08:17	16:24 (5)		07:06		05:54	19:51 (2)	05:05	04:58		
	17:02	6 16:30 (5)		19:56		20:53	25 20:16 (2)	21:43	22:00		
31	08:15	16:23 (5)		07:04				05:04			
	17:04	9 16:32 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case	18		303	443		278		103			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.67	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	3		47	81		64		25			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LM - H325

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:30 (3) 16:54	15:57 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:36 (3) 16:52	15:56 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:50 (4) 16:50	15:55 (5) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:48 (4) 16:48	15:54 (5) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:46 (4) 16:46	15:54 (5) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:45 (4) 16:44	15:53 (5) 16:07
7	05:04 21:57	05:49 21:13	20:08 (2) 20:04	07:37 18:50	17:42 (4) 16:43	15:53 (5) 16:06
8	05:05 21:56	05:50 21:11	20:05 (2) 20:01	07:39 18:48	17:42 (4) 16:41	15:53 (5) 16:06
9	05:06 21:55	05:52 21:09	20:03 (2) 19:59	07:41 18:45	17:41 (4) 16:39	15:53 (5) 16:05
10	05:07 21:55	05:54 21:07	20:01 (2) 19:56	07:42 18:43	17:40 (4) 16:37	15:55 (5) 16:05
11	05:08 21:54	05:56 21:05	20:00 (2) 19:54	07:44 18:40	17:40 (4) 16:35	15:55 (5) 16:05
12	05:09 21:53	05:57 21:03	19:59 (2) 19:51	07:46 18:38	17:40 (4) 16:34	15:56 (5) 16:05
13	05:10 21:52	05:59 21:01	19:58 (2) 19:49	07:48 18:36	17:40 (4) 16:32	15:57 (5) 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 19:47	07:50 18:33	17:40 (4) 16:31	15:59 (5) 16:04
15	05:13 21:50	06:03 20:57	19:57 (2) 19:44	07:52 18:31	17:40 (4) 16:29	15:59 (5) 16:05
16	05:14 21:49	06:04 20:55	19:56 (2) 19:42	07:54 18:29	17:40 (4) 16:27	15:59 (5) 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 19:39	07:55 18:26	17:41 (4) 16:26	15:59 (5) 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 19:37	07:57 18:24	17:41 (4) 16:24	15:59 (5) 16:05
19	05:18 21:45	06:10 20:48	19:56 (2) 19:34	07:59 18:22	17:42 (4) 16:23	15:59 (5) 16:05
20	05:20 21:44	06:12 20:46	19:56 (2) 19:32	08:01 18:20	17:43 (4) 16:22	15:59 (5) 16:06
21	05:21 21:42	06:13 20:44	19:56 (2) 19:29	08:03 18:17	17:45 (4) 16:20	15:59 (5) 16:06
22	05:23 21:41	06:15 20:42	19:56 (2) 19:27	18:38 (3) 18:15	08:05 16:19	15:59 (5) 16:06
23	05:24 21:39	06:17 20:39	19:57 (2) 19:24	18:35 (3) 18:13	08:07 16:18	15:59 (5) 16:07
24	05:26 21:38	06:19 20:37	19:58 (2) 19:22	18:34 (3) 18:11	08:09 16:17	15:59 (5) 16:08
25	05:27 21:36	06:20 20:35	19:58 (2) 20:06 (2)	18:32 (3) 18:51 (3)	07:11 17:09	15:59 (5) 16:08
26	05:29 21:35	06:22 20:32	20:00 (2) 20:04 (2)	18:31 (3) 18:48 (3)	07:13 17:06	15:59 (5) 16:09
27	05:30 21:33	06:24 20:30	19:19 19:14	18:30 (3) 18:46 (3)	07:14 17:04	15:59 (5) 16:10
28	05:32 21:32	06:26 20:28	19:14 19:12	18:30 (3) 18:44 (3)	07:16 17:02	15:59 (5) 16:11
29	05:34 21:30	06:27 20:25	19:12 19:09	18:30 (3) 18:41 (3)	07:18 17:00	15:59 (5) 16:12
30	05:35 21:28	06:29 20:23	19:07 19:07	18:29 (3) 18:38 (3)	07:20 16:58	15:59 (5) 16:12
31	05:37 21:26	06:31 20:21	19:07 19:07	18:38 (3) 16:56	16:07 (5) 16:10 (5)	15:59 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		385	128	459	182	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		85	28	91	32	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: LN - H326

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	20:00 (5) 20:25 (5)	05:03 21:45	04:59 22:00	05:39 21:25	20:16 (5) 20:27 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:59 (5) 20:25 (5)	05:02 21:46	05:00 22:00	05:40 21:23	20:15 (5) 20:30 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:59 (5) 20:25 (5)	05:01 21:48	05:00 21:59	05:42 21:21	20:13 (5) 20:30 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:59 (5) 20:24 (5)	05:00 21:49	05:01 21:59	05:44 21:19	20:12 (5) 20:32 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	20:00 (5) 20:24 (5)	04:59 21:50	05:02 21:58	05:45 21:17	20:11 (5) 20:32 (5)	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	20:00 (5) 20:23 (5)	04:59 21:51	05:03 21:57	05:47 21:15	20:10 (5) 20:33 (5)	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	20:01 (5) 20:23 (5)	04:58 21:52	05:04 21:57	05:49 21:13	20:10 (5) 20:34 (5)	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:02 (5) 20:22 (5)	04:57 21:53	05:05 21:56	05:51 21:11	20:09 (5) 20:33 (5)	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:02 (5) 20:21 (5)	04:57 21:54	05:06 21:55	05:52 21:09	20:09 (5) 20:34 (5)	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:03 (5) 20:19 (5)	04:56 21:54	05:07 21:54	05:54 21:07	20:08 (5) 20:33 (5)	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:05 (5) 20:19 (5)	04:56 21:55	05:08 21:54	05:56 21:05	20:08 (5) 20:34 (5)	06:50 19:54	07:44 18:40	07:43 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:07 (5) 20:16 (5)	04:55 21:56	05:09 21:53	05:57 21:03	20:08 (5) 20:34 (5)	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	20:08 (5) 20:31 (5)	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	05:12 21:51	06:01 20:59	20:08 (5) 20:29 (5)	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	05:13 21:50	06:03 20:57	20:09 (5) 20:28 (5)	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	05:14 21:48	06:05 20:55	20:08 (5) 20:25 (5)	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	05:16 21:47	06:06 20:53	20:09 (5) 20:23 (5)	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25		04:54 21:59	05:17 21:46	06:08 20:50	20:11 (5) 20:22 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27		04:54 22:00	05:18 21:45	06:10 20:48	20:11 (5) 20:19 (5)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28		04:54 22:00	05:20 21:43	06:12 20:46	20:13 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30		04:54 22:00	05:21 21:42	06:13 20:44		07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31		04:55 22:01	05:23 21:41	06:15 20:42		07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:07 (5) 20:12 (5)	04:55 22:01	05:24 21:39	06:17 20:39		07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	20:05 (5) 20:13 (5)	04:55 22:01	05:26 21:38	06:19 20:37		07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:04 (5) 20:15 (5)	04:56 22:01	05:27 21:36	06:20 20:35		07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	20:03 (5) 20:17 (5)	04:56 22:01	05:29 21:35	06:22 20:32		07:17 19:17	07:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:02 (5) 20:19 (5)	04:56 22:01	05:30 21:33	06:24 20:30		07:19 19:14	07:14 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 20:51	20:01 (5) 20:21 (5)	04:57 22:01	05:32 21:32	06:26 20:28		07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 20:22	20:00 (5) 20:22 (5)	04:58 21:41	05:34 21:30	06:28 20:25		07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 20:24	20:00 (5) 20:24 (5)	04:58 21:43	05:35 21:28	06:29 20:23		07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:25 (5)	20:20 (5) 20:21			07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494		510	512	460		382		259	233
Total, worst case				121	249			5		374				
Sun reduction				0.35	0.38			0.32		0.34				
Oper. time red.				1.00	1.00			1.00		1.00				
Wind dir. red.				0.65	0.65			0.65		0.65				
Total reduction				0.23	0.25			0.21		0.22				
Total, real				28	61			1		83				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LO - H327

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	19:54 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	25	20:19 (5)	21:45	22:00	21:25	20:18	19:05	16:54
2	08:44	08:12	07:14	06:59	05:50		19:55 (5)	05:02	05:00	05:40	06:35	07:28	07:26
	16:16	17:08	18:04	20:02	20:57	23	20:18 (5)	21:46	22:00	21:23	20:16	19:02	16:52
3	08:43	08:10	07:11	06:56	05:48		19:55 (5)	05:01	05:00	05:42	06:36	07:30	07:28
	16:17	17:10	18:06	20:04	20:59	22	20:17 (5)	21:48	21:59	21:21	20:13	19:00	16:50
4	08:43	08:08	07:09	06:54	05:46		19:56 (5)	05:00	05:01	05:44	06:38	07:31	07:30
	16:18	17:12	18:07	20:06	21:01	20	20:16 (5)	21:49	21:59	21:19	20:11	18:57	16:48
5	08:43	08:07	07:07	06:51	05:44		19:56 (5)	04:59	05:02	05:45	20:10 (5)	06:40	07:33
	16:20	17:14	18:09	20:07	21:03	19	20:15 (5)	21:50	21:58	21:17	20:21 (5)	20:09	18:55
6	08:42	08:05	07:04	06:49	05:42		19:57 (5)	04:59	05:03	05:47	20:09 (5)	06:42	07:35
	16:21	17:16	18:11	20:09	21:04	17	20:14 (5)	21:51	21:57	21:15	20:23 (5)	20:06	18:52
7	08:42	08:03	07:02	06:47	05:40		20:00 (5)	04:58	05:04	05:49	20:07 (5)	06:43	07:37
	16:22	17:18	18:13	20:11	21:06	13	20:13 (5)	21:52	21:57	21:13	20:25 (5)	20:04	18:50
8	08:41	08:01	07:00	06:44	05:38		20:02 (5)	04:57	05:05	05:51	20:06 (5)	06:45	07:39
	16:24	17:20	18:15	20:13	21:08	8	20:10 (5)	21:53	21:56	21:11	20:25 (5)	20:01	18:48
9	08:41	07:59	06:57	06:42	05:36			04:57	05:06	05:52	20:05 (5)	06:47	07:41
	16:25	17:22	18:17	20:15	21:10			21:54	21:55	21:09	20:26 (5)	19:59	18:45
10	08:40	07:57	06:55	06:39	05:34			04:56	05:07	05:54	20:03 (5)	06:49	07:42
	16:27	17:24	18:19	20:17	21:11			21:54	21:54	21:07	20:26 (5)	19:56	18:43
11	08:40	07:55	06:52	06:37	05:33			04:56	05:08	05:56	20:03 (5)	06:50	07:44
	16:28	17:26	18:21	20:18	21:13			21:55	21:54	21:05	20:27 (5)	19:54	18:40
12	08:39	07:53	06:50	06:35	05:31			04:55	05:09	05:57	20:03 (5)	06:52	07:46
	16:30	17:28	18:23	20:20	21:15			21:56	21:53	21:03	20:27 (5)	19:51	18:38
13	08:38	07:51	06:48	06:32	05:29			04:55	05:11	05:59	20:02 (5)	06:54	07:48
	16:31	17:30	18:25	20:22	21:17			21:57	21:52	21:01	20:27 (5)	19:49	18:36
14	08:37	07:49	06:45	06:30	05:27			04:55	05:12	06:01	20:02 (5)	06:56	07:50
	16:33	17:32	18:27	20:24	21:18			21:57	21:51	20:59	20:27 (5)	19:47	18:33
15	08:36	07:47	06:43	06:28	05:26			04:55	05:13	06:03	20:02 (5)	06:58	07:52
	16:34	17:34	18:28	20:26	21:20			21:58	21:50	20:57	20:27 (5)	19:44	18:31
16	08:35	07:45	06:40	06:25	05:24			04:54	05:14	06:05	20:01 (5)	06:59	07:54
	16:36	17:36	18:30	20:28	21:22			21:59	21:48	20:55	20:25 (5)	19:42	18:29
17	08:34	07:43	06:38	06:23	05:22			04:54	05:16	06:06	20:02 (5)	07:01	07:55
	16:38	17:38	18:32	20:30	21:23			21:59	21:47	20:53	20:23 (5)	19:39	18:26
18	08:33	07:41	06:35	06:21	05:21			04:54	05:17	06:08	20:02 (5)	07:03	07:57
	16:40	17:40	18:34	20:31	21:25			21:59	21:46	20:50	20:22 (5)	19:37	18:24
19	08:32	07:39	06:33	06:18	05:19			04:54	05:18	06:10	20:02 (5)	07:05	07:59
	16:41	17:42	18:36	20:33	21:27			22:00	21:45	20:48	20:19 (5)	19:34	18:22
20	08:31	07:36	06:31	06:16	20:03 (5)	05:18		04:54	05:20	06:12	20:03 (5)	07:06	08:01
	16:43	17:44	18:38	20:35	4	20:07 (5)	21:28	22:00	21:43	20:46	20:17 (5)	19:32	18:20
21	08:30	07:34	06:28	06:14	20:00 (5)	05:16		04:54	05:21	06:13	20:04 (5)	07:08	08:03
	16:45	17:46	18:40	20:37	8	20:08 (5)	21:30	22:00	21:42	20:44	20:15 (5)	19:29	18:17
22	08:28	07:32	06:26	06:12	19:58 (5)	05:15		04:55	05:23	06:15	20:04 (5)	07:10	08:05
	16:47	17:48	18:41	20:39	12	20:10 (5)	21:31	22:01	21:41	20:42	8	20:12 (5)	19:27
23	08:27	07:30	06:23	06:09	19:57 (5)	05:13		04:55	05:24	06:17	20:07 (5)	07:12	08:07
	16:49	17:50	18:43	20:41	15	20:12 (5)	21:33	22:01	21:39	20:39	3	20:10 (5)	19:24
24	08:26	07:28	06:21	06:07	19:56 (5)	05:12		04:55	05:26	06:19		07:13	08:09
	16:51	17:52	18:45	20:42	17	20:13 (5)	21:34	22:01	21:38	20:37		19:22	18:11
25	08:24	07:25	06:18	06:05	19:55 (5)	05:11		04:56	05:27	06:20		07:15	07:11
	16:52	17:54	18:47	20:44	20	20:15 (5)	21:36	22:01	21:36	20:35		19:19	17:09
26	08:23	07:23	06:16	06:03	19:55 (5)	05:09		04:56	05:29	06:22		07:17	07:13
	16:54	17:56	18:49	20:46	22	20:17 (5)	21:37	22:01	21:35	20:32		19:17	17:06
27	08:21	07:21	06:13	06:01	19:55 (5)	05:08		04:56	05:30	06:24		07:19	07:14
	16:56	17:58	18:51	20:48	24	20:19 (5)	21:39	22:01	21:33	20:30		19:14	17:04
28	08:20	07:18	06:11	05:58	19:54 (5)	05:07		04:57	05:32	06:26		07:21	07:16
	16:58	18:00	18:53	20:50	26	20:20 (5)	21:40	22:01	21:32	20:28		19:12	17:02
29	08:18		07:08	05:56	19:54 (5)	05:06		04:58	05:34	06:28		07:22	07:18
	17:00		19:54	20:52	26	20:20 (5)	21:41	22:00	21:30	20:25		19:09	17:00
30	08:17		07:06	05:54	19:54 (5)	05:05		04:58	05:35	06:29		07:24	07:20
	17:02		19:56	20:53	25	20:19 (5)	21:43	22:00	21:28	20:23		19:07	16:58
31	08:15		07:04		05:04				05:37	06:31		07:22	08:14
	17:04		19:58		21:44				21:26	20:21		16:56	16:13
Potential sun hours	250	273	367	420	494		510	512	460	382	328	259	233
Total, worst case				199	147				347				
Sun reduction				0.35	0.38				0.34				
Oper. time red.				1.00	1.00				1.00				
Wind dir. red.				0.65	0.65				0.65				
Total reduction				0.23	0.25				0.22				
Total, real				46	36				77				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LP - H328

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44	08:14	07:16	07:01	05:52	19:53 (5)	05:03	04:59	05:39	06:33	07:26	07:24	08:19			
	16:15	17:06	18:02	20:00	20:55	20	20:13 (5)	21:45	22:00	21:25	20:18	19:05	16:54	16:10		
2	08:44	08:12	07:14	06:59	05:50		19:54 (5)	05:02	05:00	05:40	06:35	07:28	07:26	08:21		
	16:16	17:08	18:04	20:02	20:57	18	20:12 (5)	21:46	22:00	21:23	20:16	19:02	16:52	16:09		
3	08:43	08:10	07:11	06:56	05:48		19:55 (5)	05:01	05:00	05:42	06:36	07:30	07:28	08:22		
	16:17	17:10	18:06	20:04	20:59	16	20:11 (5)	21:48	21:59	21:21	20:13	19:00	16:50	16:08		
4	08:43	08:08	07:09	06:54	05:46		19:57 (5)	05:00	05:01	05:44	06:38	07:31	07:30	08:23		
	16:18	17:12	18:07	20:06	21:01	12	20:09 (5)	21:49	21:59	21:19	20:11	18:57	16:48	16:08		
5	08:43	08:07	07:07	06:51	05:44		20:00 (5)	04:59	05:02	05:45	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:02	6	20:06 (5)	21:50	21:58	21:17	20:09	18:55	16:46	16:07		
6	08:42	08:05	07:04	06:49	05:42			04:59	05:03	05:47	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04			21:51	21:57	21:15	20:06	18:52	16:44	16:07		
7	08:42	08:03	07:02	06:47	05:40			04:58	05:04	05:49	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06			21:52	21:57	21:13	20:04	18:50	16:43	16:06		
8	08:41	08:01	07:00	06:44	05:38			04:57	05:05	05:51	20:08 (5)	06:45	07:39	08:29		
	16:24	17:20	18:15	20:13	21:08			21:53	21:56	21:11	8	20:16 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36			04:57	05:06	05:52	20:06 (5)	06:47	07:41	07:40	08:30	
	16:25	17:22	18:17	20:15	21:10			21:54	21:55	21:09	13	20:19 (5)	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34			04:56	05:07	05:54	20:03 (5)	06:49	07:42	07:42	08:31	
	16:27	17:24	18:19	20:17	21:11			21:54	21:54	21:07	16	20:19 (5)	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33			04:56	05:08	05:56	20:02 (5)	06:50	07:44	07:43	08:33	
	16:28	17:26	18:21	20:18	21:13			21:55	21:54	21:05	19	20:21 (5)	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31			04:55	05:09	05:57	20:02 (5)	06:52	07:46	07:45	08:34	
	16:30	17:28	18:23	20:20	21:15			21:56	21:53	21:03	20	20:22 (5)	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29			04:55	05:11	05:59	20:00 (5)	06:54	07:48	07:47	08:35	
	16:31	17:30	18:25	20:22	21:17			21:57	21:52	21:01	22	20:22 (5)	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27			04:55	05:12	06:01	20:00 (5)	06:56	07:50	07:49	08:36	
	16:33	17:32	18:27	20:24	21:18			21:57	21:51	20:59	23	20:23 (5)	19:46	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26			04:55	05:13	06:03	20:00 (5)	06:58	07:52	07:51	08:37	
	16:34	17:34	18:28	20:26	21:20			21:58	21:50	20:57	23	20:23 (5)	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24			04:54	05:14	06:05	19:59 (5)	06:59	07:54	07:53	08:37	
	16:36	17:36	18:30	20:28	21:22			21:59	21:48	20:55	23	20:22 (5)	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	05:22			04:54	05:16	06:06	19:59 (5)	07:01	07:55	07:55	08:38	
	16:38	17:38	18:32	20:30	21:23			21:59	21:47	20:53	24	20:23 (5)	19:39	18:26	16:26	16:05
18	08:33	07:41	06:35	06:21	20:00 (5)	05:21		04:54	05:17	06:08	19:59 (5)	07:03	07:57	07:57	08:39	
	16:40	17:40	18:34	20:31	3	20:03 (5)	21:25	21:59	21:46	20:50	23	20:22 (5)	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	19:58 (5)	05:19		04:54	05:18	06:10	19:58 (5)	07:05	07:59	07:59	08:40	
	16:41	17:42	18:36	20:33	7	20:05 (5)	21:27	22:00	21:45	20:48	21	20:19 (5)	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	19:57 (5)	05:18		04:54	05:20	06:12	19:59 (5)	07:06	08:01	08:00	08:41	
	16:43	17:44	18:38	20:35	10	20:07 (5)	21:28	22:00	21:43	20:46	18	20:17 (5)	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	19:54 (5)	05:16		04:54	05:21	06:13	19:59 (5)	07:08	08:03	08:02	08:41	
	16:45	17:46	18:40	20:37	14	20:08 (5)	21:30	22:00	21:42	20:44	16	20:15 (5)	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	19:54 (5)	05:15		04:55	05:23	06:15	19:59 (5)	07:10	08:05	08:04	08:42	
	16:47	17:48	18:41	20:39	16	20:10 (5)	21:31	22:01	21:41	20:42	13	20:12 (5)	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	19:53 (5)	05:13		04:55	05:24	06:17	20:00 (5)	07:12	08:07	08:06	08:42	
	16:49	17:50	18:43	20:41	19	20:12 (5)	21:33	22:01	21:39	20:39	10	20:10 (5)	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	19:52 (5)	05:12		04:55	05:26	06:19	20:02 (5)	07:13	08:09	08:07	08:43	
	16:51	17:52	18:45	20:42	21	20:13 (5)	21:34	22:01	21:38	20:37	7	20:09 (5)	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	19:52 (5)	05:11		04:56	05:27	06:20	20:03 (5)	07:15	07:11	08:09	08:43	
	16:52	17:54	18:47	20:44	23	20:15 (5)	21:36	22:01	21:36	20:35	3	20:06 (5)	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	19:52 (5)	05:09		04:56	05:29	06:22	20:06 (5)	07:17	07:13	08:11	08:43	
	16:54	17:56	18:49	20:46	24	20:16 (5)	21:37	22:01	21:35	20:32		19:17	17:06	16:15	16:09	
27	08:21	07:21	06:13	06:01	19:52 (5)	05:08		04:56	05:30	06:24	20:07 (5)	07:19	07:14	08:13	08:43	
	16:56	17:58	18:51	20:48	24	20:16 (5)	21:39	22:01	21:33	20:30		19:14	17:04	16:13	16:10	
28	08:20	07:18	06:11	05:58	19:52 (5)	05:07		04:57	05:32	06:26	20:07 (5)	07:21	07:16	08:14	08:44	
	16:58	18:00	18:53	20:50	23	20:15 (5)	21:40	22:01	21:32	20:28		19:12	17:02	16:13	16:11	
29	08:18		07:08	05:56	19:52 (5)	05:06		04:58	05:34	06:28	20:07 (5)	07:22	07:18	08:16	08:44	
	17:00		19:54	20:52	23	20:15 (5)	21:41	22:00	21:30	20:25		19:09	17:00	16:12	16:11	
30	08:17		07:06	05:54	19:53 (5)	05:05		04:58	05:35	06:29	20:07 (5)	07:24	07:20	08:17	08:44	
	17:02		19:56	20:53	21	20:14 (5)	21:43	22:00	21:28	20:23		19:07	16:58	16:11	16:12	
31	08:15		07:04			05:04			05:37	06:31		07:22			08:44	
	17:04		19:58			21:44			21:26	20:21		16:56			16:13	
Potential sun hours	250	273	367	420	494			510	512	460		382	328	259	233	
Total, worst case				228		72				302						
Sun reduction				0.35		0.38				0.34						
Oper. time red.				1.00		1.00				1.00						
Wind dir. red.				0.65		0.65				0.65						
Total reduction				0.23		0.25				0.22						
Total, real				52		18				67						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LQ - H329

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:53 (5) 20:03 (5)	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57		05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59		05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01		05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02		04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04		04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06		04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08		04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10		04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11		04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13		04:56 21:55	05:08 21:54	05:56 21:05	20:04 (5) 20:09 (5)	06:50 19:54	07:44 18:40	07:43 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15		04:55 21:56	05:09 21:53	05:57 21:03	20:01 (5) 20:12 (5)	06:52 19:51	07:46 18:38	07:45 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17		04:55 21:57	05:11 21:52	05:59 21:01	19:58 (5) 20:13 (5)	06:54 19:49	07:48 18:36	07:47 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	05:12 21:51	06:01 20:59	15 18	19:57 (5) 20:15 (5)	06:56 19:46	07:50 18:33
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	19:57 (5) 19:58 (5)	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	20 20	19:56 (5) 20:16 (5)	06:58 19:44	07:52 18:31
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:54 (5) 20:00 (5)	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	21 21	19:55 (5) 20:16 (5)	06:59 19:42	07:54 18:29
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:52 (5) 20:01 (5)	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	22 22	19:54 (5) 20:16 (5)	07:01 19:39	07:55 18:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:51 (5) 20:03 (5)	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	23 23	19:54 (5) 20:17 (5)	07:03 19:37	07:57 18:24
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	19:50 (5) 20:05 (5)	05:19 21:27	04:54 22:00	05:18 21:45	06:10 20:48	20 23	19:53 (5) 20:16 (5)	07:05 19:34	07:59 18:22
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:49 (5) 20:07 (5)	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	23 23	19:53 (5) 20:16 (5)	07:06 19:32	08:01 18:20
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:48 (5) 20:08 (5)	05:16 21:30	04:54 22:00	05:21 21:42	06:13 20:44	23 22	19:53 (5) 20:15 (5)	07:08 19:29	08:03 18:17
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	19:47 (5) 20:10 (5)	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	22 20	19:52 (5) 20:12 (5)	07:10 19:27	08:05 18:15
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:47 (5) 20:11 (5)	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	20 17	19:53 (5) 20:10 (5)	07:12 19:24	08:07 18:13
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:47 (5) 20:11 (5)	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	17 16	19:53 (5) 20:09 (5)	07:13 19:22	08:09 18:11
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19:47 (5) 20:10 (5)	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	16 13	19:53 (5) 20:06 (5)	07:15 19:19	08:09 18:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:48 (5) 20:10 (5)	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	13 9	19:55 (5) 20:04 (5)	07:17 19:17	08:11 18:15
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:48 (5) 20:09 (5)	05:08 21:39	04:56 22:01	05:30 21:33	06:24 20:30	9 6	19:56 (5) 20:02 (5)	07:19 19:14	08:13 18:13
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	19:49 (5) 20:08 (5)	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	6 1	19:58 (5) 19:59 (5)	07:21 19:12	08:14 18:13
29	08:18 17:00		07:08 19:54	05:56 20:52	19:50 (5) 20:07 (5)	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	1 20	19:59 (5) 19:09	07:22 17:00	08:16 18:12
30	08:17 17:02		07:06 19:56	05:54 20:53	19:51 (5) 20:05 (5)	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23		07:24 19:07	08:17 16:58	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44			05:37 21:26	06:31 20:21		07:22 16:56	08:14 16:11	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233	
Total, worst case				268	10			285					
Sun reduction				0.35	0.38			0.34					
Oper. time red.				1.00	1.00			1.00					
Wind dir. red.				0.65	0.65			0.65					
Total reduction				0.23	0.25			0.22					
Total, real				61	2			63					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LR - H330

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:46	21:59	21:23	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:23
	16:18	17:12	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07	21:02	21:50	21:58	21:17	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	21:51	21:57	21:15	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:13	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	21:56	21:11	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	21:55	21:09	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11	21:54	21:54	21:07	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33	04:56	05:08	05:56	06:50	07:44	07:43	08:32
	16:28	17:26	18:21	20:18	21:13	21:55	21:54	21:05	19:54	18:40	16:35	16:05
12	08:39	07:53	06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17	21:57	21:52	21:01	10	20:12 (5)	19:49	16:32
14	08:37	07:49	06:45	06:30	05:27	04:55	05:12	06:01	20:01 (5)	19:49	16:32	16:05
	16:33	17:32	18:27	20:24	21:18	21:57	21:51	20:59	13	20:14 (5)	19:46	16:31
15	08:36	07:47	06:43	06:28	05:26	04:55	05:13	06:03	20:00 (5)	19:46	16:31	16:05
	16:34	17:34	18:28	20:26	21:20	21:58	21:50	20:57	16	20:16 (5)	19:44	16:31
16	08:35	07:45	06:40	06:25	05:24	04:54	05:14	06:05	19:58 (5)	19:44	16:31	16:05
	16:36	17:36	18:30	20:28	3	19:59 (5)	21:22	21:59	18	20:16 (5)	19:42	16:27
17	08:34	07:43	06:38	06:23	05:22	04:54	05:16	06:06	19:57 (5)	19:42	16:27	16:05
	16:38	17:38	18:32	20:30	7	20:01 (5)	21:23	21:59	20	20:17 (5)	19:39	16:26
18	08:33	07:41	06:35	06:21	05:21	04:54	05:17	06:08	19:57 (5)	19:39	16:26	16:05
	16:40	17:40	18:34	20:31	10	20:03 (5)	21:25	21:59	20	20:17 (5)	19:37	16:25
19	08:32	07:39	06:33	06:18	05:19	04:54	05:18	06:10	19:56 (5)	19:37	16:25	16:05
	16:41	17:42	18:36	20:33	13	20:05 (5)	21:26	22:00	21	20:17 (5)	19:34	16:23
20	08:31	07:36	06:31	06:16	05:18	04:54	05:20	06:12	19:56 (5)	19:34	16:23	16:05
	16:43	17:44	18:38	20:35	15	20:07 (5)	21:28	22:00	21	20:17 (5)	19:32	16:22
21	08:30	07:34	06:28	06:14	05:16	04:54	05:21	06:13	19:56 (5)	19:32	16:22	16:06
	16:45	17:46	18:40	20:37	18	20:08 (5)	21:30	22:00	19	20:15 (5)	19:29	16:20
22	08:28	07:32	06:26	06:12	05:15	04:55	05:22	06:15	19:55 (5)	19:29	16:20	16:06
	16:47	17:48	18:41	20:39	20	20:10 (5)	21:31	22:01	17	20:12 (5)	19:27	16:19
23	08:27	07:30	06:23	06:09	05:13	04:55	05:24	06:17	19:55 (5)	19:27	16:19	16:06
	16:49	17:50	18:43	20:41	21	20:11 (5)	21:33	22:01	15	20:10 (5)	19:24	16:18
24	08:26	07:28	06:21	06:07	05:12	04:55	05:26	06:19	19:56 (5)	19:24	16:18	16:07
	16:51	17:52	18:45	20:42	21	20:11 (5)	21:34	22:01	13	20:09 (5)	19:22	16:17
25	08:24	07:25	06:18	06:05	05:11	04:56	05:27	06:20	19:56 (5)	19:22	16:17	16:08
	16:52	17:54	18:47	20:44	21	20:11 (5)	21:36	22:01	10	20:06 (5)	19:19	16:16
26	08:23	07:23	06:16	06:03	05:09	04:56	05:29	06:22	19:57 (5)	19:19	16:16	16:08
	16:54	17:56	18:49	20:46	19	20:10 (5)	21:37	22:01	7	20:04 (5)	19:17	16:15
27	08:21	07:21	06:13	06:01	05:08	04:56	05:30	06:24	19:59 (5)	19:17	16:15	16:09
	16:56	17:58	18:51	20:48	18	20:09 (5)	21:39	22:01	3	20:02 (5)	19:14	16:13
28	08:20	07:18	06:11	05:58	05:07	04:57	05:32	06:26	19:59 (5)	19:14	16:13	16:10
	16:58	18:00	18:53	20:50	16	20:08 (5)	21:40	22:01	19:12	17:02	16:12	16:11
29	08:18		07:08	05:56	05:06	04:58	05:34	06:27	19:22	17:02	16:12	16:11
	17:00		19:54	20:52	12	20:06 (5)	21:41	22:00	19:09	17:00	16:12	16:11
30	08:17		07:06	05:54	05:05	04:58	05:35	06:29	07:24	17:00	16:12	16:11
	17:02		19:56	20:53	8	20:04 (5)	21:43	22:00	19:07	16:58	16:11	16:12
31	08:15		07:04		05:04		05:37	06:31		16:58		16:12
	17:04		19:58		21:44		21:26	20:21		16:56		16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				222		8		223				
Sun reduction				0.35		0.32		0.34				
Oper. time red.				1.00		1.00		1.00				
Wind dir. red.				0.65		0.61		0.65				
Total reduction				0.23		0.19		0.22				
Total, real				51		2		49				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LS - H331

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:21 (4) 21:25	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10	
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:21 (4) 21:24 (4)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09	
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	21:21 (4) 21:23 (4)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08	
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	21:22 (4) 21:23 (4)	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08	
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58		05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07	
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57		05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07	
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57		05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06	
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56		05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06	
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	21:16 (4)	05:06 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05	
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	21:16 (4) 21:19 (4)	05:07 21:54	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05	
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	21:17 (4) 21:20 (4)	05:08 21:54	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05	
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	21:17 (4) 21:21 (4)	05:09 21:53	06:57 21:03	07:46 19:51	07:45 18:34	08:34 16:05	
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	21:16 (4) 21:21 (4)	05:11 21:52	05:59 21:01	20:06 (5) 20:08 (5)	06:54 19:49	07:48 18:36	08:35 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	05:16 (4) 21:22 (4)	05:12 21:51	06:01 20:59	20:02 (5) 20:12 (5)	06:56 19:46	07:50 18:33	08:36 16:31
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	21:16 (4) 21:22 (4)	05:13 21:50	06:03 20:57	20:01 (5) 20:14 (5)	06:57 19:44	07:52 18:31	08:37 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	19:56 (5) 19:59 (5)	05:24 21:22	04:54 21:59	21:17 (4) 21:23 (4)	05:14 21:48	06:04 20:55	19:59 (5) 20:15 (5)	06:59 19:42	07:54 18:29	08:37 16:27
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19:54 (5) 20:01 (5)	05:22 21:23	04:54 21:59	21:17 (4) 21:23 (4)	05:16 21:47	06:06 20:53	19:58 (5) 20:16 (5)	07:01 19:39	07:55 18:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	19:53 (5) 20:03 (5)	05:21 21:25	04:54 21:59	21:17 (4) 21:24 (4)	05:17 21:46	06:08 20:50	19:57 (5) 20:16 (5)	07:03 19:37	07:57 18:24	08:39 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	19:52 (5) 20:05 (5)	05:19 21:26	04:54 22:00	21:17 (4) 21:24 (4)	05:18 21:45	06:10 20:48	19:56 (5) 20:16 (5)	07:05 19:34	07:59 18:17	08:40 16:20
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	19:52 (5) 20:07 (5)	05:18 21:28	04:54 22:00	21:17 (4) 21:24 (4)	05:20 21:43	06:12 20:46	19:56 (5) 20:16 (5)	07:06 19:32	08:01 18:20	08:40 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	19:50 (5) 20:08 (5)	05:16 21:30	04:54 22:00	21:17 (4) 21:24 (4)	05:21 21:42	06:13 20:44	19:56 (5) 20:15 (5)	07:08 19:29	08:03 18:17	08:41 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	19:50 (5) 20:10 (5)	05:15 21:31	04:55 22:01	21:18 (4) 21:25 (4)	05:23 21:41	06:15 20:41	19:55 (5) 20:12 (5)	07:10 19:27	08:05 18:15	08:42 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	19:50 (5) 20:11 (5)	05:13 21:33	04:55 22:01	21:18 (4) 21:25 (4)	05:24 21:39	06:17 20:39	19:55 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:42 16:18
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	19:50 (5) 20:10 (5)	05:12 21:34	04:55 22:01	21:18 (4) 21:25 (4)	05:26 21:38	06:19 20:37	19:56 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:43 16:18
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	19:51 (5) 20:10 (5)	05:11 21:36	04:56 22:01	21:19 (4) 21:25 (4)	05:27 21:36	06:20 20:35	19:56 (5) 20:06 (5)	07:15 19:19	07:11 17:09	08:09 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	19:51 (5) 20:09 (5)	05:09 21:37	04:56 22:01	21:19 (4) 21:25 (4)	05:29 21:35	06:22 20:32	19:57 (5) 20:04 (5)	07:17 19:17	07:13 17:06	08:11 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	19:52 (5) 20:08 (5)	05:08 21:39	04:56 22:01	21:18 (4) 21:24 (4)	05:30 21:33	06:24 20:30	19:59 (5) 20:02 (5)	07:19 19:14	07:14 17:04	08:13 16:13
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	19:53 (5) 20:06 (5)	05:07 21:40	04:57 22:01	21:19 (4) 21:25 (4)	05:32 21:32	06:26 20:28		07:21 19:12	07:16 17:02	08:14 16:12
29	08:18 17:00		07:08 19:54	05:56 20:52	19:55 (5) 20:04 (5)	05:06 21:41	04:58 22:00	21:20 (4) 21:25 (4)	05:34 21:30	06:27 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05	05:05	04:58 22:00	21:20 (4) 21:24 (4)	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04	05:04			05:37 21:26	06:31 20:21		07:22 16:56	08:44 16:13	
Potential sun hours	250	273	367	420	494	510	512		460		382	328	259	233
Total, worst case				202		123		9		202				
Sun reduction				0.35		0.32		0.32		0.34				
Oper. time red.				1.00		1.00		1.00		1.00				
Wind dir. red.				0.65		0.61		0.61		0.65				
Total reduction				0.23		0.19		0.20		0.22				
Total, real				46		24		2		45				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LT - H332

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	3 19:30 (5) 20:55	05:03 21:45	04:59 22:00	05:39 21:25	20:38 (4) 20:18	06:33 20:18	8 19:28 (5) 19:05	07:24 16:54 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	7 19:35 (5) 20:57	05:02 21:46	05:00 21:59	05:40 21:23	20:38 (4) 20:16	06:35 20:16	12 19:38 (5) 19:02	07:26 16:52 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	10 19:37 (5) 20:59	05:01 21:48	05:00 21:59	05:42 21:21	20:38 (4) 20:13	06:36 20:13	15 19:38 (5) 19:00	07:28 16:50 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	12 19:39 (5) 21:01	05:00 21:49	05:01 21:59	05:44 21:19	20:39 (4) 20:11	06:38 20:11	17 19:39 (5) 18:57	07:30 16:48 16:08
5	08:43 16:19	08:07 17:14	07:07 18:09	06:51 20:07	15 19:40 (5) 21:02	04:59 21:50	05:02 21:58	05:45 21:17	20:39 (4) 20:09	06:40 20:09	17 19:39 (5) 18:55	07:32 16:46 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	17 19:42 (5) 21:04	3 20:30 (4) 21:51	04:59 21:57	05:47 21:15	20:40 (4) 20:06	06:42 20:06	16 19:38 (5) 18:52	07:34 16:44 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	17 19:42 (5) 21:06	20:30 (4) 21:52	04:58 21:57	05:04 21:13	20:41 (4) 20:04	06:43 20:04	2 19:40 (5) 18:50	07:36 16:43 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	17 19:42 (5) 21:08	20:29 (4) 21:53	04:57 21:56	05:05 21:11	06:45 20:01	20:04 20:01	12 19:33 (5) 18:48	07:38 16:41 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	15 19:41 (5) 21:10	20:28 (4) 21:54	05:06 21:55	05:52 21:09	06:47 19:59	20:07 19:59	10 19:31 (5) 18:45	07:40 16:39 16:05
10	08:40 16:26	07:57 17:24	06:55 18:19	06:39 20:17	12 19:39 (5) 21:11	20:27 (4) 21:54	05:07 21:54	05:54 21:07	06:49 19:56	20:07 19:56	7 19:28 (5) 18:43	07:42 16:37 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	8 19:37 (5) 21:13	20:28 (4) 21:55	05:08 21:59	05:56 21:05	06:50 19:54	20:12 19:54	4 19:26 (5) 18:40	07:43 16:35 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	16 19:40 (5) 21:15	20:27 (4) 21:56	05:04 21:53	05:57 21:03	06:52 19:51	20:13 19:51	3 19:27 (5) 18:43	07:46 16:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	17 19:41 (5) 21:17	20:27 (4) 21:57	05:10 21:57	05:59 19:49	06:54 19:49	20:14 19:49	2 19:26 (5) 18:42	07:47 16:32 16:05
14	08:37 16:33	07:49 17:32	06:45 18:26	06:30 20:24	20:27 (4) 21:18	20:27 (4) 21:57	05:12 21:51	06:01 20:59	06:56 19:46	20:15 19:46	1 19:25 (5) 18:33	07:49 16:31 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	21 19:42 (5) 21:20	20:27 (4) 21:58	05:13 21:50	06:03 20:57	06:57 19:44	20:16 19:44	1 19:24 (5) 18:31	07:51 16:29 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	20 19:43 (5) 21:22	20:28 (4) 21:59	05:14 21:48	06:04 20:55	06:59 19:42	20:17 19:42	1 19:23 (5) 18:29	07:53 16:27 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	19 19:44 (5) 21:23	20:28 (4) 21:59	05:16 21:47	06:06 20:53	07:01 19:39	20:18 19:39	1 19:22 (5) 18:26	07:55 16:26 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	18 19:45 (5) 21:25	20:29 (4) 21:59	05:17 21:46	06:08 20:50	07:03 19:37	20:19 19:37	1 19:21 (5) 18:24	07:57 16:24 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	17 19:46 (5) 21:26	20:30 (4) 22:00	05:18 21:45	06:10 20:48	07:05 19:34	20:20 19:34	1 19:20 (5) 18:22	07:59 16:23 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	16 19:47 (5) 21:28	20:31 (4) 22:00	20:45 (4) 21:43	7 20:52 (4) 20:46	06:12 19:32	20:21 19:32	1 19:19 (5) 18:20	08:00 16:22 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	14 19:48 (5) 21:30	20:32 (4) 22:00	05:21 21:42	11 20:54 (4) 20:44	07:08 19:29	20:22 19:29	1 19:18 (5) 18:17	08:03 16:20 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	13 19:49 (5) 21:31	20:33 (4) 22:01	05:23 21:41	14 20:55 (4) 20:41	07:10 19:27	20:23 19:27	1 19:17 (5) 18:15	08:04 16:19 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	10 19:50 (5) 21:33	20:34 (4) 22:01	05:24 21:39	15 20:56 (4) 20:39	07:12 19:24	20:24 19:24	1 19:16 (5) 18:13	08:06 16:18 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	5 19:51 (5) 21:34	20:35 (4) 22:01	05:26 21:38	17 20:57 (4) 20:37	07:13 19:22	20:25 19:22	1 19:15 (5) 18:11	08:07 16:17 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	4 19:52 (5) 21:36	20:36 (4) 22:01	05:27 21:36	18 20:58 (4) 20:35	07:15 19:19	20:26 19:19	1 19:14 (5) 18:09	08:09 16:16 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	3 19:53 (5) 21:37	20:37 (4) 22:01	05:29 21:35	19 20:59 (4) 20:32	07:17 19:17	20:27 19:17	1 19:13 (5) 18:07	08:11 16:14 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:00 20:48	2 19:54 (5) 21:39	20:38 (4) 22:01	05:30 21:33	20 20:58 (4) 20:30	07:19 19:14	20:28 19:14	1 19:12 (5) 18:04	08:13 16:13 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	1 19:55 (5) 21:40	20:39 (4) 22:01	05:32 21:31	21 20:58 (4) 20:28	07:21 19:12	20:29 19:12	1 19:11 (5) 18:03	08:14 16:12 16:11
29	08:18 17:00	07:16 19:04	06:10 19:54	05:56 20:52	0 19:56 (5) 21:41	20:40 (4) 22:00	05:34 21:30	20 20:57 (4) 20:25	07:22 19:09	20:30 19:09	1 19:10 (5) 18:02	08:16 16:12 16:11
30	08:17 17:02	07:15 19:06	06:09 19:56	05:54 20:53	0 19:57 (5) 21:43	20:41 (4) 22:00	05:35 21:28	18 20:56 (4) 20:23	07:24 19:07	20:31 19:07	1 19:09 (5) 18:01	08:17 16:11 16:12
31	08:15 17:04	07:14 19:08	06:08 19:58	05:54 21:44	0 19:58 (5) 21:46	20:42 (4) 22:01	05:37 21:26	17 20:55 (4) 20:21	07:25 20:21	20:32 20:21	1 19:08 (5) 18:00	08:18 16:10 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				133	260		197	64	133			
Sun reduction				0.35	0.38		0.32	0.34	0.32			
Oper. time red.				1.00	1.00		1.00	1.00	1.00			
Wind dir. red.				0.67	0.64		0.64	0.64	0.67			
Total reduction				0.24	0.24		0.21	0.22	0.21			
Total, real				31	63		41	14	29			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: LU - H333

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LV - H334

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:30 (5)	07:16	17:18 (4)	07:01	05:52	19:58 (2)	05:03		
	16:15	17:06	4 16:34 (5)	18:02	16	17:34 (4)	20:00	20:55	28 20:26 (2)	21:45	
2	08:44	08:12	16:30 (5)	07:14	17:16 (4)	06:59	05:50	19:58 (2)	05:02		
	16:16	17:08	7 16:37 (5)	18:04	20	17:36 (4)	20:02	20:57	28 20:26 (2)	21:46	
3	08:43	08:10	16:30 (5)	07:11	17:16 (4)	06:56	05:48	19:58 (2)	05:01		
	16:17	17:10	9 16:39 (5)	18:06	22	17:38 (4)	20:04	20:59	27 20:25 (2)	21:48	
4	08:43	08:08	16:29 (5)	07:09	17:16 (4)	06:54	05:46	19:58 (2)	05:00		
	16:18	17:12	12 16:41 (5)	18:07	25	17:41 (4)	20:06	21:01	26 20:24 (2)	21:49	
5	08:43	08:07	16:29 (5)	07:07	17:15 (4)	06:51	05:44	19:58 (2)	04:59		
	16:19	17:14	14 16:43 (5)	18:09	27	17:42 (4)	20:07	21:03	26 20:24 (2)	21:50	
6	08:42	08:05	16:29 (5)	07:04	17:15 (4)	06:49	05:42	19:59 (2)	04:59		
	16:21	17:16	16 16:45 (5)	18:11	30	17:45 (4)	20:09	21:04	24 20:23 (2)	21:51	
7	08:42	08:03	16:29 (5)	07:02	17:14 (4)	06:47	05:40	20:00 (2)	04:58		
	16:22	17:18	18 16:47 (5)	18:13	32	17:46 (4)	20:11	21:06	23 20:23 (2)	21:52	
8	08:42	08:01	16:29 (5)	07:00	17:14 (4)	06:44	05:38	20:01 (2)	04:57		
	16:24	17:20	21 16:50 (5)	18:15	34	17:48 (4)	20:13	21:08	20 20:21 (2)	21:53	
9	08:41	07:59	16:30 (5)	06:57	17:14 (4)	06:42	05:36	20:02 (2)	04:57		
	16:25	17:22	21 16:51 (5)	18:17	33	17:47 (4)	20:15	21:10	18 20:20 (2)	21:54	
10	08:40	07:57	16:30 (5)	06:55	17:15 (4)	06:39	05:34	20:03 (2)	04:56		
	16:26	17:24	21 16:51 (5)	18:19	32	17:47 (4)	20:17	21:11	15 20:18 (2)	21:55	
11	08:40	07:55	16:31 (5)	06:52	17:15 (4)	06:37	05:33	20:06 (2)	04:56		
	16:28	17:26	19 16:50 (5)	18:21	31	17:46 (4)	20:19	21:13	11 20:17 (2)	21:55	
12	08:39	07:53	16:31 (5)	06:50	17:15 (4)	06:35	05:31	20:09 (2)	04:55		
	16:30	17:28	18 16:49 (5)	18:23	30	17:45 (4)	20:20	21:15	4 20:13 (2)	21:56	
13	08:38	07:51	16:33 (5)	06:48	17:17 (4)	06:32	05:29	20:00 (2)	04:55		
	16:31	17:30	15 16:48 (5)	18:25	27	17:44 (4)	20:22	21:17		21:57	
14	08:37	07:49	16:35 (5)	06:45	17:17 (4)	06:30	05:27	20:00 (2)	04:55		
	16:33	17:32	11 16:46 (5)	18:27	27	18:00 (3)	20:24	21:18		21:57	
15	08:36	07:47	16:40 (5)	06:43	17:19 (4)	06:28	05:26	20:00 (2)	04:54		
	16:34	17:34	1 16:41 (5)	18:28	26	18:02 (3)	20:26	21:20		21:58	
16	08:35	07:45	16:40 (5)	06:40	17:21 (4)	06:25	05:24	20:00 (2)	04:54		
	16:36	17:36	18:30	06:38	24	18:04 (3)	20:28	21:22		21:59	
17	08:34	07:43	16:40 (5)	06:38	17:25 (4)	06:23	05:22	20:00 (2)	04:54		
	16:38	17:38	18:32	06:35	19	18:06 (3)	20:30	21:23		21:59	
18	08:33	07:41	16:40 (5)	06:35	17:54 (3)	06:21	05:21	20:00 (2)	04:54		
	16:40	17:40	18:34	06:33	13	18:07 (3)	20:31	21:25		22:00	
19	08:32	07:39	16:40 (5)	06:33	17:54 (3)	06:18	05:19	20:00 (2)	04:54		
	16:41	17:42	18:36	06:31	16	18:10 (3)	20:33	21:27		22:00	
20	08:31	07:36	16:40 (5)	06:31	17:54 (3)	06:16	05:18	20:00 (2)	04:54		
	16:43	17:44	18:38	06:28	17	18:11 (3)	20:35	21:28		22:00	
21	08:30	07:34	16:40 (5)	06:28	17:55 (3)	06:14	05:16	20:00 (2)	04:54		
	16:45	17:46	18:40	06:26	18	18:13 (3)	20:37	2 20:08 (2)	21:30		22:01
22	08:28	07:32	16:40 (5)	06:26	17:55 (3)	06:12	05:15	20:04 (2)	04:55		
	16:47	17:48	18:41	06:23	18	18:13 (3)	20:39	6 20:10 (2)	21:31		22:01
23	08:27	07:30	16:40 (5)	06:23	17:56 (3)	06:09	05:13	20:02 (2)	04:55		
	16:49	17:50	18:43	06:21	16	18:12 (3)	20:41	10 20:12 (2)	21:33		22:01
24	08:26	07:28	16:40 (5)	06:21	17:57 (3)	06:07	05:12	20:01 (2)	04:55		
	16:50	17:52	18:45	06:18	13	18:10 (3)	20:42	13 20:14 (2)	21:34		22:01
25	08:24	07:25	17:24 (4)	06:18	18:00 (3)	06:05	05:11	20:00 (2)	04:55		
	16:52	17:54	2 17:26 (4)	06:17	7 18:07 (3)	20:44	15 20:15 (2)	21:36		22:01	
26	08:23	07:23	17:22 (4)	06:16		06:03	19:59 (2)	05:09	04:56		
	16:54	17:56	6 17:28 (4)	06:14		20:46	18 20:17 (2)	21:37		22:01	
27	08:22	07:21	17:21 (4)	06:13		06:00	19:59 (2)	05:08	04:56		
	16:56	17:58	10 17:31 (4)	06:11		20:48	20 20:19 (2)	21:39		22:01	
28	08:20	07:18	17:19 (4)	06:11		05:58	19:58 (2)	05:07	04:57		
	16:58	18:00	13 17:32 (4)	06:08		20:50	23 20:21 (2)	21:40		22:01	
29	08:18		07:08			05:56	19:58 (2)	05:06	04:57		
	17:00		19:54			20:52	24 20:22 (2)	21:41		22:01	
30	08:17		07:06			05:54	19:58 (2)	05:05	04:58		
	17:02		19:56			20:53	26 20:24 (2)	21:43		22:00	
31	08:15	16:31 (5)	07:04				05:04				
	17:04	1 16:32 (5)	19:58				21:44				
Potential sun hours	250		273	367		420		494		510	
Total, worst case		1	238	573		157		250			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	0		36	105		36		62			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LV - H334

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	20:17 (2) 20:25 (2)	06:33 20:18	07:26 19:05	17:55 (4) 16:21 (5)
2	04:59 22:00	05:40 21:23	20:15 (2) 20:28 (2)	06:35 20:16	07:26 19:02	17:54 (4) 16:21 (5)
3	05:00 21:59	05:42 21:21	20:13 (2) 20:29 (2)	06:36 20:13	07:28 19:00	17:53 (4) 16:20 (5)
4	05:01 21:59	05:44 21:19	20:12 (2) 20:31 (2)	06:38 20:11	07:30 18:57	17:52 (4) 16:17 (5)
5	05:02 21:58	05:45 21:17	20:10 (2) 20:31 (2)	06:40 20:09	07:32 18:55	17:51 (4) 16:15 (5)
6	05:03 21:58	05:47 21:15	20:09 (2) 20:32 (2)	06:42 20:06	07:34 18:52	17:51 (4) 16:12 (5)
7	05:04 21:57	05:49 21:13	20:09 (2) 20:33 (2)	06:43 20:04	07:36 18:50	17:50 (4) 16:10 (5)
8	05:05 21:56	05:50 21:11	20:07 (2) 20:33 (2)	06:45 20:01	07:38 18:48	17:50 (4) 16:08 (5)
9	05:06 21:55	05:52 21:09	20:07 (2) 20:34 (2)	06:47 19:59	07:40 18:45	17:50 (4) 16:06 (5)
10	05:07 21:55	05:54 21:07	20:06 (2) 20:34 (2)	06:49 19:56	07:42 18:43	17:50 (4) 16:05 (5)
11	05:08 21:54	05:56 21:05	20:06 (2) 20:34 (2)	06:50 19:54	07:44 18:40	17:50 (4) 16:05 (5)
12	05:09 21:53	05:57 21:03	20:06 (2) 20:34 (2)	06:52 19:51	07:46 18:38	17:51 (4) 16:04 (5)
13	05:10 21:52	05:59 21:01	20:05 (2) 20:31 (2)	06:54 19:49	07:48 18:36	17:51 (4) 16:03 (5)
14	05:12 21:51	06:01 20:59	20:06 (2) 20:29 (2)	06:56 19:47	07:50 18:33	17:52 (4) 16:02 (5)
15	05:13 21:50	06:03 20:57	20:06 (2) 20:28 (2)	06:58 19:44	07:52 18:31	17:54 (4) 16:01 (5)
16	05:14 21:49	06:04 20:55	20:06 (2) 20:25 (2)	06:59 19:42	07:53 18:29	17:55 (4) 16:00 (5)
17	05:16 21:47	06:06 20:53	20:06 (2) 20:23 (2)	07:01 19:39	07:55 18:26	17:59 (4) 16:00 (5)
18	05:17 21:46	06:08 20:50	20:07 (2) 20:22 (2)	07:03 19:37	07:57 18:24	16:26 16:00 (5)
19	05:18 21:45	06:10 20:48	20:07 (2) 20:19 (2)	07:05 19:34	07:59 18:22	16:28 16:00 (5)
20	05:20 21:44	06:12 20:46	20:08 (2) 20:17 (2)	07:06 19:32	08:01 18:20	16:30 16:00 (5)
21	05:21 21:42	06:13 20:44	20:10 (2) 20:15 (2)	07:08 19:29	08:03 18:17	16:32 16:00 (5)
22	05:23 21:41	06:15 20:42	20:11 (2) 20:12 (2)	07:10 19:27	08:05 18:15	16:34 16:00 (5)
23	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	16:36 16:18	16:00 (5) 16:07 (5)
24	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	16:40 16:17	16:00 (5) 16:08 (5)
25	05:27 21:36	06:20 20:35	07:15 19:19	08:11 18:09	16:44 16:16	16:00 (5) 16:08 (5)
26	05:29 21:35	06:22 20:32	07:17 19:17	08:13 18:07	16:48 16:14	16:00 (5) 16:09 (5)
27	05:30 21:33	06:24 20:30	07:19 19:14	08:15 18:04	16:52 16:13	16:00 (5) 16:10 (5)
28	05:32 21:32	06:26 20:28	07:21 19:12	08:17 18:01	16:56 16:04	16:00 (5) 16:12 (5)
29	05:34 21:30	06:27 20:25	07:22 19:09	08:19 18:00	16:58 16:17	16:00 (5) 16:12 (5)
30	05:35 21:28	06:29 20:23	07:24 19:07	08:21 18:00	16:59 16:18	16:00 (5) 16:12 (5)
31	05:37 21:26	06:31 20:21	07:26 19:05	08:23 18:00	16:59 16:19	16:00 (5) 16:13 (5)
Potential sun hours	512	460	382	328	259	233
Total, worst case		410	226	446	138	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.68	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		91	49	88	24	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LW - H335

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:27 (5)	07:16	17:12 (4)	07:01	05:52	19:55 (2)	05:03		
	16:15	17:06	7 16:34 (5)	18:02	22 17:34 (4)	20:00	20:55	27 20:22 (2)	21:45		
2	08:44	08:12	16:27 (5)	07:14	17:11 (4)	06:59	05:50	19:55 (2)	05:02		
	16:16	17:08	10 16:37 (5)	18:04	25 17:36 (4)	20:02	20:57	26 20:21 (2)	21:46		
3	08:43	08:10	16:27 (5)	07:11	17:11 (4)	06:56	05:48	19:55 (2)	05:01		
	16:17	17:10	12 16:39 (5)	18:06	27 17:38 (4)	20:04	20:59	25 20:20 (2)	21:48		
4	08:43	08:08	16:27 (5)	07:09	17:11 (4)	06:54	05:46	19:56 (2)	05:00		
	16:18	17:12	14 16:41 (5)	18:07	30 17:41 (4)	20:06	21:01	23 20:19 (2)	21:49		
5	08:43	08:07	16:26 (5)	07:07	17:10 (4)	06:51	05:44	19:56 (2)	04:59		
	16:19	17:14	17 16:43 (5)	18:09	32 17:42 (4)	20:07	21:03	22 20:18 (2)	21:50		
6	08:42	08:05	16:27 (5)	07:04	17:11 (4)	06:49	05:42	19:57 (2)	04:59		
	16:21	17:16	18 16:45 (5)	18:11	33 17:44 (4)	20:09	21:04	20 20:17 (2)	21:51		
7	08:42	08:03	16:27 (5)	07:02	17:10 (4)	06:47	05:40	19:59 (2)	04:58		
	16:22	17:18	20 16:47 (5)	18:13	33 17:43 (4)	20:11	21:06	17 20:16 (2)	21:52		
8	08:42	08:01	16:27 (5)	07:00	17:11 (4)	06:44	05:38	20:01 (2)	04:57		
	16:24	17:20	21 16:48 (5)	18:15	32 17:43 (4)	20:13	21:08	13 20:14 (2)	21:53		
9	08:41	07:59	16:28 (5)	06:57	17:11 (4)	06:42	05:36	20:03 (2)	04:57		
	16:25	17:22	20 16:48 (5)	18:17	30 17:41 (4)	20:15	21:10	8 20:11 (2)	21:54		
10	08:40	07:57	16:29 (5)	06:55	17:12 (4)	06:39	05:34		04:56		
	16:26	17:24	18 16:47 (5)	18:19	28 17:40 (4)	20:17	21:11		21:55		
11	08:40	07:55	16:30 (5)	06:52	17:14 (4)	06:37	05:33		04:56		
	16:28	17:26	16 16:46 (5)	18:21	26 17:40 (4)	20:19	21:13		21:55		
12	08:39	07:53	16:31 (5)	06:50	17:14 (4)	06:35	05:31		04:55		
	16:30	17:28	13 16:44 (5)	18:23	23 17:37 (4)	20:20	21:15		21:56		
13	08:38	07:51	16:34 (5)	06:48	17:17 (4)	06:32	05:29		04:55		
	16:31	17:30	8 16:42 (5)	18:25	21 17:58 (3)	20:22	21:17		21:57		
14	08:37	07:49		06:45	17:19 (4)	06:30	05:27		04:55		
	16:33	17:32		18:27	19 18:00 (3)	20:24	21:18		21:57		
15	08:36	07:47		06:43	17:53 (3)	06:28	05:26		04:54		
	16:34	17:34		18:28	9 18:02 (3)	20:26	21:20		21:58		
16	08:35	07:45		06:40	17:52 (3)	06:25	05:24		04:54		
	16:36	17:36		18:30	12 18:04 (3)	20:28	21:22		21:59		
17	08:34	07:43		06:38	17:52 (3)	06:23	05:22		04:54		
	16:38	17:38		18:32	14 18:06 (3)	20:30	21:23		21:59		
18	08:33	07:41		06:35	17:52 (3)	06:21	05:21		04:54		
	16:40	17:40		18:34	15 18:07 (3)	20:31	21:25		22:00		
19	08:32	07:39		06:33	17:52 (3)	06:18	20:03 (2)	05:19	04:54		
	16:41	17:42		18:36	18 18:10 (3)	20:33	2 20:05 (2)	21:27	22:00		
20	08:31	07:36		06:31	17:52 (3)	06:16	20:01 (2)	05:18	04:54		
	16:43	17:44		18:38	19 18:11 (3)	20:35	6 20:07 (2)	21:28	22:00		
21	08:30	07:34		06:28	17:53 (3)	06:14	19:58 (2)	05:16	04:54		
	16:45	17:46		18:40	18 18:11 (3)	20:37	10 20:08 (2)	21:30	22:01		
22	08:28	07:32		06:26	17:54 (3)	06:12	19:57 (2)	05:15	04:55		
	16:47	17:48		18:41	14 18:08 (3)	20:39	13 20:10 (2)	21:31	22:01		
23	08:27	07:30	17:20 (4)	06:23	17:56 (3)	06:09	19:57 (2)	05:13	04:55		
	16:49	17:50	2 17:22 (4)	18:43	10 18:06 (3)	20:41	15 20:12 (2)	21:33	22:01		
24	08:26	07:28	17:18 (4)	06:21		06:07	19:56 (2)	05:12	04:55		
	16:50	17:52	6 17:24 (4)	18:45		20:42	18 20:14 (2)	21:34	22:01		
25	08:24	07:25	17:16 (4)	06:18		06:05	19:55 (2)	05:11	04:55		
	16:52	17:54	10 17:26 (4)	18:47		20:44	20 20:15 (2)	21:36	22:01		
26	08:23	07:23	17:15 (4)	06:16		06:03	19:55 (2)	05:09	04:56		
	16:54	17:56	13 17:28 (4)	18:49		20:46	22 20:17 (2)	21:37	22:01		
27	08:22	07:21	17:14 (4)	06:13		06:00	19:55 (2)	05:08	04:56		
	16:56	17:58	17 17:31 (4)	18:51		20:48	24 20:19 (2)	21:39	22:01		
28	08:20	07:18	17:13 (4)	06:11		05:58	19:54 (2)	05:07	04:57		
	16:58	18:00	19 17:32 (4)	18:53		20:50	27 20:21 (2)	21:40	22:01		
29	08:18			07:08		05:56	19:54 (2)	05:06	04:57		
	17:00			19:54		20:52	28 20:22 (2)	21:41	22:01		
30	08:17	16:28 (5)		07:06		05:54	19:54 (2)	05:05	04:58		
	17:02	2 16:30 (5)		19:56		20:53	28 20:22 (2)	21:43	22:00		
31	08:15	16:27 (5)		07:04				05:04			
	17:04	5 16:32 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case	7		261	510		213		181			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	1		40	94		49		45			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LW - H335

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:54 (4) 16:54	08:19 16:17 (5)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:52 (4) 16:52	08:21 16:18 (5)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:51 (4) 16:50	08:22 16:18 (5)
4	05:01 21:59	05:44 21:19	20:13 (2) 20:11	07:31 18:57	17:50 (4) 16:48	08:24 16:17 (5)
5	05:02 21:58	05:45 21:17	20:10 (2) 20:09	07:33 18:55	17:49 (4) 16:46	08:25 16:15 (5)
6	05:03 21:58	05:47 21:15	20:08 (2) 20:06	07:35 18:52	17:48 (4) 16:44	08:26 16:12 (5)
7	05:04 21:57	05:49 21:13	20:07 (2) 20:04	07:37 18:50	17:46 (4) 16:43	08:28 16:10 (5)
8	05:05 21:56	05:50 21:11	20:06 (2) 20:01	07:39 18:48	17:46 (4) 16:41	08:29 16:08 (5)
9	05:06 21:55	05:52 21:09	20:05 (2) 19:59	07:41 18:45	17:45 (4) 16:39	08:30 16:06 (5)
10	05:07 21:55	05:54 21:07	20:04 (2) 19:56	07:42 18:43	17:45 (4) 16:37	08:31 16:05 (5)
11	05:08 21:54	05:56 21:05	20:03 (2) 19:54	07:44 18:40	17:45 (4) 16:35	08:33 16:03 (5)
12	05:09 21:53	05:57 21:03	20:03 (2) 19:51	07:46 18:38	17:45 (4) 16:34	08:34 16:01 (5)
13	05:10 21:52	05:59 21:01	20:02 (2) 19:49	07:48 18:36	17:46 (4) 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	20:02 (2) 19:47	07:50 18:33	17:46 (4) 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	20:02 (2) 19:44	07:52 18:31	17:47 (4) 16:29	08:37 16:05
16	05:14 21:49	06:04 20:55	20:01 (2) 19:42	07:54 18:29	17:47 (4) 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	20:02 (2) 19:39	07:55 18:26	17:48 (4) 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	20:02 (2) 19:37	07:57 18:24	17:50 (4) 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	20:02 (2) 19:34	07:59 18:22	17:59 (4) 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	20:02 (2) 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	20:03 (2) 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	20:03 (2) 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	20:05 (2) 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	20:07 (2) 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	20:09 (2) 19:19	08:11 18:11	08:09 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	07:17 19:17	08:13 18:08	08:11 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	07:19 19:14	08:14 18:06	08:13 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	07:21 19:12	08:16 18:04	08:14 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	07:22 19:09	08:18 18:01	16:03 (5) 16:12 (5)	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	08:20 18:38 (3)	16:00 (5) 16:14 (5)	08:44 16:12
31	05:37 21:26	06:31 20:21	07:25 19:06	08:22 18:38 (3)	15:59 (5) 16:15 (5)	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		394	168	459	161	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		87	36	91	28	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LX - H336

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:26 (5)	07:16	17:09 (4)	07:01	05:52	19:52 (2)	05:03		
	16:15	17:06	8 16:34 (5)	18:02	25 17:34 (4)	20:00	20:55	22 20:14 (2)	21:45		
2	08:44	08:12	16:27 (5)	07:14	17:09 (4)	06:59	05:50	19:52 (2)	05:02		
	16:16	17:08	10 16:37 (5)	18:04	27 17:36 (4)	20:02	20:57	20 20:12 (2)	21:46		
3	08:43	08:10	16:26 (5)	07:11	17:09 (4)	06:56	05:48	19:54 (2)	05:01		
	16:17	17:10	13 16:39 (5)	18:06	29 17:38 (4)	20:04	20:59	17 20:11 (2)	21:48		
4	08:43	08:08	16:26 (5)	07:09	17:09 (4)	06:54	05:46	19:55 (2)	05:00		
	16:18	17:12	15 16:41 (5)	18:07	32 17:41 (4)	20:06	21:01	14 20:09 (2)	21:49		
5	08:43	08:07	16:26 (5)	07:07	17:09 (4)	06:51	05:44	19:58 (2)	04:59		
	16:19	17:14	17 16:43 (5)	18:09	31 17:40 (4)	20:07	21:03	8 20:06 (2)	21:50		
6	08:42	08:05	16:26 (5)	07:04	17:09 (4)	06:49	05:42		04:59		
	16:21	17:16	19 16:45 (5)	18:11	31 17:40 (4)	20:09	21:04		21:51		
7	08:42	08:03	16:27 (5)	07:02	17:09 (4)	06:47	05:40		04:58		
	16:22	17:18	20 16:47 (5)	18:13	29 17:38 (4)	20:11	21:06		21:52		
8	08:42	08:01	16:27 (5)	07:00	17:10 (4)	06:44	05:38		04:57		
	16:24	17:20	20 16:47 (5)	18:15	28 17:38 (4)	20:13	21:08		21:53		
9	08:41	07:59	16:28 (5)	06:57	17:11 (4)	06:42	05:36		04:57		
	16:25	17:22	19 16:47 (5)	18:17	25 17:36 (4)	20:15	21:10		21:54		
10	08:40	07:57	16:29 (5)	06:55	17:12 (4)	06:39	05:34		04:56		
	16:26	17:24	17 16:46 (5)	18:19	23 17:35 (4)	20:17	21:11		21:55		
11	08:40	07:55	16:31 (5)	06:52	17:15 (4)	06:37	05:33		04:56		
	16:28	17:26	14 16:45 (5)	18:21	18 17:33 (4)	20:19	21:13		21:55		
12	08:39	07:53	16:32 (5)	06:50	17:17 (4)	06:35	05:31		04:55		
	16:30	17:28	10 16:42 (5)	18:23	16 17:56 (3)	20:20	21:15		21:56		
13	08:38	07:51		06:48	17:52 (3)	06:32	05:29		04:55		
	16:31	17:30		18:25	6 17:58 (3)	20:22	21:17		21:57		
14	08:37	07:49		06:45	17:51 (3)	06:30	05:27		04:55		
	16:33	17:32		18:27	9 18:00 (3)	20:24	21:18		21:57		
15	08:36	07:47		06:43	17:50 (3)	06:28	05:26		04:54		
	16:34	17:34		18:28	12 18:02 (3)	20:26	21:20		21:58		
16	08:35	07:45		06:40	17:50 (3)	06:25	19:58 (2)	05:24	04:54		
	16:36	17:36		18:30	14 18:04 (3)	20:28	1 19:59 (2)	21:22	21:59		
17	08:34	07:43		06:38	17:50 (3)	06:23	19:56 (2)	05:22	04:54		
	16:38	17:38		18:32	16 18:06 (3)	20:30	5 20:01 (2)	21:23	21:59		
18	08:33	07:41		06:35	17:50 (3)	06:21	19:54 (2)	05:21	04:54		
	16:40	17:40		18:34	17 18:07 (3)	20:31	9 20:03 (2)	21:25	22:00		
19	08:32	07:39		06:33	17:51 (3)	06:18	19:53 (2)	05:19	04:54		
	16:41	17:42		18:36	18 18:09 (3)	20:33	12 20:05 (2)	21:27	22:00		
20	08:31	07:36		06:31	17:51 (3)	06:16	19:52 (2)	05:18	04:54		
	16:43	17:44		18:38	16 18:07 (3)	20:35	15 20:07 (2)	21:28	22:00		
21	08:30	07:34		06:28	17:53 (3)	06:14	19:51 (2)	05:16	04:54		
	16:45	17:46		18:40	12 18:05 (3)	20:37	17 20:08 (2)	21:30	22:01		
22	08:28	07:32		06:26	17:55 (3)	06:12	19:50 (2)	05:15	04:55		
	16:47	17:48	3 17:19 (4)	18:41	6 18:01 (3)	20:39	20 20:10 (2)	21:31	22:01		
23	08:27	07:30		06:23		06:09	19:50 (2)	05:13	04:55		
	16:49	17:50	7 17:22 (4)	18:43		20:41	22 20:12 (2)	21:33	22:01		
24	08:26	07:28		06:21		06:07	19:50 (2)	05:12	04:55		
	16:50	17:52	10 17:24 (4)	18:45		20:42	24 20:14 (2)	21:34	22:01		
25	08:24	07:25		06:18		06:05	19:49 (2)	05:11	04:55		
	16:52	17:54	14 17:26 (4)	18:47		20:44	26 20:15 (2)	21:36	22:01		
26	08:23	07:23		06:16		06:03	19:50 (2)	05:09	04:56		
	16:54	17:56	17 17:28 (4)	18:49		20:46	27 20:17 (2)	21:37	22:01		
27	08:22	07:21		06:13		06:00	19:50 (2)	05:08	04:56		
	16:56	17:58	20 17:31 (4)	18:51		20:48	27 20:17 (2)	21:39	22:01		
28	08:20	07:18		06:11		05:58	19:50 (2)	05:07	04:57		
	16:58	18:00	22 17:32 (4)	18:53		20:50	26 20:16 (2)	21:40	22:01		
29	08:18			07:08		05:56	19:50 (2)	05:06	04:57		
	17:00			19:54		20:52	25 20:15 (2)	21:41	22:01		
30	08:17	16:27 (5)		07:06		05:54	19:51 (2)	05:05	04:58		
	17:02	3 16:30 (5)		19:56		20:53	24 20:15 (2)	21:43	22:00		
31	08:15	16:27 (5)		07:04				05:04			
	17:04	5 16:32 (5)		19:58				21:44			
Potential sun hours	250		273	367		420		494		510	
Total, worst case		8	275	440		280		81			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.66	0.68		0.65		0.65			
Total reduction	0.16		0.15	0.18		0.23		0.25			
Total, real	1		42	81		64		20			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LX - H336

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:57 (4) 16:54	15:59 (5) 16:10
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:54 (4) 16:52	15:58 (5) 16:09
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:51 (4) 16:50	15:57 (5) 16:08
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:49 (4) 16:48	15:56 (5) 16:08
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:48 (4) 16:46	15:56 (5) 16:07
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:47 (4) 16:44	15:56 (5) 16:07
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	17:45 (4) 16:43	15:56 (5) 16:06
8	05:05 21:56	05:50 21:11	20:06 (2) 20:01	07:39 18:48	17:44 (4) 16:41	15:56 (5) 16:06
9	05:06 21:55	05:52 21:09	20:04 (2) 19:59	07:41 18:45	17:43 (4) 16:39	15:56 (5) 16:05
10	05:07 21:55	05:54 21:07	20:02 (2) 19:56	07:42 18:43	17:43 (4) 16:37	15:58 (5) 16:05
11	05:08 21:54	05:56 21:05	20:01 (2) 19:54	07:44 18:40	17:43 (4) 16:35	15:59 (5) 16:05
12	05:09 21:53	05:57 21:03	20:00 (2) 19:51	07:46 18:38	17:43 (4) 16:34	15:59 (5) 16:05
13	05:10 21:52	05:59 21:01	19:58 (2) 19:49	07:48 18:36	17:43 (4) 16:32	08:35 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 19:47	07:50 18:33	17:43 (4) 16:31	08:36 16:04
15	05:13 21:50	06:03 20:57	19:57 (2) 19:44	07:52 18:31	17:43 (4) 16:29	08:37 16:05
16	05:14 21:49	06:04 20:55	19:56 (2) 19:42	07:54 18:29	17:44 (4) 16:27	08:38 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 19:39	07:55 18:26	17:44 (4) 16:26	08:38 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 19:37	07:57 18:24	17:45 (4) 16:24	08:39 16:05
19	05:18 21:45	06:10 20:48	19:55 (2) 19:34	07:59 18:22	17:46 (4) 16:23	08:40 16:05
20	05:20 21:44	06:12 20:46	19:56 (2) 19:32	08:01 18:20	17:48 (4) 16:22	08:41 16:06
21	05:21 21:42	06:13 20:44	19:56 (2) 19:29	08:03 18:43 (3)	17:50 (4) 16:20	08:41 16:06
22	05:23 21:41	06:15 20:42	19:55 (2) 19:27	08:05 18:49 (3)	16:20 16:19	08:42 16:06
23	05:24 21:39	06:17 20:39	19:56 (2) 19:24	08:07 18:36 (3)	16:18 16:18	08:42 16:07
24	05:26 21:38	06:19 20:37	19:57 (2) 19:22	08:09 18:35 (3)	16:17 16:17	08:43 16:08
25	05:27 21:36	06:20 20:35	19:57 (2) 19:19	08:11 18:33 (3)	16:16 16:16	08:43 16:08
26	05:29 21:35	06:22 20:32	19:59 (2) 19:17	08:13 18:48 (3)	16:15 16:14	08:43 16:09
27	05:30 21:33	06:24 20:30	20:01 (2) 19:14	08:14 18:31 (3)	16:14 16:13	08:44 16:10
28	05:32 21:32	06:26 20:28	20:02 (2) 19:12	15:18 (5) 18:44 (3)	16:12 16:12	08:44 16:11
29	05:34 21:30	06:27 20:25	19:09 19:09	16:05 (5) 18:41 (3)	08:16 16:12	08:44 16:11
30	05:35 21:28	06:29 20:23	07:24 19:07	16:01 (5) 18:38 (3)	08:18 16:11	08:44 16:12
31	05:37 21:26	06:31 20:21	16:58 16:56	15:59 (5) 16:14 (5)	08:44 16:13	08:44 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		363	125	448	160	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.68	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		80	27	89	28	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LY - H337

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	16:31 (5)	07:16	17:15 (4)	07:01
	16:15	17:06	3	16:34 (5)	18:02	19
2	08:44	08:12	16:31 (5)	07:14	17:13 (4)	06:59
	16:16	17:08	6	16:37 (5)	18:04	23
3	08:43	08:10	16:31 (5)	07:11	17:13 (4)	06:56
	16:17	17:10	8	16:39 (5)	18:06	25
4	08:43	08:08	16:30 (5)	07:09	17:13 (4)	06:54
	16:18	17:12	11	16:41 (5)	18:07	28
5	08:43	08:07	16:30 (5)	07:07	17:13 (4)	06:51
	16:19	17:14	13	16:43 (5)	18:09	29
6	08:42	08:05	16:30 (5)	07:04	17:13 (4)	06:49
	16:21	17:16	15	16:45 (5)	18:11	31
7	08:42	08:03	16:30 (5)	07:02	17:13 (4)	06:47
	16:22	17:18	17	16:47 (5)	18:13	30
8	08:42	08:01	16:31 (5)	07:00	17:14 (4)	06:44
	16:24	17:20	19	16:50 (5)	18:15	28
9	08:41	07:59	16:31 (5)	06:57	17:14 (4)	06:42
	16:25	17:22	20	16:51 (5)	18:17	27
10	08:40	07:57	16:32 (5)	06:55	17:15 (4)	06:39
	16:26	17:24	19	16:51 (5)	18:19	25
11	08:40	07:55	16:33 (5)	06:52	17:17 (4)	06:37
	16:28	17:26	17	16:50 (5)	18:21	22
12	08:39	07:53	16:33 (5)	06:50	17:18 (4)	06:35
	16:30	17:28	15	16:48 (5)	18:23	19
13	08:38	07:51	16:35 (5)	06:48	17:20 (4)	06:32
	16:31	17:30	12	16:47 (5)	18:25	18
14	08:37	07:49	16:38 (5)	06:45	17:53 (3)	06:30
	16:33	17:32	6	16:44 (5)	18:27	7
15	08:36	07:47		06:43	17:53 (3)	06:28
	16:34	17:34		18:28	9	18:02 (3)
16	08:35	07:45		06:40	17:52 (3)	06:25
	16:36	17:36		18:30	12	18:04 (3)
17	08:34	07:43		06:38	17:52 (3)	06:23
	16:38	17:38		18:32	14	18:06 (3)
18	08:33	07:41		06:35	17:51 (3)	06:21
	16:40	17:40		18:34	16	18:07 (3)
19	08:32	07:39		06:33	17:52 (3)	06:18
	16:41	17:42		18:36	18	18:10 (3)
20	08:31	07:36		06:31	17:52 (3)	06:16
	16:43	17:44		18:38	17	18:09 (3)
21	08:30	07:34		06:28	17:54 (3)	06:14
	16:45	17:46		18:40	14	18:08 (3)
22	08:28	07:32		06:26	17:55 (3)	06:12
	16:47	17:48		18:41	10	18:05 (3)
23	08:27	07:30		06:23		06:09
	16:49	17:50		18:43		22
24	08:26	07:28		06:21		20:12 (2)
	16:50	17:52	3	17:24 (4)		20:42
25	08:24	07:25		06:18		24
	16:52	17:54	8	17:26 (4)		20:14 (2)
26	08:23	07:23		06:16		25
	16:54	17:56	11	17:28 (4)		20:15 (2)
27	08:22	07:21		06:13		26
	16:56	17:58	15	17:31 (4)		20:16 (2)
28	08:20	07:18		06:11		26
	16:58	18:00	17	17:32 (4)		20:16 (2)
29	08:18			07:08		25
	17:00			19:54		20:50
30	08:17			07:06		19:51 (2)
	17:02			19:56		20:15 (2)
31	08:15			07:04		19:52 (2)
	17:04			19:58		20:14 (2)
Potential sun hours	250	273	367	420	494	510
Total, worst case		235		441	273	60
Sun reduction		0.23		0.27	0.35	0.38
Oper. time red.		1.00		1.00	1.00	1.00
Wind dir. red.		0.66		0.68	0.65	0.65
Total reduction		0.15		0.18	0.23	0.25
Total, real		36		81	62	15

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LY - H337

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	17:58 (4) 18:36 (3)	16:01 (5) 16:20 (5)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	17:55 (4) 18:16 (4)	16:01 (5) 16:21 (5)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	17:54 (4) 18:17 (4)	16:00 (5) 16:19 (5)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	17:52 (4) 18:18 (4)	16:00 (5) 16:17 (5)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	17:51 (4) 18:19 (4)	16:00 (5) 16:15 (5)
6	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	17:50 (4) 18:20 (4)	16:00 (5) 16:12 (5)
7	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	17:48 (4) 18:19 (4)	16:00 (5) 16:10 (5)
8	05:05 21:56	05:50 21:11	06:45 20:01	07:39 18:48	17:48 (4) 18:18 (4)	16:01 (5) 16:08 (5)
9	05:06 21:55	05:52 21:09	20:06 (2) 20:17 (2)	06:47 19:59	17:48 (4) 18:45	16:01 (5) 16:06 (5)
10	05:07 21:55	05:54 21:07	20:03 (2) 20:18 (2)	06:49 19:56	17:47 (4) 18:43	16:03 (5) 16:05
11	05:08 21:54	05:56 21:05	20:02 (2) 20:20 (2)	06:50 19:54	17:47 (4) 18:40	16:04 (5) 16:05
12	05:09 21:53	05:57 21:03	20:01 (2) 20:21 (2)	06:52 19:51	17:48 (4) 18:38	16:05 (5) 16:05
13	05:10 21:52	05:59 21:01	19:59 (2) 20:21 (2)	06:54 19:49	17:48 (4) 18:36	16:06 (5) 16:05
14	05:12 21:51	06:01 20:59	19:58 (2) 20:22 (2)	06:56 19:47	17:48 (4) 18:33	16:07 (5) 16:04
15	05:13 21:50	06:03 20:57	19:58 (2) 20:23 (2)	06:57 19:44	17:49 (4) 18:31	16:08 (5) 16:04
16	05:14 21:49	06:04 20:55	19:57 (2) 20:23 (2)	06:59 19:42	17:50 (4) 18:29	16:09 (5) 16:05
17	05:16 21:47	06:06 20:53	19:56 (2) 20:23 (2)	07:01 19:39	17:51 (4) 18:26	16:10 (5) 16:05
18	05:17 21:46	06:08 20:50	19:56 (2) 20:22 (2)	07:03 19:37	17:52 (4) 18:24	16:11 (5) 16:05
19	05:18 21:45	06:10 20:48	19:56 (2) 20:19 (2)	07:05 19:34	17:53 (4) 18:22	16:12 (5) 16:05
20	05:20 21:44	06:12 20:46	19:56 (2) 20:17 (2)	07:06 19:32	17:54 (4) 18:20	16:13 (5) 16:06
21	05:21 21:42	06:13 20:44	19:56 (2) 20:15 (2)	07:08 19:29	17:55 (4) 18:20	16:14 (5) 16:06
22	05:23 21:41	06:15 20:42	19:56 (2) 20:12 (2)	07:10 19:27	17:56 (4) 18:21	16:15 (5) 16:06
23	05:24 21:39	06:17 20:39	19:56 (2) 20:10 (2)	07:12 19:24	17:57 (4) 18:22	16:16 (5) 16:07
24	05:26 21:38	06:19 20:37	19:57 (2) 20:09 (2)	07:13 19:22	17:58 (4) 18:23	16:17 (5) 16:08
25	05:27 21:36	06:20 20:35	19:57 (2) 20:06 (2)	07:15 19:19	17:59 (4) 18:24	16:18 (5) 16:09
26	05:29 21:35	06:22 20:32	19:59 (2) 20:04 (2)	07:17 19:17	17:59 (4) 18:25	16:19 (5) 16:10
27	05:30 21:33	06:24 20:30	20:01 (2) 20:02 (2)	07:19 19:14	17:59 (4) 18:26	16:20 (5) 16:11
28	05:32 21:32	06:26 20:28	19:59 (2) 19:12	07:21 18:44 (3)	17:59 (4) 18:27	16:21 (5) 16:12
29	05:34 21:30	06:27 20:25	19:59 (2) 19:09	07:22 18:41 (3)	17:59 (4) 18:28	16:22 (5) 16:13
30	05:35 21:28	06:29 20:23	19:59 (2) 19:07	07:24 18:38 (3)	17:59 (4) 18:29	16:23 (5) 16:14
31	05:37 21:26	06:31 20:21	19:59 (2) 18:56	07:26 16:56	17:59 (4) 16:19 (5)	16:24 (5) 16:15
Potential sun hours	512	460	382	328	259	233
Total, worst case		334	133	427	126	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.67	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.17	
Total, real		74	29	84	22	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LZ - H338

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	05:52	19:57 (2) 05:03
	16:15	17:06	18:02	20:00	20:55	21:18 (2) 21:45
2	08:44	08:12	07:14	06:59	05:50	19:58 (2) 05:02
	16:16	17:08	18:04	20:02	20:57	20:17 (2) 21:46
3	08:43	08:10	07:11	17:35 (4) 06:56	05:48	19:59 (2) 05:01
	16:17	17:10	18:05	17:38 (4) 20:04	20:59	20:15 (2) 21:48
4	08:43	08:08	07:09	17:34 (4) 06:54	05:46	20:00 (2) 05:00
	16:18	17:12	18:07	17:41 (4) 20:06	21:01	20:14 (2) 21:49
5	08:43	08:07	07:07	17:32 (4) 06:51	05:44	20:02 (2) 04:59
	16:19	17:14	18:09	17:42 (4) 20:07	21:03	20:11 (2) 21:50
6	08:42	08:05	07:04	17:31 (4) 06:49	05:42	20:11 (2) 04:58
	16:21	17:16	18:11	17:45 (4) 20:09	21:04	21:51
7	08:42	08:03	16:46 (5) 07:02	17:29 (4) 06:47	05:40	21:51
	16:22	17:18	16:47 (5) 18:13	17:46 (4) 20:11	21:06	21:52
8	08:41	08:01	16:46 (5) 07:00	17:29 (4) 06:44	05:38	21:53
	16:24	17:20	16:50 (5) 18:15	17:48 (4) 20:13	21:08	21:54
9	08:41	07:59	16:45 (5) 06:57	17:28 (4) 06:42	05:36	21:55
	16:25	17:22	16:52 (5) 18:17	17:50 (4) 20:15	21:10	21:56
10	08:40	07:57	16:44 (5) 06:55	17:28 (4) 06:39	05:34	21:57
	16:26	17:24	16:54 (5) 18:19	17:52 (4) 20:17	21:11	21:58
11	08:40	07:55	16:44 (5) 06:52	17:28 (4) 06:37	05:33	21:59
	16:28	17:26	16:56 (5) 18:21	17:55 (4) 20:18	21:13	22:00
12	08:39	07:53	16:43 (5) 06:50	17:28 (4) 06:35	05:31	22:01
	16:30	17:28	16:58 (5) 18:23	17:56 (4) 20:20	21:15	22:02
13	08:38	07:51	16:43 (5) 06:48	17:28 (4) 06:32	05:29	22:03
	16:31	17:30	17:00 (5) 18:25	17:56 (4) 20:22	21:17	22:04
14	08:37	07:49	16:44 (5) 06:45	17:28 (4) 06:30	05:27	22:05
	16:33	17:32	17:02 (5) 18:27	17:55 (4) 20:24	21:18	22:06
15	08:36	07:47	16:44 (5) 06:43	17:29 (4) 06:28	05:26	22:07
	16:34	17:34	17:03 (5) 18:28	17:54 (4) 20:26	21:20	22:08
16	08:35	07:45	16:45 (5) 06:40	17:29 (4) 06:25	05:24	22:09
	16:36	17:36	17:03 (5) 18:30	18:04 (3) 20:28	21:22	22:10
17	08:34	07:43	16:47 (5) 06:38	17:31 (4) 06:23	05:22	22:11
	16:38	17:38	17:02 (5) 18:32	18:06 (3) 20:30	21:23	22:12
18	08:33	07:41	16:47 (5) 06:35	17:32 (4) 06:21	05:21	22:13
	16:40	17:40	17:00 (5) 18:34	18:07 (3) 20:31	21:25	22:14
19	08:32	07:39	16:50 (5) 06:33	17:36 (4) 06:18	20:02 (2) 05:19	22:15
	16:41	17:42	16:57 (5) 18:36	18:10 (3) 20:33	20:05 (2) 21:27	22:16
20	08:31	07:36	06:31	17:59 (3) 06:16	20:00 (2) 05:18	22:17
	16:43	17:44	18:38	18:11 (3) 20:35	20:07 (2) 21:28	22:18
21	08:30	07:34	06:28	17:59 (3) 06:14	19:58 (2) 05:16	22:19
	16:45	17:46	18:40	18:13 (3) 20:37	20:08 (2) 21:30	22:20
22	08:28	07:32	06:26	17:59 (3) 06:12	19:57 (2) 05:15	22:21
	16:47	17:48	18:41	18:15 (3) 20:39	20:10 (2) 21:31	22:22
23	08:27	07:30	06:23	18:00 (3) 06:09	19:57 (2) 05:13	22:23
	16:49	17:50	18:43	18:17 (3) 20:41	20:12 (2) 21:33	22:24
24	08:26	07:28	06:21	18:00 (3) 06:07	19:56 (2) 05:12	22:25
	16:50	17:52	18:45	18:15 (3) 20:42	20:14 (2) 21:34	22:26
25	08:24	07:25	06:18	18:02 (3) 06:05	19:56 (2) 05:11	22:27
	16:52	17:54	18:47	18:13 (3) 20:44	20:15 (2) 21:36	22:28
26	08:23	07:23	06:16	18:05 (3) 06:03	19:56 (2) 05:09	22:29
	16:54	17:56	18:49	18:09 (3) 20:46	20:17 (2) 21:37	22:30
27	08:22	07:21	06:13	06:00	19:56 (2) 05:08	22:31
	16:56	17:58	18:51	20:48	20:19 (2) 21:39	22:32
28	08:20	07:18	06:11	05:58	19:56 (2) 05:07	22:33
	16:58	18:00	18:53	20:50	20:20 (2) 21:40	22:34
29	08:18		07:08	05:56	19:56 (2) 05:06	22:35
	17:00		19:54	20:52	20:19 (2) 21:41	22:36
30	08:17		07:06	05:54	19:56 (2) 05:05	22:37
	17:02		19:56	20:53	20:19 (2) 21:43	22:38
31	08:15		07:04		05:04	22:39
	17:04		19:58		21:44	22:40
Potential sun hours	250	273	367	420	494	510
Total, worst case		156	430	199	79	
Sun reduction		0.23	0.27	0.35	0.38	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.66	0.68	0.65	0.65	
Total reduction		0.15	0.18	0.23	0.25	
Total, real		24	79	46	20	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: LZ - H338

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:07 (4) 16:54	16:14 (5) 16:23 (5)
2	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:06 (4) 16:52	16:15 (5) 16:21 (5)
3	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	18:06 (4) 16:50	16:15 (5) 16:19 (5)
4	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	18:06 (4) 16:48	16:16 (5) 16:17 (5)
5	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	18:06 (4) 16:46	16:17 (5) 16:07
6	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	18:06 (4) 16:44	16:08 16:07
7	05:04 21:57	05:49 21:13	20:14 (2) 20:19 (2)	06:43 20:04	07:37 18:50	16:06 16:06
8	05:05 21:56	05:50 21:11	20:10 (2) 20:22 (2)	06:45 20:01	07:39 18:48	16:05 16:06
9	05:06 21:55	05:52 21:09	20:09 (2) 20:24 (2)	06:47 19:59	07:41 18:45	16:05 16:05
10	05:07 21:55	05:54 21:07	20:07 (2) 20:24 (2)	06:49 19:56	07:42 18:43	16:05 16:05
11	05:08 21:54	05:56 21:05	20:06 (2) 20:26 (2)	06:50 19:54	07:44 18:40	16:05 16:05
12	05:09 21:53	05:57 21:03	20:05 (2) 20:27 (2)	06:52 19:51	07:46 18:38	16:05 16:05
13	05:10 21:52	05:59 21:01	20:04 (2) 20:26 (2)	06:54 19:49	07:48 18:36	16:05 16:05
14	05:12 21:51	06:01 20:59	20:03 (2) 20:27 (2)	06:56 19:47	07:50 18:33	16:05 16:04
15	05:13 21:50	06:03 20:57	20:03 (2) 20:27 (2)	06:57 19:44	07:52 18:31	16:04 16:04
16	05:14 21:49	06:04 20:55	20:02 (2) 20:25 (2)	06:59 19:42	07:54 18:29	16:04 16:05
17	05:16 21:47	06:06 20:53	20:02 (2) 20:23 (2)	07:01 19:39	07:55 18:26	16:05 16:05
18	05:17 21:46	06:08 20:50	20:03 (2) 20:22 (2)	07:03 19:37	07:57 18:24	16:05 16:05
19	05:18 21:45	06:10 20:48	20:02 (2) 20:19 (2)	07:05 19:34	07:59 18:22	16:05 16:05
20	05:20 21:44	06:12 20:46	20:02 (2) 20:17 (2)	07:06 19:32	08:01 18:20	16:05 16:06
21	05:21 21:42	06:13 20:44	20:03 (2) 20:15 (2)	07:08 19:29	08:03 18:17	16:06 16:06
22	05:23 21:41	06:15 20:42	20:03 (2) 20:12 (2)	07:10 19:27	08:05 18:15	16:06 16:06
23	05:24 21:39	06:17 20:39	20:04 (2) 20:10 (2)	07:12 19:24	08:07 18:13	16:06 16:07
24	05:26 21:38	06:19 20:37	20:06 (2) 20:09 (2)	07:13 19:22	08:09 18:11	16:08 16:08
25	05:27 21:36	06:20 20:35	07:15 19:19	18:16 (4) 18:51 (3)	07:11 17:09	16:16 (5) 16:16
26	05:29 21:35	06:22 20:32	07:17 19:17	18:13 (4) 18:48 (3)	07:13 17:06	16:15 (5) 16:14
27	05:30 21:33	06:24 20:30	07:19 19:14	18:12 (4) 18:46 (3)	07:14 17:04	16:14 (5) 16:13
28	05:32 21:32	06:26 20:28	07:21 19:12	18:10 (4) 18:34 (4)	07:16 17:02	16:13 (5) 16:12
29	05:34 21:30	06:27 20:25	07:22 19:09	18:09 (4) 18:35 (4)	07:18 17:00	16:13 (5) 16:12
30	05:35 21:28	06:29 20:23	07:24 19:07	18:07 (4) 18:35 (4)	07:20 16:58	16:13 (5) 16:11
31	05:37 21:26	06:31 20:21	07:25 16:56	18:33 (4) 16:56	07:21 16:56	16:13 (5) 16:13
Potential sun hours	512	460	382	328	259	233
Total, worst case		286	245	319	20	
Sun reduction		0.34	0.32	0.29	0.27	
Oper. time red.		1.00	1.00	1.00	1.00	
Wind dir. red.		0.65	0.68	0.67	0.66	
Total reduction		0.22	0.22	0.20	0.18	
Total, real		63	53	63	4	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MA - H339

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December			
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	19:58 (5) 20:25 (5)	05:03 21:45	04:59 22:00	21:18 (3) 21:24 (3)	05:39 21:25	20:14 (5) 20:29 (5)	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	19:58 (5) 20:25 (5)	05:02 21:46	05:00 22:00	21:18 (3) 21:24 (3)	05:40 21:23	20:13 (5) 20:30 (5)	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	19:58 (5) 20:25 (5)	05:01 21:48	05:00 21:59	21:18 (3) 21:23 (3)	05:42 21:21	20:11 (5) 20:31 (5)	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	19:58 (5) 20:25 (5)	05:00 21:49	05:01 21:59	21:19 (3) 21:23 (3)	05:44 21:19	20:10 (5) 20:32 (5)	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	19:58 (5) 20:24 (5)	04:59 21:50	05:02 1	21:14 (3) 21:15 (3)	05:02 21:58	21:19 (3) 21:23 (3)	05:45 21:17	20:09 (5) 20:32 (5)	07:33 18:55	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	19:58 (5) 20:23 (5)	04:59 21:51	05:03 2	21:14 (3) 21:16 (3)	05:03 21:57	21:20 (3) 21:22 (3)	05:47 21:15	20:09 (5) 20:33 (5)	07:35 18:52	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	19:59 (5) 20:23 (5)	04:58 21:52	05:04 3	21:13 (3) 21:16 (3)	05:04 21:57	21:20 (3) 21:22 (3)	05:49 21:13	20:08 (5) 20:34 (5)	07:37 18:50	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	20:00 (5) 20:22 (5)	04:57 21:53	05:05 4	21:13 (3) 21:17 (3)	05:05 21:56	05:51 21:11	20:07 (5) 20:34 (5)	06:45 20:01	07:39 18:48	08:29 16:41
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	20:00 (5) 20:21 (5)	04:57 21:54	05:52 5	21:14 (3) 21:19 (3)	05:06 21:55	05:52 21:09	20:07 (5) 20:34 (5)	06:47 20:01	07:41 18:45	08:30 16:39
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	20:01 (5) 20:20 (5)	04:56 21:54	05:54 6	21:13 (3) 21:19 (3)	05:07 21:54	05:54 21:07	20:06 (5) 20:33 (5)	06:49 20:03	07:42 18:43	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	20:03 (5) 20:20 (5)	04:56 21:55	05:56 6	21:14 (3) 21:20 (3)	05:08 21:54	05:56 21:05	20:07 (5) 20:34 (5)	06:50 20:04	07:44 18:40	08:33 16:36
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	20:04 (5) 20:18 (5)	04:55 21:56	05:58 7	21:14 (3) 21:21 (3)	05:09 21:53	05:58 21:03	20:07 (5) 20:34 (5)	06:52 20:05	07:46 18:38	08:34 16:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	20:06 (5) 20:15 (5)	04:55 21:57	05:59 8	21:13 (3) 21:14 (3)	05:11 05:12	05:59 21:03	20:06 (5) 20:31 (5)	06:54 20:05	07:48 18:36	08:35 16:32
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18		04:55 21:57	06:01 8	21:14 (3) 21:22 (3)	05:12 21:51	06:01 20:59	20:07 (5) 20:29 (5)	06:56 19:47	07:49 18:33	08:36 16:31
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20		04:55 21:58	06:03 8	21:14 (3) 21:22 (3)	05:13 21:50	06:03 20:57	20:07 (5) 20:28 (5)	06:58 19:44	07:52 18:31	08:37 16:29
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22		04:54 21:59	06:05 9	21:14 (3) 21:23 (3)	05:14 21:48	06:05 20:55	20:07 (5) 20:25 (5)	06:59 19:42	07:54 18:29	08:38 16:27
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23		04:54 21:59	06:06 9	21:14 (3) 21:23 (3)	05:16 21:47	06:06 20:53	20:08 (5) 20:23 (5)	07:01 20:05	07:55 18:26	08:38 16:26
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25		04:54 21:59	06:08 9	21:15 (3) 21:24 (3)	05:17 21:46	06:08 20:50	20:09 (5) 20:22 (5)	07:03 19:37	07:57 18:24	08:39 16:25
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27		04:54 22:00	06:10 9	21:15 (3) 21:24 (3)	05:18 21:45	06:10 20:48	20:10 (5) 20:19 (5)	07:05 19:34	07:59 18:22	08:40 16:23
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28		04:54 22:00	06:12 9	21:15 (3) 21:24 (3)	05:20 21:43	06:12 20:46	20:12 (5) 20:17 (5)	07:06 19:32	08:01 18:20	08:41 16:22
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30		04:54 22:00	06:13 9	21:15 (3) 21:24 (3)	05:21 21:42	06:13 20:44	20:10 (5) 20:11 (5)	07:08 19:29	08:02 18:17	08:41 16:20
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	20:09 (5)	05:15	06:15 9	21:16 (3) 21:25 (3)	05:23 21:41	06:15 20:42	20:08 (5) 20:12 (5)	07:10 19:17	08:05 18:15	08:42 16:19
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	20:06 (5)	05:13	06:17 9	21:16 (3) 21:25 (3)	05:24 21:39	06:17 20:39	20:09 (5) 20:13 (5)	07:12 19:24	08:07 18:13	08:42 16:17
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 20:45	20:04 (5)	05:12	06:19 9	21:16 (3) 21:25 (3)	05:26 21:38	06:19 20:37	20:08 (5) 20:12 (5)	07:13 19:22	08:09 18:11	08:43 16:17
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	20:02 (5)	05:11	06:20 8	21:17 (3) 21:25 (3)	05:27 21:36	06:20 20:35	20:09 (5) 20:15 (5)	07:14 19:19	08:11 17:09	08:44 16:16
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	20:01 (5)	05:09	06:22 9	21:16 (3) 21:25 (3)	05:29 21:35	06:22 20:30	20:10 (5) 20:12 (5)	07:17 19:17	08:11 17:06	08:43 16:15
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	20:00 (5)	05:08	06:24 22:01	21:16 (3) 21:24 (3)	05:30 21:33	06:24 20:30	20:13 (5) 20:14 (5)	07:18 19:14	08:13 17:04	08:44 16:13
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	20:00 (5)	05:07	06:26 22:01	21:17 (3) 21:25 (3)	05:32 21:32	06:26 20:28	20:14 (5) 20:15 (5)	07:21 19:12	08:14 17:02	08:44 16:13
29	08:18 17:00		07:08 19:54	05:56 20:52	05:06 21:41	19:59 (5)	05:06	06:28 22:00	21:18 (3) 21:25 (3)	05:34 21:30	06:28 20:25	20:16 (5) 20:19 (5)	07:22 19:09	08:16 17:00	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	19:59 (5)	05:05	06:29 22:00	21:17 (3) 21:24 (3)	05:35 21:28	06:29 5	20:19 (5) 20:24 (5)	07:23 19:07	08:17 16:58	08:44 16:11
31	08:15 17:04		07:04 19:58		05:04 21:44			06:30 21:26			06:31 11	20:16 (5) 20:27 (5)	07:24 16:56	08:17 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460			382	328	259		233
Total, worst case				133	285	186	45	410							
Sun reduction				0.35	0.38	0.32	0.32	0.34							
Oper. time red.				1.00	1.00	1.00	1.00	1.00							
Wind dir. red.				0.65	0.65	0.61	0.62	0.65							
Total reduction				0.23	0.25	0.19	0.20	0.22							
Total, real				30	70	36	9	91							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MB - H340

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December							
1	08:44	08:14	07:16	07:01	05:52	19:57 (5)	05:03	04:59	21:16 (3)	05:39	20:16 (5)	06:33	07:26	07:24	08:19				
	16:15	17:06	18:02	20:00	20:55	20:24 (5)	21:45	22:00	21:24 (3)	21:25	20:24 (5)	20:18	19:05	16:54	16:10				
2	08:44	08:12	07:14	06:59	05:50	19:57 (5)	05:02	05:00	21:16 (3)	05:40	20:14 (5)	06:35	07:28	07:26	08:21				
	16:16	17:08	18:04	20:02	20:57	20:23 (5)	21:46	22:00	21:24 (3)	21:23	20:27 (5)	20:16	19:02	16:52	16:09				
3	08:43	08:10	07:11	06:56	05:48	19:57 (5)	05:01	05:00	21:16 (3)	05:42	20:11 (5)	06:36	07:30	07:28	08:22				
	16:17	17:10	18:06	20:04	20:59	20:23 (5)	21:48	2	21:13 (3)	21:59	7	21:23 (3)	21:21	17	20:28 (5)	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	19:57 (5)	05:00	05:01	21:11 (3)	05:01	21:16 (3)	05:44	20:10 (5)	06:38	07:31	07:30	08:23		
	16:18	17:12	18:07	20:06	21:01	20:22 (5)	21:49	3	21:14 (3)	21:59	7	21:23 (3)	21:19	19	20:29 (5)	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	19:57 (5)	04:59	05:00	21:11 (3)	05:02	21:17 (3)	05:45	20:09 (5)	06:40	07:33	07:32	08:25		
	16:20	17:14	18:09	20:07	21:03	20:22 (5)	21:50	4	21:15 (3)	21:58	6	21:23 (3)	21:17	20	20:29 (5)	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	19:58 (5)	04:59	05:00	21:11 (3)	05:03	21:17 (3)	05:47	20:08 (5)	06:42	07:35	07:34	08:26		
	16:21	17:16	18:11	20:09	21:04	20:21 (5)	21:51	5	21:16 (3)	21:57	5	21:22 (3)	21:15	23	20:31 (5)	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	19:59 (5)	04:58	05:00	21:10 (3)	05:04	21:18 (3)	05:49	20:08 (5)	06:43	07:37	07:36	08:28		
	16:22	17:18	18:13	20:11	21:06	20:21 (5)	21:52	6	21:16 (3)	21:57	4	21:22 (3)	21:13	24	20:32 (5)	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	20:00 (5)	04:57	05:00	21:11 (3)	05:05	21:18 (3)	05:51	20:07 (5)	06:45	07:39	07:38	08:29		
	16:24	17:20	18:15	20:13	21:08	20:20 (5)	21:53	6	21:17 (3)	21:56	3	21:21 (3)	21:11	24	20:31 (5)	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	20:00 (5)	04:57	05:00	21:11 (3)	05:06	21:19 (3)	05:52	20:06 (5)	06:47	07:41	07:40	08:30		
	16:25	17:22	18:17	20:15	21:10	20:18 (5)	21:54	8	21:19 (3)	21:55	2	21:21 (3)	21:09	26	20:32 (5)	20:01	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34	20:02 (5)	04:56	05:00	21:11 (3)	05:07	21:19 (3)	05:54	20:05 (5)	06:49	07:42	07:42	08:31		
	16:27	17:24	18:19	20:17	21:11	20:17 (5)	21:54	8	21:19 (3)	21:54	1	21:20 (3)	21:07	27	20:32 (5)	20:01	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33	20:04 (5)	04:56	05:00	21:11 (3)	05:08	05:56	20:05 (5)	06:50	07:44	07:43	08:33			
	16:28	17:26	18:21	20:18	21:13	20:16 (5)	21:55	9	21:20 (3)	21:54	21:05	27	20:32 (5)	20:04	18:40	16:36	16:05		
12	08:39	07:53	06:50	06:35	05:31	20:07 (5)	04:55	05:00	21:12 (3)	05:09	05:58	20:06 (5)	06:52	07:46	07:45	08:34			
	16:30	17:28	18:23	20:20	21:15	20:12 (5)	21:56	9	21:21 (3)	21:53	21:03	26	20:32 (5)	20:01	18:38	16:34	16:05		
13	08:38	07:51	06:48	06:32	05:29	20:05 (5)	04:55	05:00	21:11 (3)	05:11	05:59	20:05 (5)	06:54	07:48	07:47	08:35			
	16:31	17:30	18:25	20:22	21:17	20:21 (3)	21:52	10	21:21 (3)	21:43	21:02	26	20:31 (5)	20:01	18:36	16:32	16:05		
14	08:37	07:49	06:45	06:30	05:27	20:05 (5)	04:55	05:00	21:12 (3)	05:12	06:01	20:05 (5)	06:56	07:50	07:49	08:36			
	16:33	17:32	18:27	20:24	21:18	20:22 (3)	21:51	10	21:22 (3)	21:51	20:59	24	20:29 (5)	19:47	18:33	16:31	16:05		
15	08:36	07:47	06:43	06:28	05:26	20:05 (5)	04:55	05:00	21:12 (3)	05:13	06:03	20:06 (5)	06:58	07:52	07:51	08:37			
	16:34	17:34	18:28	20:26	21:20	20:28 (5)	21:50	10	21:22 (3)	21:50	20:57	22	20:28 (5)	19:44	18:31	16:29	16:05		
16	08:35	07:45	06:40	06:25	05:24	20:05 (5)	04:54	05:00	21:12 (3)	05:14	06:05	20:05 (5)	06:59	07:54	07:53	08:38			
	16:36	17:36	18:30	20:28	21:22	20:25 (5)	21:48	11	21:23 (3)	21:48	20:55	20	20:25 (5)	19:42	18:29	16:27	16:05		
17	08:34	07:43	06:38	06:23	05:22	20:04 (5)	04:54	05:00	21:12 (3)	05:16	06:06	20:06 (5)	07:01	07:55	07:55	08:38			
	16:38	17:38	18:32	20:30	21:23	20:23 (5)	21:47	11	21:23 (3)	21:47	20:53	17	20:23 (5)	19:39	18:26	16:26	16:05		
18	08:33	07:41	06:35	06:21	05:21	20:05 (5)	04:54	05:00	21:12 (3)	05:17	06:08	20:07 (5)	07:03	07:57	07:57	08:39			
	16:40	17:40	18:34	20:31	21:25	20:24 (3)	21:46	12	21:24 (3)	21:46	20:50	15	20:22 (5)	19:37	18:24	16:25	16:05		
19	08:32	07:39	06:33	06:18	05:19	20:03 (5)	04:54	05:00	21:13 (3)	05:18	06:10	20:07 (5)	07:05	07:59	07:59	08:40			
	16:41	17:42	18:36	20:33	21:27	20:24 (3)	21:45	11	21:24 (3)	21:45	20:48	12	20:19 (5)	19:34	18:22	16:23	16:05		
20	08:31	07:36	06:31	06:16	05:18	20:04 (5)	04:54	05:00	21:13 (3)	05:20	06:13	20:09 (5)	07:06	08:01	08:00	08:41			
	16:43	17:44	18:38	20:35	21:28	20:25 (5)	21:43	11	21:23 (3)	21:43	20:46	8	20:17 (5)	19:32	18:20	16:22	16:06		
21	08:30	07:34	06:28	06:14	05:16	20:03 (5)	04:54	05:00	21:13 (3)	05:21	06:13	20:11 (5)	07:08	08:03	08:02	08:41			
	16:45	17:46	18:40	20:37	21:30	20:26 (5)	21:42	11	21:24 (3)	21:42	20:44	4	20:15 (5)	19:29	18:17	16:20	16:06		
22	08:28	07:32	06:26	06:12	05:15	20:02 (5)	04:55	05:00	21:14 (3)	05:23	06:15	07:10	08:05	08:04	08:42				
	16:47	17:48	18:41	20:39	21:31	20:27 (5)	21:41	11	21:25 (3)	21:41	20:42	19:27	18:15	16:19	16:07				
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24	08:26	07:28	06:21	06:07	05:12	20:01 (5)	04:55	05:00	21:14 (3)	05:26	20:19	07:13	08:09	08:07	08:43				
	16:51	17:52	18:45	20:42	21:34	20:29 (5)	21:43	11	21:25 (3)	21:38	20:37	19:22	18:11	16:17	16:08				
25	08:24	07:25	06:18	06:05	05:11	20:00 (5)	04:56	05:00	21:14 (3)	05:27	06:20	07:15	07:11	08:09	08:43				
	16:52	17:54	18:47	20:44	21:36	20:30 (5)	21:43	11	21:25 (3)	21:36	20:35	19:19	17:09	16:16	16:08				
26	08:23	07:23	06:16	06:03	05:09	20:00 (5)	04:56	05:00	21:14 (3)	05:29	06:22	07:17	07:13	08:11	08:43				
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	16:56	17:58	18:51	20:48	21:39	20:32 (5)	21:43	22:01	21:24 (3)	21:33	20:30	19:14	17:04	16:13	16:10				
28	08:20	07:18	06:11	05:58	05:07	20:01 (5)	04:57	05:00	21:15 (3)	05:32	06:26	07:21	07:16	08:14	08:44				
	16:58	18:00	18:53	20:50	21:40	20:33 (5)	21:43	22:01	21:25 (3)	21:32	20:28	19:12	17:02	16:13	16:11				
29	08:18	07:08	05:56	05:06	05:06	20:02 (5)	04:58	05:00	21:15 (3)	05:34	06:28	07:22	07:18	08:16	08:44				
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30	08:17	07:06	05:54	05:05	05:05	20:03 (5)	04:58	05:00	21:15 (3)	05:35	06:29	07:24	07:20	08:17	08:44				
	17:02	19:56	20:53	21:43	21:43	20:35 (5)	21:43	22:00	9	21:24 (3)	21:28	20:23	16:58	16:11	16:12				
31	08:15	07:04	05:54	05:04	05:04	20:04 (5)	04:57	05:00	21:15 (3)	05:37	06:31	07:22	08:18	08:16	08:44				
	17:04	19:58	20:55	21:44	21:44	20:36 (5)	21:43	22:00	21:26 (3)	21:26	20:21	16:56	16:11	16:13					
Potential sun hours	250	273	367	420	494	510	512	512	460	402	382	328	259	233					
Total, worst case																			
Sun reduction				0.35	0.38	0.32	0.32	0.32		0.34									
Oper. time red.				1.00	1.00	1.00	1.00	1.00		1.00									
Wind dir. red.				0.65	0.65	0.61	0.61	0.61		0.65									
Total reduction				0.23	0.25	0.19	0.20	0.20		0.22									
Total, real				35	60	49	10	89		89									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MC - H341

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December		
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	21:07 (4) 21:10 (4)	04:59 22:00	21:11 (4) 21:24 (4)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	21:07 (4) 21:12 (4)	05:00 21:59	21:11 (4) 21:24 (4)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:48	21:07 (4) 21:13 (4)	05:00 21:59	21:11 (4) 21:23 (4)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:06 (4) 21:14 (4)	05:01 21:59	21:11 (4) 21:23 (4)	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	21:07 (4) 21:15 (4)	05:02 21:58	21:12 (4) 21:23 (4)	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:09	06:49 20:09	05:42 21:04	04:59 21:51	21:06 (4) 21:16 (4)	05:03 21:57	21:12 (4) 21:22 (4)	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:06 (4) 21:16 (4)	05:04 21:57	21:13 (4) 21:22 (4)	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:06 (4) 21:17 (4)	05:05 21:56	21:13 (4) 21:21 (4)	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:06 (4) 21:18 (4)	05:06 21:55	21:14 (4) 21:21 (4)	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:06 (4) 21:19 (4)	05:07 21:54	21:14 (4) 21:20 (4)	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:06 (4) 21:20 (4)	05:08 21:54	21:15 (4) 21:19 (4)	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:06 (4) 21:20 (4)	05:09 21:53	21:15 (4) 21:18 (4)	05:57 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:06 (4) 21:21 (4)	05:11 21:52	21:16 (4) 21:17 (4)	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:07 (4) 21:22 (4)	05:12 21:51	06:01 20:59	06:01 20:59	06:56 19:46	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:07 (4) 21:22 (4)	05:13 21:50	06:03 20:57	06:03 20:57	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:07 (4) 21:23 (4)	05:14 21:48	06:04 20:55	06:04 20:55	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:07 (4) 21:23 (4)	05:16 21:47	06:06 20:53	19:57 (5) 20:05 (5)	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:07 (4) 21:24 (4)	05:17 21:46	06:08 20:50	19:55 (5) 20:07 (5)	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:08 (4) 21:24 (4)	05:18 21:45	06:10 20:48	19:53 (5) 20:08 (5)	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:08 (4) 21:24 (4)	05:19 21:43	06:12 20:46	19:52 (5) 20:09 (5)	07:06 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:54 22:00	21:08 (4) 21:24 (4)	05:21 21:42	06:13 20:44	19:51 (5) 20:10 (5)	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:09 (4) 21:25 (4)	05:23 21:41	06:15 20:41	19:50 (5) 20:09 (5)	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:06
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:09 (4) 21:25 (4)	05:24 21:39	06:17 20:39	19:50 (5) 20:10 (5)	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	05:12 20:42	04:55 22:01	21:09 (4) 21:25 (4)	05:26 21:38	06:19 20:37	19:50 (5) 20:09 (5)	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:09 (4) 21:25 (4)	05:27 21:36	06:20 20:35	19:49 (5) 20:06 (5)	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:09 (4) 21:26 (4)	05:29 21:35	06:22 20:32	19:49 (5) 20:04 (5)	07:17 19:17	07:13 17:06	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:09 (4) 21:24 (4)	05:30 21:33	06:24 20:30	19:50 (5) 20:02 (5)	07:19 19:14	08:13 17:04	08:13 16:13	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:10 (4) 21:25 (4)	05:32 21:32	06:26 20:28	19:50 (5) 19:59 (5)	07:21 19:12	07:16 17:02	08:14 16:12	08:44 16:11
29	08:18 17:00	07:16 18:02	06:09 18:54	05:56 20:52	05:06 21:41	04:57 22:00	21:10 (4) 21:25 (4)	05:34 21:30	06:27 20:25	19:51 (5) 19:57 (5)	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:11
30	08:17 17:02	07:14 18:04	06:06 18:56	05:54 20:53	05:05 21:43	04:58 22:00	21:10 (4) 21:24 (4)	05:35 21:28	06:29 20:23	19:53 (5) 19:55 (5)	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04	07:12 18:04	06:05 18:58	05:52 20:54	05:04 21:44	21:07 (4) 21:09 (4)	05:37 21:26	05:37 21:26	06:31 20:21	06:31 19:55 (5)	07:22 16:56	07:22 16:56	08:44 16:13	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233		
Total, worst case				187	2	395	109	190						
Sun reduction				0.35	0.38	0.32	0.32	0.34						
Oper. time red.				1.00	1.00	1.00	1.00	1.00						
Wind dir. red.				0.65	0.61	0.61	0.61	0.65						
Total reduction				0.23	0.23	0.19	0.20	0.22						
Total, real				43	0	77	21	42						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MD - H342

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	05:40 20:16	06:35 19:02	07:28 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: ME - H343

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	05:40 20:16	06:35 19:02	07:28 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MF - H344

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MG - H345

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MH - H346

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MI - H347

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
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Total reduction												
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Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MJ - H348

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
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9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MK - H349

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	05:40 20:16	06:35 19:02	07:28 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: ML - H350

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44	08:14	07:16	07:01	18:44 (4)	05:52
	16:15	17:06	18:02	20:00	48	19:33 (3)
2	08:44	08:12	07:14	06:59	18:44 (4)	05:50
	16:16	17:08	18:04	20:02	47	19:33 (3)
3	08:43	08:10	07:11	06:56	18:46 (4)	05:48
	16:17	17:10	18:06	20:04	41	19:32 (3)
4	08:43	08:08	07:09	06:54	18:49 (4)	05:46
	16:18	17:12	18:07	20:06	34	19:31 (3)
5	08:43	08:07	07:07	06:51	18:52 (4)	05:44
	16:19	17:14	18:09	20:07	23	19:29 (3)
6	08:42	08:05	07:04	06:49	19:18 (3)	05:42
	16:21	17:16	18:11	20:09	8	19:26 (3)
7	08:42	08:03	07:02	06:47		05:40
	16:22	17:18	18:13	20:11		21:06
8	08:42	08:01	07:00	06:44		05:38
	16:24	17:20	18:15	20:13		21:08
9	08:41	07:59	06:57	06:42		05:36
	16:25	17:22	18:17	20:15		21:10
10	08:40	07:57	06:55	06:39		05:34
	16:26	17:24	18:19	20:17		21:11
11	08:40	07:55	16:52 (5)	06:52		05:33
	16:28	17:26	4	16:56 (5)		21:13
12	08:39	07:53	16:50 (5)	06:50		05:31
	16:30	17:28	8	16:58 (5)		21:15
13	08:38	07:51	16:49 (5)	06:48		05:29
	16:31	17:30	11	17:00 (5)		21:17
14	08:37	07:49	16:48 (5)	06:45	17:56 (4)	06:30
	16:33	17:32	14	17:02 (5)	4	18:00 (4)
15	08:36	07:47	16:48 (5)	06:43	17:53 (4)	06:28
	16:34	17:34	17	17:05 (5)	9	18:02 (4)
16	08:35	07:45	16:47 (5)	06:40	17:50 (4)	06:25
	16:36	17:36	20	17:07 (5)	14	18:04 (4)
17	08:34	07:43	16:47 (5)	06:38	17:49 (4)	06:23
	16:38	17:38	22	17:09 (5)	17	18:06 (4)
18	08:33	07:41	16:47 (5)	06:35	17:47 (4)	06:21
	16:40	17:40	24	17:11 (5)	20	18:07 (4)
19	08:32	07:39	16:47 (5)	06:33	17:46 (4)	06:18
	16:41	17:42	24	17:11 (5)	24	18:10 (4)
20	08:31	07:36	16:47 (5)	06:31	17:44 (4)	06:16
	16:43	17:44	23	17:10 (5)	27	18:11 (4)
21	08:30	07:34	16:48 (5)	06:28	17:44 (4)	06:14
	16:45	17:46	22	17:10 (5)	29	18:13 (4)
22	08:28	07:32	16:48 (5)	06:26	17:43 (4)	06:12
	16:47	17:48	21	17:09 (5)	32	18:15 (4)
23	08:27	07:30	16:50 (5)	06:23	17:42 (4)	06:09
	16:49	17:50	18	17:08 (5)	35	18:17 (4)
24	08:26	07:28	16:51 (5)	06:21	17:41 (4)	06:07
	16:50	17:52	15	17:06 (5)	37	18:18 (4)
25	08:24	07:25	16:53 (5)	06:18	17:42 (4)	06:05
	16:52	17:54	10	17:03 (5)	39	18:21 (3)
26	08:23	07:23		06:16	17:41 (4)	06:03
	16:54	17:56		18:49	41	18:22 (3)
27	08:22	07:21		06:13	17:41 (4)	06:01
	16:56	17:58		18:51	43	18:24 (3)
28	08:20	07:18		06:11	17:42 (4)	05:58
	16:58	18:00		18:53	44	18:26 (3)
29	08:18			07:08	18:42 (4)	05:56
	17:00			19:54	46	19:28 (3)
30	08:17			07:06	18:42 (4)	05:54
	17:02			19:56	48	19:30 (3)
31	08:15			07:04	18:42 (4)	05:54
	17:04			19:58	49	19:31 (3)
Potential sun hours	250	273	367	420	494	510
Total, worst case		253	558	201	515	202
Sun reduction		0.23	0.27	0.35	0.38	0.32
Oper. time red.		1.00	1.00	1.00	1.00	1.00
Wind dir. red.		0.67	0.67	0.67	0.63	0.63
Total reduction		0.15	0.18	0.24	0.24	0.20
Total, real		39	102	48	124	41

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: ML - H350

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59	20:44 (2)	05:39	20:40 (2)	06:33		07:26		07:24		08:19
	22:00	8	20:52 (2)	21:25	13	20:53 (2)	20:18		16:54		16:10
2	04:59	20:44 (2)	05:40	20:41 (2)	06:35		07:28		07:26		08:21
	22:00	10	20:54 (2)	21:23	11	20:52 (2)	20:16		16:52		16:09
3	05:00	20:42 (2)	05:42	20:41 (2)	06:36		07:30		07:28		08:22
	21:59	12	20:54 (2)	21:21	9	20:50 (2)	20:13		16:50		16:08
4	05:01	20:42 (2)	05:44	20:43 (2)	06:38		07:31		07:30		08:24
	21:59	13	20:55 (2)	21:19	5	20:48 (2)	20:11		16:48		16:08
5	05:02	20:42 (2)	05:45	20:44 (2)	06:40		07:33		07:32		08:25
	21:58	14	20:56 (2)	21:17	2	20:46 (2)	20:09		16:46		16:07
6	05:03	20:41 (2)	05:47		06:42		19:14 (3)		07:35		08:26
	21:58	16	20:57 (2)	21:15		20:06	8	19:22 (3)	18:52		16:44
7	05:04	20:41 (2)	05:49		06:43		18:47 (4)		07:37		08:28
	21:57	17	20:58 (2)	21:13		20:04	23	19:24 (3)	18:50		16:43
8	05:05	20:41 (2)	05:51		06:45		18:43 (4)		07:39		08:29
	21:56	18	20:59 (2)	21:11		20:01	33	19:25 (3)	18:48		16:41
9	05:06	20:40 (2)	05:52		06:47		18:41 (4)		07:41		08:30
	21:55	19	20:59 (2)	21:09		19:59	40	19:26 (3)	18:45		16:39
10	05:07	20:40 (2)	05:54		06:49		18:38 (4)		07:42		08:31
	21:55	20	21:00 (2)	21:07		19:56	45	19:26 (3)	18:43		16:37
11	05:08	20:39 (2)	05:56		06:50		18:36 (4)		07:44		08:33
	21:54	22	21:01 (2)	21:05		19:54	49	19:26 (3)	18:40		16:35
12	05:09	20:39 (2)	05:57		06:52		18:35 (4)		07:46		08:34
	21:53	22	21:01 (2)	21:03		19:51	49	19:24 (3)	18:38		16:34
13	05:10	20:38 (2)	05:59		06:54		18:34 (4)		07:48		08:35
	21:52	24	21:02 (2)	21:01		19:49	48	19:22 (3)	18:36		16:32
14	05:12	20:38 (2)	06:01		06:56		18:32 (4)		07:50		08:36
	21:51	24	21:02 (2)	20:59		19:47	46	19:18 (3)	18:33		16:31
15	05:13	20:38 (2)	06:03		06:58		18:31 (4)		07:52		08:37
	21:50	24	21:02 (2)	20:57		19:44	45	19:16 (3)	18:31		16:29
16	05:14	20:37 (2)	06:04		06:59		18:31 (4)		07:54		08:38
	21:49	26	21:03 (2)	20:55		19:42	43	19:14 (3)	18:29	5	17:33 (5)
17	05:16	20:38 (2)	06:06		07:01		18:29 (4)		07:55		17:24 (5)
	21:47	26	21:04 (2)	20:53		19:39	42	19:11 (3)	18:26	12	17:36 (5)
18	05:17	20:37 (2)	06:08		07:03		18:29 (4)		07:57		17:22 (5)
	21:46	27	21:04 (2)	20:50		19:37	39	19:08 (3)	18:24	16	17:38 (5)
19	05:18	20:37 (2)	06:10		07:05		18:29 (4)		07:59		17:20 (5)
	21:45	27	21:04 (2)	20:48		19:34	36	19:05 (4)	18:22	19	17:39 (5)
20	05:20	20:37 (2)	06:12		07:06		18:29 (4)		08:01		17:19 (5)
	21:44	28	21:05 (2)	20:46		19:32	35	19:04 (4)	18:20	21	17:40 (5)
21	05:21	20:37 (2)	06:13		07:08		18:28 (4)		08:03		17:18 (5)
	21:42	28	21:05 (2)	20:44		19:29	33	19:01 (4)	18:17	23	17:41 (5)
22	05:23	20:36 (2)	06:15		07:10		18:28 (4)		08:05		17:18 (5)
	21:41	28	21:04 (2)	20:42		19:27	30	18:58 (4)	18:15	23	17:41 (5)
23	05:24	20:37 (2)	06:17		07:12		18:29 (4)		08:07		17:17 (5)
	21:39	28	21:05 (2)	20:39		19:24	27	18:56 (4)	18:13	24	17:41 (5)
24	05:26	20:37 (2)	06:19		07:13		18:29 (4)		08:09		17:17 (5)
	21:38	28	21:05 (2)	20:37		19:22	25	18:54 (4)	18:11	24	17:41 (5)
25	05:27	20:37 (2)	06:20		07:15		18:29 (4)		07:11		16:17 (5)
	21:36	27	21:04 (2)	20:35		19:19	22	18:51 (4)	17:09	21	16:38 (5)
26	05:29	20:37 (2)	06:22		07:17		18:30 (4)		07:13		16:17 (5)
	21:35	25	21:02 (2)	20:32		19:17	18	18:48 (4)	17:06	19	16:36 (5)
27	05:30	20:37 (2)	06:24		07:19		18:31 (4)		07:14		16:17 (5)
	21:33	23	21:00 (2)	20:30		19:14	15	18:46 (4)	17:04	17	16:34 (5)
28	05:32	20:38 (2)	06:26		07:21		18:33 (4)		07:16		16:18 (5)
	21:32	21	20:59 (2)	20:28		19:12	11	18:44 (4)	17:02	13	16:31 (5)
29	05:34	20:38 (2)	06:27		07:22		18:36 (4)		07:18		16:18 (5)
	21:30	19	20:57 (2)	20:25		19:09	5	18:41 (4)	17:00	11	16:29 (5)
30	05:35	20:38 (2)	06:29		07:24				07:20		16:19 (5)
	21:28	18	20:56 (2)	20:23		19:07			16:58	8	16:27 (5)
31	05:37	20:40 (2)	06:31						07:22		16:21 (5)
	21:26	15	20:55 (2)	20:21					16:56	4	16:25 (5)
Potential sun hours	512		460		382		328		259		233
Total, worst case	657		40		767		260				
Sun reduction	0.32		0.34		0.32		0.29				
Oper. time red.	1.00		1.00		1.00		1.00				
Wind dir. red.	0.63		0.63		0.67		0.67				
Total reduction	0.20		0.22		0.22		0.19				
Total, real	135		9		166		51				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MM - H351

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MN - H352

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MO - H353

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:56	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:41 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:57 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:09 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:18	06:40 20:09	07:33 18:55	07:32 16:47	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:12	06:49 20:09	05:42 21:05	04:59 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:53	07:34 16:45	08:27 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:58 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:56	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:12	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:57	07:43 18:43	07:42 16:37	08:32 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:56	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:21	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:04	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:33 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:19	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:36 16:36	07:45 17:36	06:41 18:31	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	07:00 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:35 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:24	04:55 21:59	05:16 21:48	06:07 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:39 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:58 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:07 19:32	08:01 18:20	08:01 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:44	06:10 20:41	05:14 21:33	04:55 22:01	05:25 21:40	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:26 17:54	06:19 18:47	06:05 20:45	05:11 21:36	04:56 22:01	05:28 21:37	06:21 20:35	07:15 19:20	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:33	07:17 19:17	07:13 17:07	08:11 16:15	08:44 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:42	04:58 22:01	05:34 21:30	06:28 20:26	07:23 19:10	07:19 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:57	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:30 20:23	07:24 19:07	07:21 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:27	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MP - H354

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44		09:42 (1)	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19										
	16:15	13	09:55 (1)	17:06	18:02	20:00	20:56	21:46	22:00	21:25	20:18	19:05	16:54	16:10										
2	08:44		09:44 (1)	08:12	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:21										
	16:16	11	09:55 (1)	17:08	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09										
3	08:44		09:45 (1)	08:10	07:12	06:56	05:48	05:01	05:00	05:42	06:37	07:30	07:28	08:22										
	16:17	10	09:55 (1)	17:10	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	16:08										
4	08:44		09:46 (1)	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:24										
	16:18	7	09:53 (1)	17:12	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	16:08										
5	08:43		09:49 (1)	08:07	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25										
	16:20	4	09:53 (1)	17:14	18:10	20:08	21:03	21:50	21:58	21:18	20:09	18:55	16:46	16:07										
6	08:43			08:05	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:27										
	16:21			17:16	18:11	20:09	21:05	21:51	21:58	21:16	20:06	18:53	16:45	16:07										
7	08:42			08:03	07:02	06:47	05:40	04:58	05:04	05:49	06:44	07:37	07:36	08:28								09:35 (1)		
	16:22			17:18	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	16:06	3							09:38 (1)		
8	08:42			08:01	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:29								09:34 (1)		
	16:24			17:20	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	16:06	7							09:41 (1)		
9	08:41			07:59	06:58	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:31								09:33 (1)		
	16:25			17:22	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	16:05	10							09:43 (1)		
10	08:41			07:57	06:55	06:40	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:32								09:33 (1)		
	16:27			17:24	18:19	20:17	21:12	21:55	21:58	21:08	19:57	18:43	16:37	16:05	11							09:44 (1)		
11	08:40			07:55	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:33								09:32 (1)		
	16:28			17:26	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	16:05	13							09:45 (1)		
12	08:39			07:53	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34								09:33 (1)		
	16:30			17:28	18:23	20:21	21:15	21:56	21:53	21:04	19:52	18:38	16:34	16:05	13							09:46 (1)		
13	08:38			07:51	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:48	08:35								09:33 (1)		
	16:31			17:30	18:25	20:22	21:17	21:57	21:52	21:02	19:49	18:36	16:32	16:05	14							09:47 (1)		
14	08:37			07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:50	08:36								09:33 (1)		
	16:33			17:32	18:27	20:24	21:19	21:58	21:51	20:59	19:47	18:34	16:31	16:05	15							09:48 (1)		
15	08:37			07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:37								09:34 (1)		
	16:35			17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	16:05	15							09:49 (1)		
16	08:36			07:45	06:41	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:38								09:34 (1)		
	16:36			17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:28	16:05	15							09:49 (1)		
17	08:35			07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:39								09:33 (1)		
	16:38			17:38	18:32	20:30	21:24	21:59	21:48	20:53	19:39	18:27	16:26	16:05	16							09:49 (1)		
18	08:34			07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:58	07:57	08:39								09:34 (1)		
	16:40			17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	16:05	16							09:50 (1)		
19	08:32			07:39	06:33	06:18	05:19	04:54	05:19	06:10	07:05	07:59	07:59	08:40								09:35 (1)		
	16:41			17:42	18:36	20:34	21:27	22:00	21:45	20:49	19:34	18:22	16:23	16:05	16							09:51 (1)		
20	08:31			07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:07	08:01	08:01	08:41								09:34 (1)		
	16:43			17:44	18:38	20:35	21:28	22:01	21:44	20:46	19:32	18:20	16:22	16:06	17							09:51 (1)		
21	08:30			07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41								09:35 (1)		
	16:45			17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:18	16:21	16:06	17							09:52 (1)		
22	08:29			07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42								09:35 (1)		
	16:47			17:48	18:42	20:39	21:32	22:01	21:41	20:42	19:27	18:15	16:19	16:07	17							09:52 (1)		
23	08:27			07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:43								09:36 (1)		
	16:49			17:50	18:44	20:41	21:33	22:01	21:40	20:40	19:24	18:13	16:18	16:07	17							09:53 (1)		
24	08:26			07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:43								09:36 (1)		
	16:51			17:52	18:45	20:43	21:35	22:01	21:38	20:37	19:22	18:11	16:17	16:08	17							09:53 (1)		
25	08:25			07:26	06:18	06:05	05:11	04:56	05:27	06:21	07:15	07:11	08:10	08:43								09:38 (1)		
	16:52			17:54	18:47	20:45	21:36	22:01	21:37	20:35	19:19	17:09	16:16	16:08	16							09:54 (1)		
26	08:23			07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	08:11	08:44								09:38 (1)		
	16:54			17:56	18:49	20:46	21:38	22:01	21:35	20:33	19:17	17:07	16:15	16:09	16							09:54 (1)		
27	08:22			07:21	06:14	06:01	05:08	04:56	05:31	06:24	07:19	07:15	08:13	08:44								09:39 (1)		
	16:56			17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:15	17:05	16:14	16:10	15							09:54 (1)		
28	08:20			07:19	06:11	05:59	05:07	04:57	05:32	06:26	07:21	07:17	08:15	08:44								09:39 (1)		
	16:58			18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:13	16:11	16							09:55 (1)		
29	08:19				07:09	05:56	05:06	04:58	05:34	06:28	07:23	07:19	08:16	08:44								09:40 (1)		
	17:00				19:55	20:52	21:42	22:01	21:30	20:26	19:10	17:00	16:12	16:12	15							09:55 (1)		
30	08:17				07:06	05:54	05:05	04:58	05:35	06:29	07:24	07:21	08:18	08:44								09:41 (1)		
	17:02				19:57	20:54	21:43	22:01	21:28	20:23	19:07	16:58	16:11	16:12	14							09:55 (1)		
31	08:16				07:04		05:04		05:37	06:31		07:22		08:44								09:42 (1)		</

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MQ - H355

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44	08:14	07:16	07:01	05:52	05:03	04:59	05:39	06:09 (1)	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:56	21:45	22:00	21:25	9	06:18 (1)	20:18	19:05	16:54
2	08:44	08:12	07:14	06:59	05:50	05:02	05:00	05:41	06:11 (1)	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:47	22:00	21:23	7	06:18 (1)	20:16	19:02	16:52
3	08:44	08:10	07:12	06:57	05:48	05:01	05:01	05:42	06:12 (1)	06:37	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48	21:59	21:21	5	06:17 (1)	20:14	19:00	16:50
4	08:43	08:09	07:09	06:54	05:46	05:00	05:01	05:44	06:14 (1)	06:38	07:32	07:30	08:24
	16:18	17:12	18:08	20:06	21:01	21:49	21:59	21:19	2	06:16 (1)	20:11	18:57	16:48
5	08:43	08:07	07:07	06:52	05:44	05:00	05:02	05:46		06:40	07:33	07:32	08:25
	16:20	17:14	18:10	20:08	21:03	21:50	21:58	21:18		20:09	18:55	16:47	16:07
6	08:43	08:05	07:05	06:49	05:42	04:59	05:03	05:47		06:42	07:35	07:34	08:27
	16:21	17:16	18:12	20:09	21:05	21:51	21:58	21:16		20:06	18:53	16:45	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58	05:04	05:49		06:44	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	21:57	21:14		20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38	06:05 (1)	04:57	05:05		06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	1	06:06 (1)	21:53		20:01	18:48	16:41	16:06
9	08:41	07:59	06:58	06:42	05:36	06:03 (1)	04:57	05:06		06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	3	06:06 (1)	21:54		21:10	19:59	18:45	16:39
10	08:41	07:57	06:55	06:40	05:35	06:02 (1)	04:56	05:07		06:49	07:43	07:42	08:32
	16:27	17:24	18:19	20:17	21:12	5	06:07 (1)	21:55		21:08	19:57	18:43	16:37
11	08:40	07:55	06:53	06:37	05:33	06:00 (1)	04:56	05:08		06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13	7	06:07 (1)	21:56		21:06	19:54	18:41	16:36
12	08:39	07:53	06:50	06:35	05:31	05:58 (1)	04:56	05:10		06:52	07:46	07:46	08:34
	16:30	17:28	18:23	20:21	21:15	9	06:07 (1)	21:56		21:04	19:52	18:38	16:34
13	08:38	07:51	06:48	06:33	05:29	05:57 (1)	04:55	05:11		06:54	07:48	07:48	08:35
	16:31	17:30	18:25	20:22	21:17	11	06:08 (1)	21:57		21:01	19:49	18:36	16:32
14	08:37	07:49	06:45	06:30	05:27	05:55 (1)	04:55	05:12		06:01	06:56	07:50	07:49
	16:33	17:32	18:27	20:24	21:19	13	06:08 (1)	21:58		20:59	19:47	18:34	16:31
15	08:37	07:47	06:43	06:28	05:26	05:54 (1)	04:55	05:13		06:03	06:58	07:52	07:51
	16:35	17:34	18:29	20:26	21:20	14	06:08 (1)	21:58		20:57	19:44	18:31	16:29
16	08:36	07:45	06:41	06:25	05:24	05:52 (1)	04:55	05:15		06:05	07:00	07:54	07:53
	16:36	17:36	18:31	20:28	21:22	15	06:07 (1)	21:59		20:55	19:42	18:29	16:28
17	08:35	07:43	06:38	06:23	05:22	05:51 (1)	04:55	05:16		06:06	07:01	07:56	07:55
	16:38	17:38	18:32	20:30	21:24	17	06:08 (1)	21:59		20:53	19:39	18:27	16:26
18	08:33	07:41	06:36	06:21	05:21	05:49 (1)	04:54	05:17		06:08	07:03	07:58	07:57
	16:40	17:40	18:34	20:32	21:25	18	06:07 (1)	22:00		20:51	19:37	18:24	16:25
19	08:32	07:39	06:33	06:19	05:19	05:49 (1)	04:54	05:19	06:04 (1)	06:10	07:05	07:59	07:59
	16:42	17:42	18:36	20:34	21:27	18	06:07 (1)	22:00	7	06:11 (1)	19:34	18:22	16:23
20	08:31	07:37	06:31	06:16	05:18	05:49 (1)	04:55	05:20	06:02 (1)	06:12	07:07	08:01	08:01
	16:43	17:44	18:38	20:35	21:28	16	06:05 (1)	22:00	11	06:13 (1)	19:32	18:20	16:22
21	08:30	07:34	06:28	06:14	05:16	05:50 (1)	04:55	05:22	06:01 (1)	06:14	07:08	08:03	08:02
	16:45	17:46	18:40	20:37	21:30	15	06:05 (1)	22:01	13	06:14 (1)	19:29	18:18	16:21
22	08:29	07:32	06:26	06:12	05:15	05:51 (1)	04:55	05:23	06:01 (1)	06:15	07:10	08:05	08:04
	16:47	17:48	18:42	20:39	21:31	13	06:04 (1)	22:01	14	06:15 (1)	19:27	18:15	16:19
23	08:27	07:30	06:23	06:10	05:13	05:52 (1)	04:55	05:24	06:00 (1)	06:17	07:12	08:07	08:06
	16:49	17:50	18:44	20:41	21:33	12	06:04 (1)	22:01	16	06:16 (1)	19:24	18:13	16:18
24	08:26	07:28	06:21	06:07	05:12	05:53 (1)	04:55	05:26	05:59 (1)	06:19	07:14	08:09	08:08
	16:51	17:52	18:45	20:43	21:35	8	06:01 (1)	22:01	17	06:16 (1)	19:22	18:11	16:17
25	08:25	07:26	06:19	06:05	05:11	05:55 (1)	04:56	05:28	05:59 (1)	06:21	07:15	07:11	08:09
	16:53	17:54	18:47	20:45	21:36	4	05:59 (1)	22:01	18	06:17 (1)	19:20	17:09	16:16
26	08:23	07:23	06:16	06:03	05:10	04:56	05:29	05:29	06:00 (1)	06:22	07:17	07:13	08:11
	16:55	17:56	18:49	20:46	21:37	22:01	21:35	21:35	17	06:17 (1)	19:17	17:07	16:15
27	08:22	07:21	06:14	06:01	05:08	04:57	05:31	05:31	06:02 (1)	06:24	07:19	07:15	08:13
	16:56	17:58	18:51	20:48	21:39	22:01	21:33	21:33	16	06:18 (1)	19:15	17:05	16:14
28	08:20	07:19	06:11	05:59	05:07	04:57	05:32	05:32	06:03 (1)	06:26	07:21	07:17	08:15
	16:58	18:00	18:53	20:50	21:40	22:01	21:32	21:32	15	06:18 (1)	19:12	17:02	16:13
29	08:19		07:09	05:56	05:06	04:58	05:34	05:34	06:05 (1)	06:28	07:23	07:19	08:16
	17:00		19:55	20:52	21:42	22:01	21:30	21:30	13	06:18 (1)	19:10	17:00	16:12
30	08:17		07:06	05:54	05:05	04:58	05:36	05:36	06:06 (1)	06:30	07:24	07:21	08:18
	17:02		19:57	20:54	21:43	22:00	21:28	21:28	12	06:18 (1)	19:07	16:58	16:11
31	08:15		07:04		05:04		05:37	05:37	06:08 (1)	06:31		07:22	08:44
	17:04		19:58		21:44		21:27	21:27	10	06:18 (1)	20:21	16:56	16:14
Potential sun hours	250	273	367	420	494	510	512	460		382		328	259
Total, worst case					199			179		23			
Sun reduction					0.38			0.32		0.34			
Oper. time red.					1.00			1.00		1.00			
Wind dir. red.					0.66			0.66		0.66			
Total reduction					0.25			0.21		0.23			
Total, real					50			38		5			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MR - H356

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:04 (5)	07:16	16:43 (4)	07:01	05:52	19:48 (2)	05:03		
	16:15	17:06	16:23 (5)	18:02	17:15 (4)	20:00	20:55	33	20:21 (2)	21:45	
2	08:44	08:12	16:05 (5)	07:14	16:43 (4)	06:59	05:50		19:48 (2)	05:02	
	16:16	17:08	16:22 (5)	18:04	17:13 (4)	20:02	20:57	33	20:21 (2)	21:46	
3	08:44	08:10	16:07 (5)	07:12	16:45 (4)	06:56	05:48		19:48 (2)	05:01	
	16:17	17:10	16:20 (5)	18:06	17:11 (4)	20:04	20:59	32	20:20 (2)	21:48	
4	08:43	08:08	16:10 (5)	07:09	16:47 (4)	06:54	05:46		19:48 (2)	05:00	
	16:18	17:12	16:18 (5)	18:07	17:10 (4)	20:06	21:01	32	20:20 (2)	21:49	
5	08:43	08:07		07:07	16:49 (4)	06:51	05:44		19:49 (2)	04:59	
	16:19	17:14		18:09	17:06 (4)	20:07	21:03	30	20:19 (2)	21:50	
6	08:42	08:05		07:04	16:54 (4)	06:49	05:42		19:49 (2)	04:59	
	16:21	17:16		18:11	17:45 (3)	20:09	21:04	29	20:18 (2)	21:51	
7	08:42	08:03		07:02	17:42 (3)	06:47	05:40		19:51 (2)	04:58	
	16:22	17:18		18:13	17:46 (3)	20:11	21:06	27	20:18 (2)	21:52	
8	08:42	08:01		07:00	17:41 (3)	06:44	05:38		19:51 (2)	04:57	
	16:24	17:20		18:15	17:48 (3)	20:13	21:08	26	20:17 (2)	21:53	
9	08:41	07:59	16:49 (4)	06:57	17:40 (3)	06:42	05:36		19:52 (2)	04:57	
	16:25	17:22	3	16:52 (4)	18:17	20:15	21:10	23	20:15 (2)	21:54	
10	08:40	07:57	16:47 (4)	06:55	17:40 (3)	06:39	05:34		19:53 (2)	04:56	
	16:26	17:24	7	16:54 (4)	18:19	20:17	21:11	21	20:14 (2)	21:55	
11	08:40	07:55	16:46 (4)	06:52	17:39 (3)	06:37	05:33		19:55 (2)	04:56	
	16:28	17:26	10	16:56 (4)	18:21	20:19	21:13	18	20:13 (2)	21:55	
12	08:39	07:53	16:44 (4)	06:50	17:39 (3)	06:35	05:31		19:57 (2)	04:55	
	16:30	17:28	14	16:58 (4)	18:23	20:20	21:15	13	20:10 (2)	21:56	
13	08:38	07:51	16:43 (4)	06:48	17:39 (3)	06:32	05:29		20:00 (2)	04:55	
	16:31	17:30	17	17:00 (4)	18:25	20:22	21:17	7	20:07 (2)	21:57	
14	08:37	07:49	16:42 (4)	06:45	17:38 (3)	06:30	05:27			04:55	
	16:33	17:32	20	17:02 (4)	18:27	20:24	21:18			21:58	
15	08:36	07:47	16:42 (4)	06:43	17:39 (3)	06:28	05:26			04:54	
	16:34	17:34	23	17:05 (4)	18:28	20:26	21:20			21:58	
16	08:35	07:45	16:41 (4)	06:40	17:39 (3)	06:25	05:24			04:54	
	16:36	17:36	26	17:07 (4)	18:30	20:28	21:22			21:59	
17	08:34	16:00 (5)	07:43	16:41 (4)	06:38	17:41 (3)	06:23		05:22	04:54	
	16:38	16:03 (5)	17:38	17:09 (4)	18:32	17:59 (3)	20:30		21:23	21:59	
18	08:33	16:00 (5)	07:41	16:40 (4)	06:35	17:42 (3)	06:21	19:58 (2)	05:21	04:54	
	16:40	16:05 (5)	17:40	17:11 (4)	18:34	17:57 (3)	20:31	5	20:03 (2)	21:25	22:00
19	08:32	16:00 (5)	07:39	16:39 (4)	06:33	17:45 (3)	06:18	19:56 (2)	05:19	04:54	
	16:41	16:07 (5)	17:42	17:13 (4)	18:36	17:54 (3)	20:33	9	20:05 (2)	21:27	22:00
20	08:31	15:59 (5)	07:36	16:40 (4)	06:31		06:16	19:55 (2)	05:18	04:54	
	16:43	16:08 (5)	17:44	17:16 (4)	18:38		20:35	12	20:07 (2)	21:28	22:00
21	08:30	15:59 (5)	07:34	16:40 (4)	06:28		06:14	19:52 (2)	05:16	04:54	
	16:45	16:11 (5)	17:46	17:18 (4)	18:40		20:37	16	20:08 (2)	21:30	22:01
22	08:29	15:59 (5)	07:32	16:39 (4)	06:26		06:12	19:51 (2)	05:15	04:55	
	16:47	16:12 (5)	17:48	17:19 (4)	18:42		20:39	19	20:10 (2)	21:31	22:01
23	08:27	15:59 (5)	07:30	16:39 (4)	06:23		06:09	19:51 (2)	05:13	04:55	
	16:49	16:15 (5)	17:50	17:19 (4)	18:43		20:41	21	20:12 (2)	21:33	22:01
24	08:26	15:59 (5)	07:28	16:40 (4)	06:21		06:07	19:50 (2)	05:12	04:55	
	16:50	16:17 (5)	17:52	17:19 (4)	18:45		20:43	24	20:14 (2)	21:34	22:01
25	08:24	16:00 (5)	07:25	16:39 (4)	06:18		06:05	19:49 (2)	05:11	04:55	
	16:52	16:19 (5)	17:54	17:18 (4)	18:47		20:44	26	20:15 (2)	21:36	22:01
26	08:23	16:00 (5)	07:23	16:40 (4)	06:16		06:03	19:49 (2)	05:09	04:56	
	16:54	16:21 (5)	17:56	17:18 (4)	18:49		20:46	28	20:17 (2)	21:37	22:01
27	08:22	16:00 (5)	07:21	16:41 (4)	06:13		06:01	19:48 (2)	05:08	04:56	
	16:56	16:23 (5)	17:58	17:17 (4)	18:51		20:48	31	20:19 (2)	21:39	22:01
28	08:20	16:01 (5)	07:18	16:41 (4)	06:11		05:58	19:48 (2)	05:07	04:57	
	16:58	16:24 (5)	18:00	17:15 (4)	18:53		20:50	33	20:21 (2)	21:40	22:01
29	08:18	16:01 (5)		07:08			05:56	19:48 (2)	05:06	04:57	
	17:00	16:24 (5)		19:54			20:52	34	20:22 (2)	21:41	22:01
30	08:17	16:02 (5)		07:06			05:54	19:48 (2)	05:05	04:58	
	17:02	16:23 (5)		19:56			20:54	34	20:22 (2)	21:43	22:00
31	08:15	16:02 (5)		07:04					05:04		
	17:04	16:23 (5)		19:58					21:44		
Potential sun hours	250		273	367		420		494		510	
Total, worst case	234		610	329		292		324			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.67	0.67		0.65		0.65			
Total reduction	0.16		0.16	0.18		0.23		0.25			
Total, real	38		95	60		67		80			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MR - H356

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 22:00	05:39 21:25	15	20:07 (2) 20:22 (2)	06:33 20:18		07:26 19:05	18:18 (3) 18:36 (3)	07:24 16:54	16:17 (4) 16:23 (4)	08:19 16:10
2	04:59 22:00	05:40 21:23	19	20:05 (2) 20:24 (2)	06:35 20:16		07:28 19:02	18:17 (3) 18:33 (3)	07:26 16:52	16:19 (4) 16:21 (4)	08:21 16:09
3	05:00 21:59	05:42 21:21	22	20:03 (2) 20:25 (2)	06:36 20:13		07:30 19:00	18:17 (3) 18:31 (3)	07:28 16:50		08:22 16:08
4	05:01 21:59	05:44 21:19	24	20:02 (2) 20:26 (2)	06:38 20:11		07:31 18:57	18:18 (3) 18:29 (3)	07:30 16:48		08:24 16:08
5	05:02 21:58	05:45 21:17	27	20:00 (2) 20:27 (2)	06:40 20:09		07:33 18:55	18:18 (3) 18:26 (3)	07:32 16:46		08:25 16:07
6	05:03 21:58	05:47 21:15	28	20:00 (2) 20:28 (2)	06:42 20:06		07:35 18:52	18:19 (3) 18:24 (3)	07:34 16:44		08:26 16:07
7	05:04 21:57	05:49 21:13	30	19:59 (2) 20:29 (2)	06:43 20:04		07:37 18:50	18:19 (3) 18:21 (3)	07:36 16:43	15:39 (5) 15:48 (5)	08:28 16:06
8	05:05 21:56	05:51 21:12	31	19:58 (2) 20:29 (2)	06:45 20:01		07:39 18:48	17:26 (4) 17:39 (4)	07:38 16:41	15:37 (5) 15:50 (5)	08:29 16:06
9	05:06 21:55	05:52 21:10	31	19:58 (2) 20:29 (2)	06:47 19:59		07:41 18:45	17:23 (4) 17:42 (4)	07:40 16:39	15:35 (5) 15:52 (5)	08:30 16:05
10	05:07 21:55	05:54 21:07	32	19:57 (2) 20:29 (2)	06:49 19:56		07:42 18:43	17:20 (4) 17:44 (4)	07:42 16:37	15:35 (5) 15:54 (5)	08:31 16:05
11	05:08 21:54	05:56 21:05	34	19:56 (2) 20:30 (2)	06:50 19:54		07:44 18:40	17:18 (4) 17:46 (4)	07:44 16:35	15:34 (5) 15:55 (5)	08:33 16:05
12	05:09 21:53	05:57 21:03	34	19:56 (2) 20:30 (2)	06:52 19:51		07:46 18:38	17:17 (4) 17:47 (4)	07:45 16:34	15:33 (5) 15:55 (5)	08:34 16:05
13	05:10 21:52	05:59 21:01	34	19:55 (2) 20:29 (2)	06:54 19:49		07:48 18:36	17:15 (4) 17:48 (4)	07:47 16:32	15:33 (5) 15:56 (5)	08:35 16:05
14	05:12 21:51	06:01 20:59	33	19:56 (2) 20:29 (2)	06:56 19:47		07:50 18:33	17:14 (4) 17:49 (4)	07:49 16:31	15:33 (5) 15:56 (5)	08:36 16:04
15	05:13 21:50	06:03 20:57	32	19:56 (2) 20:28 (2)	06:58 19:44		07:52 18:31	17:13 (4) 17:49 (4)	07:51 16:29	15:33 (5) 15:56 (5)	08:37 16:05
16	05:14 21:49	06:04 20:55	30	19:55 (2) 20:25 (2)	06:59 19:42		07:54 18:29	17:12 (4) 17:50 (4)	07:53 16:27	15:33 (5) 15:54 (5)	08:38 16:05
17	05:16 21:47	06:06 20:53	28	19:55 (2) 20:23 (2)	07:01 19:39		07:55 18:26	17:11 (4) 17:50 (4)	07:55 16:26	15:33 (5) 15:52 (5)	08:38 16:05
18	05:17 21:46	06:08 20:51	26	19:56 (2) 20:22 (2)	07:03 19:37		07:57 18:24	17:11 (4) 17:50 (4)	07:57 16:24	15:35 (5) 15:51 (5)	08:39 16:05
19	05:18 21:45	06:10 20:48	23	19:56 (2) 20:19 (2)	07:05 19:34		07:59 18:22	17:11 (4) 17:50 (4)	07:59 16:23	15:33 (5) 15:49 (5)	08:40 16:05
20	05:20 21:44	06:12 20:46	21	19:56 (2) 20:17 (2)	07:06 19:32		08:01 18:20	17:10 (4) 17:50 (4)	08:00 16:22	15:34 (5) 15:47 (5)	08:41 16:06
21	05:21 21:42	06:13 20:44	18	19:57 (2) 20:15 (2)	07:08 19:29		08:03 18:17	17:10 (4) 17:48 (4)	08:02 16:20	15:34 (5) 15:46 (5)	08:41 16:06
22	05:23 21:41	06:15 20:42	15	19:57 (2) 20:12 (2)	07:10 19:27		08:05 18:15	17:10 (4) 17:45 (4)	08:04 16:19	15:35 (5) 15:44 (5)	08:42 16:06
23	05:24 21:39	06:17 20:39	11	19:59 (2) 20:10 (2)	07:12 19:24		08:07 18:13	17:10 (4) 17:43 (4)	08:06 16:18	15:36 (5) 15:43 (5)	08:42 16:07
24	05:26 21:38	06:19 20:37	9	20:00 (2) 20:09 (2)	07:13 19:22	6	18:30 (3) 18:36 (3)	08:09 17:41 (4)	08:08 16:17	15:37 (5) 15:42 (5)	08:43 16:08
25	05:27 21:36	06:20 20:35	5	20:01 (2) 20:06 (2)	07:15 19:19	14	18:25 (3) 18:39 (3)	07:11 17:09	16:10 (4) 16:16	15:38 (5) 15:41 (5)	08:43 16:08
26	05:29 21:35	06:22 20:32			07:17 19:17	17	18:23 (3) 18:40 (3)	07:13 17:06	16:11 (4) 16:14	15:39 (5) 15:40 (5)	08:43 16:09
27	05:30 21:33	06:24 20:30			07:19 19:14	20	18:21 (3) 18:41 (3)	07:15 17:04	16:11 (4) 16:13		08:44 16:10
28	05:32 21:32	06:26 20:28			07:21 19:12	22	18:20 (3) 18:42 (3)	07:16 17:02	16:12 (4) 16:12		08:44 16:11
29	05:34 21:30	06:27 20:25			07:22 19:09	21	18:20 (3) 18:41 (3)	07:18 17:00	16:13 (4) 16:12		08:44 16:11
30	05:35 21:28	06:29 20:23			07:24 19:07	20	18:18 (3) 18:38 (3)	07:20 16:58	16:13 (4) 16:27 (4)		08:44 16:12
31	05:37 21:26	20:10 (2) 20:20 (2)	06:31 20:21				07:22 16:56	16:15 (4) 16:25 (4)			08:44 16:13
Potential sun hours	512		460		382		328		259		233
Total, worst case	10		612		120		759		302		
Sun reduction	0.32		0.34		0.32		0.29		0.27		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.65		0.65		0.67		0.67		0.66		
Total reduction	0.21		0.22		0.22		0.20		0.18		
Total, real	2		135		26		148		53		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MS - H357

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December				
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	21:15 (4) 21:24 (4)	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10			
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	21:16 (4) 21:24 (4)	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09			
3	08:43 16:17	08:10 17:10	07:11 18:05	06:56 20:04	05:48 20:59	05:01 21:47	21:12 (4) 21:13 (4)	05:00 21:59	21:15 (4) 21:23 (4)	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08		
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:11 (4) 21:14 (4)	05:01 21:59	21:16 (4) 21:23 (4)	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08		
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	21:12 (4) 21:15 (4)	05:02 21:58	21:17 (4) 21:23 (4)	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07		
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:11 (4) 21:16 (4)	05:03 21:57	21:17 (4) 21:22 (4)	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07		
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:10 (4) 21:16 (4)	05:04 21:57	21:18 (4) 21:23 (4)	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06		
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:11 (4) 21:17 (4)	05:05 21:56	21:18 (4) 21:21 (4)	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06		
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:10 (4) 21:18 (4)	05:06 21:55	21:19 (4) 21:21 (4)	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05		
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:11 (4) 21:19 (4)	05:07 21:54	21:21 (4) 21:07	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05		
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:11 (4) 21:20 (4)	05:08 21:54	21:20 (4) 21:05	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:35	08:32 16:05		
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:10 (4) 21:20 (4)	05:09 21:53	21:09 21:03	05:57 19:51	06:52 18:46	07:45 17:38	07:45 16:34	08:34 16:05		
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:11 (4) 21:21 (4)	05:11 21:52	21:09 21:01	05:59 19:49	06:54 18:36	07:48 17:32	07:47 16:32	08:35 16:05		
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:11 (4) 21:22 (4)	05:12 21:51	06:01 19:49	05:56 20:59	06:50 19:46	07:50 18:33	07:49 16:31	08:36 16:05		
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:11 (4) 21:22 (4)	05:13 21:50	06:03 20:57	20:02 (5) 21:12 (5)	06:57 19:44	07:52 18:31	07:51 16:29	08:37 16:05		
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 19:59 (5)	04:54 21:22	21:11 (4) 21:23 (4)	05:14 21:48	06:04 20:55	20:00 (5) 20:13 (5)	06:59 19:42	07:54 18:29	07:53 16:27	08:37 16:05		
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 20:01 (5)	04:54 21:23	21:12 (4) 21:23 (4)	05:16 21:47	06:06 20:53	07:01 (5) 20:14 (5)	07:55 19:39	07:55 18:26	07:55 16:26	08:38 16:05		
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:03 (5)	04:54 21:25	21:12 (4) 21:24 (4)	05:17 21:46	06:08 20:50	07:03 (5) 20:15 (5)	07:57 19:37	07:57 18:24	07:57 16:25	08:39 16:05		
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:02 (5)	04:54 21:26	21:12 (4) 21:24 (4)	05:18 21:45	06:10 20:48	07:05 (5) 20:15 (5)	07:59 19:34	07:58 18:22	07:58 16:23	08:40 16:05		
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	06:16 19:51 (5)	04:54 21:28	21:12 (4) 21:24 (4)	05:20 21:43	06:12 20:46	07:06 (5) 20:15 (5)	08:01 19:32	08:00 18:20	08:00 16:22	08:40 16:06		
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	06:14 19:50 (5)	04:54 21:30	21:12 (4) 21:24 (4)	05:21 21:42	06:13 20:44	07:08 (5) 20:15 (5)	08:03 19:29	08:02 18:17	08:02 16:20	08:41 16:06		
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	06:12 19:50 (5)	04:55 21:31	21:13 (4) 21:25 (4)	05:23 21:41	06:15 20:41	07:10 (5) 20:12 (5)	08:05 19:27	08:04 18:15	08:04 16:19	08:42 16:06		
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	06:09 19:50 (5)	04:55 21:33	21:13 (4) 21:25 (4)	05:24 21:39	06:17 20:39	07:12 (5) 20:10 (5)	08:07 19:24	08:06 18:13	08:06 16:18	08:42 16:07		
24	08:26 16:50	07:28 17:52	06:21 18:45	06:07 20:42	06:07 19:51 (5)	04:55 21:34	21:13 (4) 21:25 (4)	05:26 21:38	06:19 20:37	07:13 (5) 20:09 (5)	08:09 19:22	08:07 18:11	08:07 16:17	08:43 16:08		
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	06:05 19:51 (5)	04:56 21:36	21:14 (4) 21:25 (4)	05:27 21:36	06:20 20:35	07:15 (5) 20:06 (5)	08:11 19:19	08:09 18:17	08:09 16:16	08:43 16:08		
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	06:03 19:52 (5)	04:56 21:37	21:13 (4) 21:25 (4)	05:29 21:35	06:22 20:32	07:17 (5) 20:04 (5)	08:13 19:17	08:11 18:15	08:11 16:15	08:43 16:09		
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	06:01 19:53 (5)	04:56 21:39	21:13 (4) 21:24 (4)	05:30 21:33	06:24 20:30	07:19 (5) 20:02 (5)	08:14 19:14	08:13 18:14	08:13 16:13	08:43 16:10		
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:58 19:55 (5)	04:57 21:40	21:14 (4) 21:25 (4)	05:32 21:31	06:26 20:28	07:21 (5) 20:28	08:15 19:22	08:14 18:17	08:14 16:12	08:44 16:11		
29	08:18 17:00	07:08 19:54	05:56 20:52	05:06 21:41	05:06 21:41	04:58 22:00	21:15 (4) 21:25 (4)	05:34 21:30	06:27 20:25	07:22 (5) 19:09	08:16 18:00	08:16 17:00	08:16 16:12	08:44 16:11		
30	08:17 17:02	07:06 19:56	05:54 20:53	05:05 21:43	05:05 21:43	04:58 22:00	21:14 (4) 21:24 (4)	05:35 21:28	06:29 20:23	07:24 (5) 19:07	08:17 16:58	08:17 17:00	08:17 16:11	08:44 16:12		
31	08:15 17:04	07:04 19:58		05:04 21:44	05:04 21:44			05:37 21:26	06:31 20:21	07:22 (5) 20:21	08:18 16:56	08:18 17:00	08:18 16:13	08:44 16:13		
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233				
Total, worst case				182		263			181							
Sun reduction				0.35		0.32		0.32	0.34							
Oper. time red.				1.00		1.00		1.00	1.00							
Wind dir. red.				0.65		0.61		0.61	0.65							
Total reduction				0.23		0.19		0.20	0.22							
Total, real				42		51		10	40							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MT - H358

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	15:36 (5)	08:14	16:12 (4)	07:16	17:28 (3)	07:01	05:52	19:33 (2)	05:03	
	16:15	1	15:37 (5)	17:06	23	16:35 (4)	18:02	20:55	33	20:06 (2)	21:45
2	08:44	15:36 (5)	08:12	16:11 (4)	07:14	17:26 (3)	06:59	05:50		19:34 (2)	05:02
	16:16	3	15:39 (5)	17:08	26	16:37 (4)	18:04	20:57	31	20:05 (2)	21:46
3	08:44	15:36 (5)	08:10	16:11 (4)	07:12	17:25 (3)	06:56	05:48		19:35 (2)	05:01
	16:17	3	15:39 (5)	17:10	28	16:39 (4)	18:06	20:59	29	20:04 (2)	21:48
4	08:43	15:36 (5)	08:08	16:10 (4)	07:09	17:25 (3)	06:54	05:46		19:36 (2)	05:00
	16:18	5	15:41 (5)	17:12	31	16:41 (4)	18:07	21:01	26	20:02 (2)	21:49
5	08:43	15:36 (5)	08:07	16:10 (4)	07:07	17:24 (3)	06:51	05:44		19:37 (2)	04:59
	16:19	6	15:42 (5)	17:14	33	16:43 (4)	18:09	21:03	24	20:01 (2)	21:50
6	08:43	15:37 (5)	08:05	16:10 (4)	07:04	17:24 (3)	06:49	05:42		19:38 (2)	04:59
	16:21	7	15:44 (5)	17:16	35	16:45 (4)	18:11	21:04	21	19:59 (2)	21:51
7	08:42	15:37 (5)	08:03	16:09 (4)	07:02	17:23 (3)	06:47	05:40		19:41 (2)	04:58
	16:22	8	15:45 (5)	17:18	38	16:47 (4)	18:13	21:06	17	19:58 (2)	21:52
8	08:42	15:36 (5)	08:01	16:09 (4)	07:00	17:24 (3)	06:44	05:38		19:43 (2)	04:57
	16:24	10	15:46 (5)	17:20	41	16:50 (4)	18:15	21:08	12	19:55 (2)	21:53
9	08:41	15:37 (5)	07:59	16:09 (4)	06:57	17:24 (3)	06:42	05:36			04:57
	16:25	12	15:49 (5)	17:22	42	16:51 (4)	18:17	21:10			21:54
10	08:40	15:37 (5)	07:57	16:09 (4)	06:55	17:25 (3)	06:39	05:34			04:56
	16:26	13	15:50 (5)	17:24	42	16:51 (4)	18:19	21:11			21:55
11	08:40	15:37 (5)	07:55	16:10 (4)	06:52	17:26 (3)	06:37	19:50 (2)	05:33		04:56
	16:28	15	15:52 (5)	17:26	42	16:52 (4)	18:21	19:51 (2)	21:13		21:55
12	08:39	15:37 (5)	07:53	16:09 (4)	06:50	17:27 (3)	06:35	19:46 (2)	05:31		04:55
	16:30	17	15:54 (5)	17:28	42	16:51 (4)	18:23	19:53 (2)	21:15		21:56
13	08:38	15:38 (5)	07:51	16:09 (4)	06:48	17:29 (3)	06:32	19:42 (2)	05:29		04:55
	16:31	17	15:55 (5)	17:30	41	16:50 (4)	18:25	19:54 (2)	21:17		21:57
14	08:37	15:38 (5)	07:49	16:10 (4)	06:45	17:33 (3)	06:30	19:40 (2)	05:27		04:55
	16:33	19	15:57 (5)	17:32	40	16:50 (4)	18:27	19:56 (2)	21:18		21:58
15	08:36	15:38 (5)	07:47	16:11 (4)	06:43		06:28	19:39 (2)	05:26		04:54
	16:34	21	15:59 (5)	17:34	39	16:50 (4)	18:28	19:58 (2)	21:20		21:58
16	08:35	15:38 (5)	07:45	16:11 (4)	06:40		06:25	19:38 (2)	05:24		04:54
	16:36	22	16:00 (5)	17:36	39	16:50 (4)	18:30	20:00 (2)	21:22		21:59
17	08:34	15:39 (5)	07:43	16:12 (4)	06:38		06:23	19:36 (2)	05:22		04:54
	16:38	24	16:03 (5)	17:38	37	16:49 (4)	18:32	20:01 (2)	21:23		21:59
18	08:33	15:39 (5)	07:41	16:12 (4)	06:35		06:21	19:35 (2)	05:21		04:54
	16:40	25	16:04 (5)	17:40	36	16:48 (4)	18:34	20:03 (2)	21:25		22:00
19	08:32	15:40 (5)	07:39	16:14 (4)	06:33		06:18	19:34 (2)	05:19		04:54
	16:41	24	16:04 (5)	17:42	33	16:47 (4)	18:36	20:05 (2)	21:27		22:00
20	08:31	15:40 (5)	07:36	16:15 (4)	06:31		06:16	19:34 (2)	05:18		04:54
	16:43	24	16:04 (5)	17:44	31	16:46 (4)	18:38	20:07 (2)	21:28		22:00
21	08:30	15:41 (5)	07:34	16:17 (4)	06:28		06:14	19:32 (2)	05:16		04:54
	16:45	23	16:04 (5)	17:46	28	16:45 (4)	18:40	20:08 (2)	21:30		22:01
22	08:29	15:41 (5)	07:32	16:18 (4)	06:26		06:12	19:32 (2)	05:15		04:55
	16:47	22	16:03 (5)	17:48	24	16:42 (4)	18:42	20:09 (2)	21:31		22:01
23	08:27	15:43 (5)	07:30	16:21 (4)	06:23		06:09	19:32 (2)	05:13		04:55
	16:49	20	16:03 (5)	17:50	19	16:40 (4)	18:43	20:09 (2)	21:33		22:01
24	08:26	15:43 (5)	07:28	16:25 (4)	06:21		06:07	19:32 (2)	05:12		04:55
	16:50	20	16:03 (5)	17:52	11	16:36 (4)	18:45	20:43	37	20:09 (2)	21:34
25	08:24	15:45 (5)	07:25		06:18		06:05	19:32 (2)	05:11		04:55
	16:52	18	16:03 (5)	17:54			06:44	20:44	37	20:09 (2)	21:36
26	08:23	15:46 (5)	07:23		06:16		06:03	19:32 (2)	05:09		04:56
	16:54	18	16:21 (4)	17:56			06:46	20:46	37	20:09 (2)	21:37
27	08:22	15:47 (5)	07:21		06:13		06:01	19:32 (2)	05:08		04:56
	16:56	20	16:23 (4)	17:58			06:48	20:48	36	20:08 (2)	21:39
28	08:20	15:51 (5)	07:18	17:29 (3)	06:11		05:58	19:32 (2)	05:07		04:57
	16:58	18	16:26 (4)	18:00	3	17:32 (3)	18:53	20:50	36	20:08 (2)	21:40
29	08:18	16:14 (4)			07:08		05:56	19:32 (2)	05:06		04:57
	17:00	14	16:28 (4)		19:54		05:52	20:52	35	20:07 (2)	21:41
30	08:17	16:13 (4)			07:06		05:54	19:33 (2)	05:05		04:58
	17:02	17	16:30 (4)		19:56		05:54	20:54	34	20:07 (2)	21:43
31	08:15	16:12 (4)			07:04					05:04	
	17:04	19	16:31 (4)		19:58					21:44	
Potential sun hours	250		273		367		420		494		510
Total, worst case	485		804		230		556		193		
Sun reduction	0.24		0.23		0.27		0.35		0.38		
Oper. time red.	1.00		1.00		1.00		1.00		1.00		
Wind dir. red.	0.66		0.66		0.68		0.65		0.65		
Total reduction	0.16		0.15		0.18		0.23		0.25		
Total, real	78		123		42		127		48		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: MT - H358

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December									
1	04:59	05:39	06:33	19:49 (2)	07:26	18:06 (3)	07:24	15:39 (4)	08:19	15:19 (5)					
	22:00	21:25	20:18	1	19:50 (2)	19:05	16	18:22 (3)	16:54	42	16:21 (4)	16:10	15	15:34 (5)	
2	04:59	05:40	06:35		07:28	18:04 (3)	07:26	15:39 (4)	08:21	15:19 (5)					
	22:00	21:23	20:16		19:02	19	18:23 (3)	16:52	42	16:21 (4)	16:09	14	15:33 (5)		
3	05:00	05:42	06:36		07:30	18:03 (3)	07:28	15:39 (4)	08:22	15:20 (5)					
	21:59	21:21	20:13		19:00	21	18:24 (3)	16:50	40	16:19 (4)	16:08	12	15:32 (5)		
4	05:01	05:44	19:56 (2)	06:38	07:31	18:02 (3)	07:30	15:39 (4)	08:24	15:21 (5)					
	21:59	21:19	7	20:03 (2)	20:11	18:57	23	18:25 (3)	16:48	38	16:17 (4)	16:08	11	15:32 (5)	
5	05:02	05:45	19:51 (2)	06:40	07:33	18:01 (3)	07:32	15:39 (4)	08:25	15:22 (5)					
	21:58	21:17	15	20:06 (2)	20:09	18:55	25	18:26 (3)	16:46	36	16:15 (4)	16:07	8	15:30 (5)	
6	05:03	05:47	19:49 (2)	06:42	07:35	18:01 (3)	07:34	15:40 (4)	08:26	15:23 (5)					
	21:58	21:15	19	20:08 (2)	20:06	18:52	23	18:24 (3)	16:44	32	16:12 (4)	16:07	7	15:30 (5)	
7	05:04	05:49	19:48 (2)	06:43	07:37	17:59 (3)	07:36	15:40 (4)	08:28	15:23 (5)					
	21:57	21:13	22	20:10 (2)	20:04	18:50	22	18:21 (3)	16:43	30	16:10 (4)	16:06	6	15:29 (5)	
8	05:05	05:51	19:46 (2)	06:45	07:39	17:59 (3)	07:38	15:41 (4)	08:29	15:24 (5)					
	21:56	21:12	25	20:11 (2)	20:01	18:48	19	18:18 (3)	16:41	27	16:08 (4)	16:06	4	15:28 (5)	
9	05:06	05:52	19:45 (2)	06:47	07:41	17:59 (3)	07:40	15:41 (4)	08:30	15:25 (5)					
	21:55	21:10	27	20:12 (2)	19:59	18:45	17	18:16 (3)	16:39	25	16:06 (4)	16:05	3	15:28 (5)	
10	05:07	05:54	19:43 (2)	06:49	07:42	17:59 (3)	07:42	15:43 (4)	08:31	15:26 (5)					
	21:55	21:07	29	20:12 (2)	19:56	18:43	15	18:14 (3)	16:37	22	16:05 (4)	16:05	2	15:28 (5)	
11	05:08	05:56	19:42 (2)	06:50	07:44	18:00 (3)	07:44	15:44 (4)	08:33	15:26 (5)					
	21:54	21:05	31	20:13 (2)	19:54	18:40	11	18:11 (3)	16:35	19	16:03 (4)	16:05	1	15:27 (5)	
12	05:09	05:57	19:42 (2)	06:52	07:46	18:00 (3)	07:45	15:45 (4)	08:34						
	21:53	21:03	32	20:14 (2)	19:51	18:38	9	18:09 (3)	16:34	16	16:01 (4)	16:05			
13	05:10	05:59	19:40 (2)	06:54	07:48	18:01 (3)	07:47	15:46 (4)	08:35						
	21:52	21:01	34	20:14 (2)	19:49	18:36	6	18:07 (3)	16:32	13	15:59 (4)	16:05			
14	05:12	06:01	19:40 (2)	06:56	07:50	18:02 (3)	07:49	15:52 (5)	08:36						
	21:51	20:59	35	20:15 (2)	19:47	18:33	2	18:04 (3)	16:31	18	15:58 (4)	16:04			
15	05:13	06:03	19:40 (2)	06:58	07:52		07:51	15:50 (5)	08:37						
	21:50	20:57	35	20:15 (2)	19:44	18:31		16:29	16:05	20	15:56 (4)	16:05			
16	05:14	06:04	19:38 (2)	06:59	07:54		07:53	15:19 (5)	08:38						
	21:49	20:55	37	20:15 (2)	19:42	18:29		16:27	16:05	18	15:54 (4)	16:05			
17	05:16	06:06	19:38 (2)	07:01	07:55		07:55	15:18 (5)	08:38						
	21:47	20:53	37	20:15 (2)	19:39	18:26		16:26	16:05	18	15:36 (5)	16:05			
18	05:17	06:08	19:38 (2)	07:03	07:57		16:54 (4)	07:57	15:17 (5)	08:39					
	21:46	20:51	38	20:16 (2)	19:37	18:24	15	17:09 (4)	16:24	20	15:37 (5)	16:05			
19	05:18	06:10	19:37 (2)	07:05	07:59	16:51 (4)	07:59	15:17 (5)	08:40						
	21:45	20:48	38	20:15 (2)	19:34	18:22	21	17:12 (4)	16:23	20	15:37 (5)	16:05			
20	05:20	06:12	19:37 (2)	07:06	08:01	16:49 (4)	08:00	15:16 (5)	08:41						
	21:44	20:46	38	20:15 (2)	19:32	18:20	25	17:14 (4)	16:22	22	15:38 (5)	16:06			
21	05:21	06:13	19:38 (2)	07:08	08:03	16:47 (4)	08:02	15:16 (5)	08:41						
	21:42	20:44	37	20:15 (2)	19:29	18:17	28	17:15 (4)	16:20	23	15:39 (5)	16:06			
22	05:23	06:15	19:37 (2)	07:10	08:05	16:45 (4)	08:04	15:16 (5)	08:42						
	21:41	20:42	35	20:12 (2)	19:27	18:15	32	17:17 (4)	16:19	24	15:40 (5)	16:06			
23	05:24	06:17	19:37 (2)	07:12	08:07	16:44 (4)	08:06	15:16 (5)	08:42						
	21:39	20:39	33	20:10 (2)	19:24	18:13	33	17:17 (4)	16:18	24	15:40 (5)	16:07			
24	05:26	06:19	19:38 (2)	07:13	08:09	16:42 (4)	08:08	15:16 (5)	08:43						
	21:38	20:37	31	20:09 (2)	19:22	18:11	36	17:18 (4)	16:17	25	15:41 (5)	16:08			
25	05:27	06:20	19:38 (2)	07:15	07:11	15:41 (4)	08:09	15:17 (5)	08:43						
	21:36	20:35	28	20:06 (2)	19:19	17:09	38	16:19 (4)	16:16	24	15:41 (5)	16:08			
26	05:29	06:22	19:39 (2)	07:17	07:13	15:41 (4)	08:11	15:17 (5)	08:43						
	21:35	20:32	25	20:04 (2)	19:17	17:06	38	16:19 (4)	16:14	23	15:40 (5)	16:09			
27	05:30	06:24	19:40 (2)	07:19	07:15	15:40 (4)	08:13	15:18 (5)	08:44						
	21:33	20:30	22	20:02 (2)	19:14	17:04	40	16:20 (4)	16:13	20	15:38 (5)	16:10			
28	05:32	06:26	19:40 (2)	07:21	07:16	15:39 (4)	08:14	15:18 (5)	08:44						
	21:32	20:28	19	19:59 (2)	19:12	17:02	41	16:20 (4)	16:12	19	15:37 (5)	16:11			
29	05:34	06:27	19:41 (2)	07:22	07:18	15:39 (4)	08:16	15:18 (5)	08:44						
	21:30	20:25	16	19:57 (2)	19:09	17:00	41	16:20 (4)	16:12	18	15:36 (5)	16:11			
30	05:35	06:29	19:43 (2)	07:24		18:09 (3)	07:20	15:38 (4)	08:18						
	21:28	20:23	12	19:55 (2)	19:07	11	18:20 (3)	16:58	42	16:20 (4)	16:11	16	15:35 (5)	16:12	
31	05:37	06:31	19:45 (2)		07:22		15:38 (4)		08:44						
	21:27	20:21	7	19:52 (2)		16:56	42	16:20 (4)		16:13					
Potential sun hours	512	460	382	328	259	233									
Total, worst case		764	12	700	734	83									
Sun reduction		0.34	0.32	0.29	0.27	0.21									
Oper. time red.		1.00	1.00	1.00	1.00	1.00									
Wind dir. red.		0.65	0.67	0.66	0.66	0.66									
Total reduction		0.22	0.22	0.19	0.17	0.14									
Total, real		169	3	136	128	11									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MU - H359

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	21:01 (5) 04:59	21:06 (5) 05:39	06:33 07:26	07:24 08:19	07:24 08:19	08:19
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	21:02 (5) 05:00	21:07 (5) 05:40	06:35 07:28	07:26 08:21	07:26 08:21	08:21
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	21:01 (5) 05:00	21:06 (5) 05:42	06:36 07:30	07:28 08:22	07:28 08:22	08:22
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	21:01 (5) 05:01	21:07 (5) 05:44	06:38 07:31	07:30 08:23	07:30 08:23	08:23
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	21:01 (5) 05:02	21:07 (5) 05:45	06:40 07:33	07:32 08:25	07:32 08:25	08:25
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	21:01 (5) 05:03	21:07 (5) 05:47	06:42 07:35	07:34 08:26	07:34 08:26	08:26
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	21:01 (5) 05:04	21:08 (5) 05:49	06:43 07:37	07:36 08:28	07:36 08:28	08:28
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	21:01 (5) 05:05	21:08 (5) 05:51	06:45 07:39	07:38 08:29	07:38 08:29	08:29
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	21:02 (5) 05:06	21:09 (5) 05:52	06:47 07:41	07:40 08:30	07:40 08:30	08:30
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	21:01 (5) 05:07	21:09 (5) 05:54	06:49 07:42	07:42 08:31	07:42 08:31	08:31
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	21:02 (5) 05:08	21:09 (5) 05:56	06:50 07:44	07:43 08:32	07:43 08:32	08:32
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	21:02 (5) 05:09	21:10 (5) 05:58	06:52 07:46	07:45 08:34	07:45 08:34	08:34
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	21:02 (5) 05:11	21:10 (5) 05:59	06:54 07:48	07:47 08:35	07:47 08:35	08:35
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	21:02 (5) 05:12	21:11 (5) 06:01	06:56 07:50	07:49 08:36	07:49 08:36	08:36
15	08:36 16:34	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	21:02 (5) 05:13	21:11 (5) 06:03	06:58 07:52	07:51 08:37	07:51 08:37	08:37
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	21:03 (5) 05:14	21:13 (5) 06:05	06:59 07:54	07:53 08:37	07:53 08:37	08:37
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	21:03 (5) 05:16	21:15 (5) 06:06	06:59 07:55	07:54 08:38	07:54 08:38	08:38
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	21:03 (5) 05:17	21:16 (5) 06:08	06:59 07:56	07:55 08:39	07:55 08:39	08:39
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	21:03 (5) 05:18	21:18 (5) 06:10	06:59 07:57	07:58 08:40	07:58 08:40	08:40
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	21:03 (5) 05:20	21:24 (5) 06:12	06:59 07:58	07:59 08:41	07:59 08:41	08:41
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	21:03 (5) 05:21	21:25 (5) 06:13	06:59 07:59	08:00 08:42	08:00 08:42	08:42
22	08:28 16:47	07:32 17:48	06:26 18:41	06:12 20:39	05:15 21:31	04:55 22:01	21:04 (5) 05:23	21:26 (5) 06:15	06:59 07:59	08:01 08:43	08:01 08:43	08:43
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	21:04 (5) 05:24	21:27 (5) 06:17	06:59 07:59	08:02 08:44	08:02 08:44	08:44
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	21:04 (5) 05:26	21:28 (5) 06:19	06:59 07:59	08:03 08:45	08:03 08:45	08:45
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	21:05 (5) 05:27	21:29 (5) 06:20	06:59 07:59	08:04 08:46	08:04 08:46	08:46
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	21:05 (5) 05:29	21:30 (5) 06:22	06:59 07:59	08:05 08:47	08:05 08:47	08:47
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:56 22:01	21:05 (5) 05:31	21:31 (5) 06:24	06:59 07:59	08:06 08:48	08:06 08:48	08:48
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	21:05 (5) 05:32	21:32 (5) 06:26	06:59 07:59	08:07 08:49	08:07 08:49	08:49
29	08:18 17:00	07:08 19:04	05:56 20:52	05:06 21:41	05:06 21:41	04:58 22:00	21:06 (5) 05:34	21:33 (5) 06:28	06:59 07:59	08:08 08:50	08:08 08:50	08:50
30	08:17 17:02	07:06 19:06	05:54 20:54	05:05 21:43	05:05 21:43	04:58 22:00	21:06 (5) 05:35	21:34 (5) 06:29	06:59 07:59	08:09 08:51	08:09 08:51	08:51
31	08:15 17:04	07:04 19:08	05:54 20:54	05:05 21:44	05:05 21:44	04:58 22:00	21:06 (5) 05:37	21:35 (5) 06:30	06:59 07:59	08:10 08:52	08:10 08:52	08:52
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case					22	538	185					
Sun reduction					0.38	0.32	0.32					
Oper. time red.					1.00	1.00	1.00					
Wind dir. red.					0.61	0.61	0.61					
Total reduction					0.23	0.20	0.20					
Total, real					5	105	37					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MV - H360

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	05:40 20:16	06:35 19:02	07:28 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:11 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:02	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:52 18:21	06:37 20:18	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:50 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:26	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:35 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:18 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:58 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
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30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MW - H361

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:44	08:26 16:07
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12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
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16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:54 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:20	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MX - H362

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00	07:28 16:50	08:22 16:09
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10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
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13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
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31	08:15 17:04		07:04 19:58	05:04	05:04		05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MY - H363

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:08
4	08:43 16:18	08:08 17:12	07:09 18:07	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
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28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:12
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: MZ - H364

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December	
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	18:24 (4) 18:36 (4)	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	04:59 22:00	05:40 21:23	06:35 20:16	07:28 19:02	18:24 (4) 18:33 (4)	07:26 16:52	08:21 16:09
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19	08:32 16:41	07:39 17:42	06:33 18:36	18:03 (4) 20:33	06:18 20:33	05:22 21:27	05:18 22:00	06:10 21:45	14 20:14 (2)	07:05 19:32		07:59 18:22	08:40 16:05
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30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23		07:24 19:07	18:24 (4) 18:38 (4)	07:20 16:58	08:17 16:11
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		07:22 16:56	08:44 16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328		259	233
Total, worst case			171		150				152	142		30	
Sun reduction			0.27		0.35				0.36	0.32		0.29	
Oper. time red.			1.00		1.00				1.00	1.00		1.00	
Wind dir. red.			0.67		0.65				0.65	0.67		0.67	
Total reduction			0.18		0.23				0.22	0.22		0.20	
Total, real			31		34			34		31		6	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: NA - H365

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	08:14	07:16	07:01	05:52	05:03	21:09 (4)	04:59	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55	21:45	21:10 (4)	22:00	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50	05:02	21:09 (4)	05:00	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57	21:46	21:12 (4)	21:59	20:16	19:02	16:52	16:09
3	08:43	08:10	07:11	06:56	05:48	05:01	21:08 (4)	05:00	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59	21:48	21:13 (4)	21:59	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46	05:00	21:08 (4)	05:01	06:38	07:31	07:30	08:23
	16:18	17:12	18:07	20:06	21:01	21:49	21:14 (4)	21:59	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44	04:59	21:08 (4)	05:02	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07	21:02	21:50	21:15 (4)	21:58	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42	04:59	21:08 (4)	05:03	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04	21:51	21:16 (4)	21:57	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40	04:58	21:07 (4)	05:04	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06	21:52	21:16 (4)	21:57	20:04	18:50	16:43	16:06
8	08:41	08:01	07:00	06:44	05:38	04:57	21:08 (4)	05:05	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08	21:53	21:17 (4)	21:56	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36	04:57	21:07 (4)	05:06	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10	21:54	21:18 (4)	21:55	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34	04:56	21:07 (4)	05:07	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11	21:54	21:19 (4)	21:54	19:56	18:43	16:37	16:05
11	08:40	07:55	06:52	06:37	05:33	04:56	21:08 (4)	05:08	06:50	07:44	07:43	08:32
	16:28	17:26	18:21	20:18	21:13	21:55	21:20 (4)	21:54	19:54	18:40	16:35	16:05
12	08:39	07:53	06:50	06:35	05:31	04:55	21:07 (4)	05:09	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15	21:56	21:20 (4)	21:53	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	19:51 (5)	05:29	21:08 (4)	05:11	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	19:54 (5)	21:17	21:21 (4)	21:52	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	19:49 (5)	05:27	21:08 (4)	05:12	06:01	06:56	07:50	08:36
	16:33	17:32	18:27	20:24	19:56 (5)	21:18	21:22 (4)	21:51	19:46	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	19:48 (5)	05:26	21:08 (4)	05:13	06:03	06:57	07:52	08:37
	16:34	17:34	18:28	20:26	19:58 (5)	21:20	21:22 (4)	21:50	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	19:46 (5)	05:24	21:08 (4)	05:14	06:04	06:59	07:54	08:37
	16:36	17:36	18:30	20:28	19:59 (5)	21:22	21:23 (4)	21:48	19:42	18:29	16:27	16:05
17	08:34	07:43	06:38	06:23	19:45 (5)	05:22	21:09 (4)	05:16	06:06	19:56 (5)	07:01	07:55
	16:38	17:38	18:32	20:30	20:01 (5)	21:23	21:23 (4)	21:47	20:53	20:05 (5)	19:39	18:26
18	08:33	07:41	06:35	06:21	19:45 (5)	05:21	21:09 (4)	05:17	06:08	19:54 (5)	07:03	07:57
	16:40	17:40	18:34	20:31	20:03 (5)	21:25	21:24 (4)	21:46	20:50	20:07 (5)	19:37	18:24
19	08:32	07:39	06:33	06:18	19:45 (5)	05:19	21:09 (4)	05:18	06:10	19:52 (5)	07:05	07:59
	16:41	17:42	18:36	20:33	20:05 (5)	21:26	21:24 (4)	21:45	20:48	20:08 (5)	19:34	18:22
20	08:31	07:36	06:31	06:16	19:45 (5)	05:18	21:09 (4)	05:20	06:12	19:51 (5)	07:06	08:01
	16:43	17:44	18:38	20:35	20:06 (5)	21:28	21:24 (4)	21:43	20:46	20:09 (5)	19:32	18:20
21	08:30	07:34	06:28	06:14	19:44 (5)	05:16	21:09 (4)	05:21	06:13	19:50 (5)	07:08	08:03
	16:45	17:46	18:40	20:37	20:04 (5)	21:30	21:24 (4)	21:42	20:44	20:09 (5)	19:29	18:17
22	08:28	07:32	06:26	06:12	19:45 (5)	05:15	21:10 (4)	05:23	06:15	19:49 (5)	07:10	08:05
	16:47	17:48	18:41	20:39	20:04 (5)	21:31	21:25 (4)	21:41	20:41	20:09 (5)	19:27	18:15
23	08:27	07:30	06:23	06:09	19:46 (5)	05:13	21:10 (4)	05:24	06:17	19:49 (5)	07:12	08:07
	16:49	17:50	18:43	20:41	20:03 (5)	21:33	21:25 (4)	21:39	20:39	20:09 (5)	19:24	18:13
24	08:26	07:28	06:21	06:07	19:47 (5)	05:12	21:10 (4)	05:26	06:19	19:49 (5)	07:13	08:09
	16:51	17:52	18:45	20:42	20:02 (5)	21:34	21:25 (4)	21:38	20:37	20:09 (5)	19:22	18:11
25	08:24	07:25	06:18	06:05	19:48 (5)	05:11	21:11 (4)	05:27	06:20	19:48 (5)	07:15	07:11
	16:52	17:54	18:47	20:44	20:00 (5)	21:36	21:25 (4)	21:36	20:35	20:06 (5)	19:19	17:09
26	08:23	07:23	06:16	06:03	19:51 (5)	05:09	21:10 (4)	05:29	06:22	19:48 (5)	07:17	07:13
	16:54	17:56	18:49	20:46	19:58 (5)	21:37	21:25 (4)	21:35	20:32	20:04 (5)	19:17	17:06
27	08:21	07:21	06:13	06:01	19:58 (5)	05:08	21:10 (4)	05:30	06:24	19:49 (5)	07:19	07:14
	16:56	17:58	18:51	20:48	21:39	22:01	21:24 (4)	21:33	20:30	20:02 (5)	19:14	17:04
28	08:20	07:18	06:11	05:58	19:57 (5)	05:07	21:11 (4)	05:32	06:26	19:49 (5)	07:21	07:16
	16:58	18:00	18:53	20:50	21:40	22:01	21:25 (4)	21:32	20:28	19:59 (5)	19:12	17:02
29	08:18		07:08	05:56	19:56 (5)	05:06	21:12 (4)	05:34	06:27	19:50 (5)	07:22	07:18
	17:00		19:54	20:52	21:41	22:00	21:25 (4)	21:30	20:25	19:57 (5)	19:09	17:00
30	08:17		07:06	05:54	19:55 (5)	05:05	21:11 (4)	05:35	06:29	19:52 (5)	07:24	07:20
	17:02		19:56	20:53	21:43	22:00	21:24 (4)	21:28	20:23	19:55 (5)	19:07	16:58
31	08:15		07:04		19:54 (5)	05:04		05:37	06:31			07:22
	17:04		19:58		21:44			21:26	20:21			16:56
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case				198		354				202		
Sun reduction				0.35		0.32				0.34		
Oper. time red.				1.00		1.00				1.00		
Wind dir. red.				0.65		0.61				0.65		
Total reduction				0.23		0.19				0.22		
Total, real				45		69				45		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: NB - H366

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:44 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:01 21:59	05:42 21:21	06:37 20:14	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:10	06:52 20:08	05:44 21:03	05:00 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:43 16:21	08:05 17:16	07:05 18:11	06:49 20:09	05:42 21:04	05:03 21:51	05:03 21:58	05:47 21:15	06:42 20:06	07:35 18:53	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:14	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:42 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:58 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:06	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:10 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:46 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:58	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:34	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:29	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:15 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:55 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:56 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:32	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:42	07:39 17:42	06:33 18:36	06:19 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:06
20	08:31 16:43	07:37 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:55 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:01	05:22 21:42	06:14 20:44	07:08 19:29	08:03 18:18	08:02 16:21	08:41 16:06
22	08:29 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:25 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:28 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:55	07:23 17:53	06:16 18:49	06:03 20:46	05:10 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:14 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:15	07:15 17:05	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:59 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:17 17:02	08:14 16:13	08:44 16:11
29	08:19 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:23 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:36 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58	05:04	05:04	05:04	05:37	06:31		07:22		08:44
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: NC - H367

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

		[January		[February		[March		[April		[May		[June		[July		[August		[September		[October		[November		[December	
1	08:44	15:21 (3)	08:14	28	15:41 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:19	15:09 (3)									
	16:15	15:37 (3)	17:06		16:09 (2)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	16:10	15:34 (2)									
2	08:44	15:22 (3)	08:12		15:41 (2)	07:14	06:59	05:50	05:02	04:59	05:40	06:35	07:28	07:26	08:21	15:08 (3)									
	16:16	15:38 (3)	17:08	27	16:08 (2)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	16:09	24	15:32 (2)								
3	08:44	15:21 (3)	08:10		15:42 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:22	15:08 (3)									
	16:17	15:39 (3)	17:10	25	16:07 (2)	18:06	20:04	20:59	21:48	21:59	21:21	20:13	19:00	16:50	5	15:28 (2)	16:08	24	15:32 (2)						
4	08:43	15:22 (3)	08:08		15:43 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:31	07:30	08:24	15:09 (3)									
	16:18	15:41 (3)	17:12	23	16:06 (2)	18:07	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	14	15:32 (2)	16:08	23	15:32 (2)						
5	08:43	15:22 (3)	08:07		15:45 (2)	07:07	06:51	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:25	15:09 (3)									
	16:19	15:42 (3)	17:14	20	16:05 (2)	18:09	20:07	21:03	21:50	21:58	21:17	20:09	18:55	16:46	18	15:34 (2)	16:07	20	15:29 (3)						
6	08:43	15:23 (3)	08:05		15:47 (2)	07:04	06:49	05:42	04:58	05:03	05:47	06:42	07:35	07:34	08:26	15:10 (3)									
	16:21	15:43 (3)	17:16	17	16:04 (2)	18:11	20:09	21:04	21:51	21:58	21:15	20:06	18:52	16:44	21	15:35 (2)	16:07	20	15:30 (3)						
7	08:42	15:24 (3)	08:03		15:49 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:28	15:09 (3)									
	16:22	15:43 (3)	17:18	12	16:01 (2)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	23	15:36 (2)	16:06	20	15:29 (3)						
8	08:42	15:24 (3)	08:01			07:00	06:44	05:38	04:57	05:05	05:50	06:45	07:39	07:38	08:29	15:09 (3)									
	16:24	15:46 (2)	17:20			18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	25	15:37 (2)	16:06	19	15:28 (3)						
9	08:41	15:25 (3)	07:59			06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:30	15:11 (3)									
	16:25	15:49 (2)	17:22			18:17	20:15	21:10	21:54	21:55	21:10	19:59	18:45	16:39	27	15:39 (2)	16:05	17	15:28 (3)						
10	08:40	15:26 (3)	07:57			06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:42	07:42	08:32	15:11 (3)									
	16:26	15:50 (2)	17:24			18:19	20:17	21:11	21:55	21:55	21:08	19:56	18:43	16:37	28	15:39 (2)	16:05	17	15:28 (3)						
11	08:40	15:26 (3)	07:55			06:53	06:37	05:32	04:56	05:08	05:56	06:50	07:44	07:44	08:33	15:11 (3)									
	16:28	15:52 (2)	17:26			18:21	20:19	21:13	21:55	21:54	21:05	19:54	18:40	16:35	29	15:40 (2)	16:05	16	15:27 (3)						
12	08:39	15:27 (3)	07:53			06:50	06:35	05:31	04:55	05:09	05:57	06:52	07:46	07:46	08:34	15:11 (3)									
	16:29	15:54 (2)	17:28			18:23	20:20	21:15	21:56	21:53	21:03	19:51	18:38	16:34	29	15:40 (2)	16:05	16	15:27 (3)						
13	08:38	15:28 (3)	07:51			06:48	06:32	05:29	04:55	05:10	05:59	06:54	07:48	07:47	08:35	15:12 (3)									
	16:31	15:55 (2)	17:30			18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	31	15:41 (2)	16:04	14	15:26 (3)						
14	08:37	15:29 (3)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:36	15:12 (3)									
	16:33	15:57 (2)	17:32			18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	31	15:41 (2)	16:04	14	15:26 (3)						
15	08:36	15:30 (3)	07:47			06:43	06:28	05:25	04:54	05:13	06:03	06:58	07:52	07:51	08:37	15:13 (3)									
	16:34	15:59 (2)	17:34			18:28	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	31	15:41 (2)	16:04	13	15:26 (3)						
16	08:35	15:31 (3)	07:45			06:40	06:25	05:24	04:54	05:14	06:04	06:59	07:54	07:53	08:38	15:13 (3)									
	16:36	16:00 (2)	17:36			18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	31	15:41 (2)	16:05	13	15:26 (3)						
17	08:34	15:33 (3)	07:43			06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:55	07:55	08:38	15:14 (3)									
	16:38	16:02 (2)	17:38			18:32	20:30	21:23	21:59	21:47	20:53	19:39	18:26	16:26	31	15:41 (2)	16:05	13	15:27 (3)						
18	08:33	15:37 (2)	07:41			06:35	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:39	15:15 (3)									
	16:40	16:04 (2)	17:40			18:34	20:31	21:25	22:00	21:46	20:51	19:37	18:24	16:24	30	15:41 (2)	16:05	12	15:27 (3)						
19	08:32	15:38 (2)	07:39			06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:40	15:15 (3)									
	16:41	16:05 (2)	17:42			18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	30	15:41 (2)	16:05	13	15:28 (3)						
20	08:31	15:37 (2)	07:36			06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:00	08:41	15:15 (3)									
	16:43	16:05 (2)	17:44			18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	29	15:41 (2)	16:06	12	15:27 (3)						
21	08:30	15:37 (2)	07:34			06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:41	15:16 (3)									
	16:45	16:06 (2)	17:46			18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	29	15:41 (2)	16:06	12	15:28 (3)						
22	08:29	15:37 (2)	07:32			06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:42	15:16 (3)									
	16:47	16:06 (2)	17:48			18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	28	15:41 (2)	16:06	12	15:28 (3)						
23	08:27	15:37 (2)	07:30			06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:42	15:17 (3)									
	16:49	16:07 (2)	17:50			18:43	20:41	21:33	22:01	21:39	20:39	19:24	18:13	16:18	27	15:41 (2)	16:07	12	15:29 (3)						
24	08:26	15:37 (2)	07:28			06:21	06:07	05:12	04:55	05:26	06:19	07:13	08:09	08:08	08:43	15:17 (3)									
	16:50	16:07 (2)	17:52			18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	27	15:41 (2)	16:08	12	15:29 (3)						
25	08:25	15:37 (2)	07:25			06:18	06:05	05:11	04:55	05:27	06:20	07:15	08:11	08:09	08:43	15:18 (3)									
	16:52	16:08 (2)	17:54			18:47	20:44	21:36	22:01	21:36	20:35	19:19	17:09	16:16	30	15:41 (2)	16:08	12	15:30 (3)						
26	08:23	15:37 (2)	07:23			06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11	08:43	15:18 (3)									
	16:54	16:08 (2)	17:56			18:49	20:46	21:37	22:01	21:35	20:32	19:17	17:06	16:14	29	15:39 (2)	16:09	12	15:30 (3)						
27	08:22	15:37 (2)	07:21			06:13	06:00	05:08	04:56	05:30	06:24	07:19	08:15	08:13	08:44	15:19 (3)									
	16:56	16:08 (2)	17:58			18:51	20:48	21:39	22:01	21:33	20:30	19:14	17:04	16:13	28	15:38 (2)	16:10	13	15:32 (3)						
28	08:20	15:38 (2)	07:18			06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:16	08:14	08:44	15:19 (3)									
	16:58	16:09 (2)	18:00			18:53	20:50	21:40	22:01	21:32	20:28	19:12	17:02	16:12	28	15:37 (2)	16:10	14	15:33 (3)						
29	08:19	15:38 (2)				07:08	05:56	05:06	04:57	05:34	06:27	07:22	08:18	08:16	08:44	15:20 (3)									
	17:00	16:09 (2)				19:55	20:52	21:41	22:01	21:30	20:25	19:09	17:00	16:11	27	15:35 (2)	16:11	14	15:34 (3)						
30	08:17	15:39 (2)				07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:18	08:16	08:44	15:20 (3)									
	17:02	16:08 (2)				19:56	20:54	21:43	22:00	21:28	20:23	19:07	16:58	16:11	27	15:35 (2)	16:12	15	15:35 (3)						
31	08:15	15:39 (2)				07:04	05:04	05:04	05:04	05:37	06:31	07:22	08:16	08:14	08:44	15:20 (3)									
	17:04	16:08 (2)				19:58	21:44	21:44	21:44	21:27	20:21	19:05	16:56	16:11	27	15:35 (2)	16:13	15	15:35 (3)						
Potential sun hours	250	273				367	420	494	510	512	460	382	328	259	233	488									
Total, worst case	806	152												743		0.21									
Sun reduction	0.24	0.23												0.27		0.21									
Oper. time red.	1.00	1.00												1.00		1.00									
Wind dir. red.	0.66	0.66												0.66		0.66									
Total reduction	0.16	0.15												0.18		0.14									
Total, real	129	23												130		66									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: ND - H368

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	05:40 20:16	06:35 19:02	07:28 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NE - H369

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44	08:14	16:09 (5)	07:16	16:49 (4)	07:01	05:52	19:50 (2)	05:03		
	16:15	17:06	22 16:31 (5)	18:02	36 17:25 (4)	20:00	20:55	32 20:22 (2)	21:45		
2	08:44	08:12	16:09 (5)	07:14	16:49 (4)	06:59	05:50	19:50 (2)	05:02		
	16:16	17:08	21 16:30 (5)	18:04	34 17:23 (4)	20:02	20:57	32 20:22 (2)	21:46		
3	08:44	08:10	16:10 (5)	07:12	16:50 (4)	06:56	05:48	19:51 (2)	05:01		
	16:17	17:10	19 16:29 (5)	18:06	33 17:23 (4)	20:04	20:59	30 20:21 (2)	21:48		
4	08:43	08:08	16:11 (5)	07:09	16:52 (4)	06:54	05:46	19:51 (2)	05:00		
	16:18	17:12	18 16:29 (5)	18:07	30 17:22 (4)	20:06	21:01	30 20:21 (2)	21:49		
5	08:43	08:07	16:13 (5)	07:07	16:52 (4)	06:51	05:44	19:51 (2)	04:59		
	16:19	17:14	14 16:27 (5)	18:09	28 17:20 (4)	20:07	21:03	29 20:20 (2)	21:50		
6	08:42	08:05	16:15 (5)	07:04	16:54 (4)	06:49	05:42	19:52 (2)	04:59		
	16:21	17:16	10 16:25 (5)	18:11	24 17:18 (4)	20:09	21:04	27 20:19 (2)	21:51		
7	08:42	08:03		07:02	16:56 (4)	06:47	05:40	19:53 (2)	04:58		
	16:22	17:18		18:13	19 17:15 (4)	20:11	21:06	26 20:19 (2)	21:52		
8	08:42	08:01		07:00	17:00 (4)	06:44	05:38	19:54 (2)	04:57		
	16:24	17:20		18:15	13 17:48 (3)	20:13	21:08	23 20:17 (2)	21:53		
9	08:41	07:59		06:57	17:45 (3)	06:42	05:36	19:55 (2)	04:57		
	16:25	17:22		18:17	5 17:50 (3)	20:15	21:10	21 20:16 (2)	21:54		
10	08:40	07:57		06:55	17:45 (3)	06:39	05:34	19:56 (2)	04:56		
	16:26	17:24		18:19	7 17:52 (3)	20:17	21:11	18 20:14 (2)	21:55		
11	08:40	07:55		06:52	17:44 (3)	06:37	05:33	19:59 (2)	04:56		
	16:28	17:26		18:21	11 17:55 (3)	20:19	21:13	14 20:13 (2)	21:55		
12	08:39	07:53		06:50	17:43 (3)	06:35	05:31	20:01 (2)	04:55		
	16:30	17:28		18:23	13 17:56 (3)	20:20	21:15	9 20:10 (2)	21:56		
13	08:38	07:51	16:57 (4)	06:48	17:43 (3)	06:32	05:29		04:55		
	16:31	17:30	3 17:00 (4)	18:25	15 17:58 (3)	20:22	21:17		21:57		
14	08:37	07:49	16:55 (4)	06:45	17:42 (3)	06:30	05:27		04:55		
	16:33	17:32	7 17:02 (4)	18:27	18 18:00 (3)	20:24	21:18		21:58		
15	08:36	07:47	16:54 (4)	06:43	17:43 (3)	06:28	05:26		04:54		
	16:34	17:34	11 17:05 (4)	18:28	19 18:02 (3)	20:26	21:20		21:58		
16	08:35	07:45	16:53 (4)	06:40	17:42 (3)	06:25	05:24		04:54		
	16:36	17:36	14 17:07 (4)	18:30	22 18:04 (3)	20:28	21:22		21:59		
17	08:34	07:43	16:52 (4)	06:38	17:43 (3)	06:23	05:22		04:54		
	16:38	17:38	17 17:09 (4)	18:32	21 18:04 (3)	20:30	21:23		21:59		
18	08:33	07:41	16:51 (4)	06:35	17:44 (3)	06:21	05:21		04:54		
	16:40	17:40	20 17:11 (4)	18:34	18 18:02 (3)	20:31	2 20:03 (2)	21:25	22:00		
19	08:32	07:39	16:50 (4)	06:33	17:45 (3)	06:18	19:59 (2)	05:19	04:54		
	16:41	17:42	23 17:13 (4)	18:36	16 18:01 (3)	20:33	6 20:05 (2)	21:27	22:00		
20	08:31	16:07 (5)	07:36	16:50 (4)	06:31	17:47 (3)	06:16	19:57 (2)	05:18	04:54	
	16:43	16:08 (5)	17:44	26 17:16 (4)	18:38	11 17:58 (3)	20:35	10 20:07 (2)	21:28	22:00	
21	08:30	16:07 (5)	07:34	16:49 (4)	06:28		06:14	19:55 (2)	05:16	04:54	
	16:45	16:11 (5)	17:46	29 17:18 (4)	18:40		20:37	13 20:08 (2)	21:30	22:01	
22	08:29	16:07 (5)	07:32	16:48 (4)	06:26		06:12	19:54 (2)	05:15	04:55	
	16:47	5 16:12 (5)	17:48	31 17:19 (4)	18:42		20:39	16 20:10 (2)	21:31	22:01	
23	08:27	16:07 (5)	07:30	16:48 (4)	06:23		06:09	19:53 (2)	05:13	04:55	
	16:49	8 16:15 (5)	17:50	34 17:22 (4)	18:43		20:41	19 20:12 (2)	21:33	22:01	
24	08:26	16:06 (5)	07:28	16:49 (4)	06:21		06:07	19:52 (2)	05:12	04:55	
	16:50	11 16:17 (5)	17:52	35 17:24 (4)	18:45		20:42	22 20:14 (2)	21:34	22:01	
25	08:24	16:07 (5)	07:25	16:48 (4)	06:18		06:05	19:52 (2)	05:11	04:55	
	16:52	12 16:19 (5)	17:54	38 17:26 (4)	18:47		20:44	23 20:15 (2)	21:36	22:01	
26	08:23	16:06 (5)	07:23	16:48 (4)	06:16		06:03	19:51 (2)	05:09	04:56	
	16:54	15 16:21 (5)	17:56	38 17:26 (4)	18:49		20:46	26 20:17 (2)	21:37	22:01	
27	08:22	16:06 (5)	07:21	16:49 (4)	06:13		06:01	19:51 (2)	05:08	04:56	
	16:56	17 16:23 (5)	17:58	37 17:26 (4)	18:51		20:48	28 20:19 (2)	21:39	22:01	
28	08:20	16:07 (5)	07:18	16:48 (4)	06:11		05:58	19:50 (2)	05:07	04:57	
	16:58	19 16:26 (5)	18:00	37 17:25 (4)	18:53		20:50	31 20:21 (2)	21:40	22:01	
29	08:18	16:07 (5)		07:08			05:56	19:50 (2)	05:06	04:57	
	17:00	21 16:28 (5)		19:54			20:52	32 20:22 (2)	21:41	22:01	
30	08:17	16:07 (5)		07:06			05:54	19:50 (2)	05:05	04:58	
	17:02	23 16:30 (5)		19:56			20:53	33 20:23 (2)	21:43	22:00	
31	08:15	16:07 (5)		07:04					05:04		
	17:04	23 16:30 (5)		19:58					21:44		
Potential sun hours	250		273	367		420		494		510	
Total, worst case		159	504	393		261		291			
Sun reduction	0.24		0.23	0.27		0.35		0.38			
Oper. time red.	1.00		1.00	1.00		1.00		1.00			
Wind dir. red.	0.66		0.67	0.67		0.65		0.65			
Total reduction	0.16		0.16	0.18		0.23		0.25			
Total, real	26		78	72		60		72			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NE - H369

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August		September		October		November		December			
1	04:59	05:39		20:10 (2)	06:33		07:26		18:22 (3)	07:24		08:19	
	22:00	21:25	11	20:21 (2)	20:18		19:05	14	18:36 (3)	16:54		16:10	
2	04:59	05:40		20:08 (2)	06:35		07:28		18:22 (3)	07:26		08:21	
	22:00	21:23	16	20:24 (2)	20:16		19:02	11	18:33 (3)	16:52		16:09	
3	05:00	05:42		20:06 (2)	06:36		07:30		18:22 (3)	07:28		08:22	
	21:59	21:21	19	20:25 (2)	20:13		19:00	9	18:31 (3)	16:50		16:08	
4	05:01	05:44		20:05 (2)	06:38		07:31		18:23 (3)	07:30		08:24	
	21:59	21:19	22	20:27 (2)	20:11		18:57	6	18:29 (3)	16:48	2	15:51 (5)	16:08
5	05:02	05:45		20:03 (2)	06:40		07:33		17:40 (4)	07:32		15:44 (5)	08:25
	21:58	21:17	24	20:27 (2)	20:09		18:55	8	18:26 (3)	16:46	11	15:55 (5)	16:07
6	05:03	05:47		20:02 (2)	06:42		07:35		17:35 (4)	07:34		15:42 (5)	08:26
	21:58	21:15	26	20:28 (2)	20:06		18:52	16	17:51 (4)	16:44	15	15:57 (5)	16:07
7	05:04	05:49		20:02 (2)	06:43		07:37		17:31 (4)	07:36		15:41 (5)	08:28
	21:57	21:13	27	20:29 (2)	20:04		18:50	21	17:52 (4)	16:43	17	15:58 (5)	16:06
8	05:05	05:50		20:00 (2)	06:45		07:39		17:28 (4)	07:38		15:40 (5)	08:29
	21:56	21:12	29	20:29 (2)	20:01		18:48	26	17:54 (4)	16:41	19	15:59 (5)	16:06
9	05:06	05:52		20:00 (2)	06:47		07:41		17:27 (4)	07:40		15:39 (5)	08:30
	21:55	21:10	30	20:30 (2)	19:59		18:45	28	17:55 (4)	16:39	21	16:00 (5)	16:05
10	05:07	05:54		19:59 (2)	06:49		07:42		17:25 (4)	07:42		15:39 (5)	08:31
	21:55	21:07	31	20:30 (2)	19:56		18:43	31	17:56 (4)	16:37	23	16:02 (5)	16:05
11	05:08	05:56		19:59 (2)	06:50		07:44		17:24 (4)	07:44		15:39 (5)	08:33
	21:54	21:05	31	20:30 (2)	19:54		18:40	33	17:57 (4)	16:35	23	16:02 (5)	16:05
12	05:09	05:57		19:59 (2)	06:52		07:46		17:23 (4)	07:45		15:39 (5)	08:34
	21:53	21:03	32	20:31 (2)	19:51		18:38	35	17:58 (4)	16:34	22	16:01 (5)	16:05
13	05:10	05:59		19:58 (2)	06:54		07:48		17:22 (4)	07:47		15:39 (5)	08:35
	21:52	21:01	32	20:30 (2)	19:49		18:36	36	17:58 (4)	16:32	20	15:59 (5)	16:05
14	05:12	06:01		19:58 (2)	06:56		07:50		17:21 (4)	07:49		15:39 (5)	08:36
	21:51	20:59	31	20:29 (2)	19:47		18:33	37	17:58 (4)	16:31	19	15:58 (5)	16:04
15	05:13	06:03		19:58 (2)	06:58		07:52		17:21 (4)	07:51		15:39 (5)	08:37
	21:50	20:57	30	20:28 (2)	19:44		18:31	38	17:59 (4)	16:29	17	15:56 (5)	16:05
16	05:14	06:04		19:57 (2)	06:59		07:54		17:20 (4)	07:53		15:39 (5)	08:38
	21:49	20:55	28	20:25 (2)	19:42		18:29	39	17:59 (4)	16:27	15	15:54 (5)	16:05
17	05:16	06:06		19:58 (2)	07:01		07:55		17:20 (4)	07:55		15:40 (5)	08:38
	21:47	20:53	25	20:23 (2)	19:39		18:26	37	17:57 (4)	16:26	12	15:52 (5)	16:05
18	05:17	06:08		19:58 (2)	07:03		07:57		17:20 (4)	07:57		15:40 (5)	08:39
	21:46	20:51	24	20:22 (2)	19:37		18:24	35	17:55 (4)	16:24	11	15:51 (5)	16:05
19	05:18	06:10		19:58 (2)	07:05		07:59		17:20 (4)	07:59		15:41 (5)	08:40
	21:45	20:48	21	20:19 (2)	19:34		18:22	32	17:52 (4)	16:23	8	15:49 (5)	16:05
20	05:20	06:12		19:59 (2)	07:06		08:01		17:20 (4)	08:00		15:42 (5)	08:41
	21:44	20:46	18	20:17 (2)	19:32		18:20	30	17:50 (4)	16:22	5	15:47 (5)	16:06
21	05:21	06:13		20:00 (2)	07:08		08:03		17:20 (4)	08:02		15:42 (5)	08:41
	21:42	20:44	15	20:15 (2)	19:29		18:17	28	17:48 (4)	16:20	4	15:46 (5)	16:06
22	05:23	06:15		20:00 (2)	07:10		08:05		17:20 (4)	08:04			08:42
	21:41	20:42	12	20:12 (2)	19:27		18:15	25	17:45 (4)	16:19			16:06
23	05:24	06:17		20:01 (2)	07:12		08:07		17:21 (4)	08:06			08:42
	21:39	20:39	9	20:10 (2)	19:24	8	18:41 (3)	18:13	17:43 (4)	16:18			16:07
24	05:26	06:19		20:03 (2)	07:13		18:30 (3)	08:09	17:21 (4)	08:08			08:43
	21:38	20:37	6	20:09 (2)	19:22	14	18:44 (3)	18:11	17:41 (4)	16:17			16:08
25	05:27	06:20		20:04 (2)	07:15		18:27 (3)	07:11	16:22 (4)	08:09			08:43
	21:36	20:35	2	20:06 (2)	19:19	17	18:44 (3)	17:09	16:38 (4)	16:16			16:08
26	05:29	06:22			07:17		18:25 (3)	07:13	16:23 (4)	08:11			08:43
	21:35	20:32			19:17	20	18:45 (3)	17:06	16:36 (4)	16:14			16:09
27	05:30	06:24			07:19		18:24 (3)	07:15	16:24 (4)	08:13			08:44
	21:33	20:30			19:14	22	18:46 (3)	17:04	16:34 (4)	16:13			16:10
28	05:32	06:26			07:21		18:24 (3)	07:16	16:25 (4)	08:14			08:44
	21:32	20:28			19:12	20	18:44 (3)	17:02	16:31 (4)	16:12			16:11
29	05:34	06:27			07:22		18:23 (3)	07:18	16:27 (4)	08:16			08:44
	21:30	20:25			19:09	18	18:41 (3)	17:00	16:29 (4)	16:12			16:11
30	05:35	06:29			07:24		18:22 (3)	07:20		08:18			08:44
	21:28	20:23			19:07	16	18:38 (3)	16:58		16:11			16:12
31	05:37	06:31					07:22						08:44
	21:26	20:21					16:56						16:13
Potential sun hours	512	460		382			328		259			233	
Total, worst case			551		135		664		264				
Sun reduction			0.34		0.32		0.29		0.27				
Oper. time red.			1.00		1.00		1.00		1.00				
Wind dir. red.			0.65		0.67		0.67		0.66				
Total reduction			0.22		0.22		0.20		0.18				
Total, real			122		29		130		46				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: NF - H370

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:46 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:44 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:40 20:17	05:35 21:11	04:56 21:55	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
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17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
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29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: NG - H371

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:47	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
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21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: NH - H372

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
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4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
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23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
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31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
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Sun reduction												
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Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: NI - H373

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 21:59	05:00 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:23 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:51 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:11	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:09	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:06
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:54	05:07 21:54	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:40	07:43 16:36	08:32 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:56 21:56	05:09 21:53	05:58 21:03	06:52 19:51	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:48	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:37 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 21:59	05:17 21:46	06:08 20:50	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:26	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:43	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:40 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:42	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:13 19:22	08:09 18:11	08:07 16:17	08:43 16:08
25	08:24 16:53	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:20 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:21 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:14 17:04	08:13 16:14	08:43 16:10
28	08:20 16:58	07:18 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:54	05:56 20:52	05:06 21:41	04:58 22:00	05:34 21:30	06:28 20:25	07:22 19:09	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:53	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:17 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	459	382	328	259	234
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: NJ - SAINT PATRICK'S NATIONAL SCHOOL

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum
160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44 16:15	08:14 17:06	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05	07:24 16:54	08:19 16:10
2	08:44 16:16	08:12 17:08	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:46	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02	07:26 16:52	08:21 16:09
3	08:43 16:17	08:10 17:10	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:13	07:30 19:00	07:28 16:50	08:22 16:09
4	08:43 16:18	08:08 17:12	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:31 18:57	07:30 16:48	08:24 16:08
5	08:43 16:20	08:07 17:14	07:07 18:09	06:52 20:07	05:44 21:03	04:59 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55	07:32 16:46	08:25 16:07
6	08:42 16:21	08:05 17:16	07:04 18:11	06:49 20:09	05:42 21:04	04:59 21:51	05:03 21:57	05:47 21:15	06:42 20:06	07:35 18:52	07:34 16:45	08:26 16:07
7	08:42 16:22	08:03 17:18	07:02 18:13	06:47 20:11	05:40 21:06	04:58 21:52	05:04 21:57	05:49 21:13	06:43 20:04	07:37 18:50	07:36 16:43	08:28 16:06
8	08:41 16:24	08:01 17:20	07:00 18:15	06:44 20:13	05:38 21:08	04:57 21:53	05:05 21:56	05:51 21:12	06:45 20:01	07:39 18:48	07:38 16:41	08:29 16:06
9	08:41 16:25	07:59 17:22	06:57 18:17	06:42 20:15	05:36 21:10	04:57 21:54	05:06 21:55	05:52 21:10	06:47 19:59	07:41 18:45	07:40 16:39	08:30 16:05
10	08:40 16:27	07:57 17:24	06:55 18:19	06:39 20:17	05:34 21:11	04:56 21:55	05:07 21:55	05:54 21:07	06:49 19:56	07:42 18:43	07:42 16:37	08:31 16:05
11	08:40 16:28	07:55 17:26	06:53 18:21	06:37 20:19	05:33 21:13	04:56 21:55	05:08 21:54	05:56 21:05	06:51 19:54	07:44 18:41	07:44 16:36	08:33 16:05
12	08:39 16:30	07:53 17:28	06:50 18:23	06:35 20:20	05:31 21:15	04:55 21:56	05:09 21:53	05:58 21:03	06:52 19:52	07:46 18:38	07:45 16:34	08:34 16:05
13	08:38 16:31	07:51 17:30	06:48 18:25	06:32 20:22	05:29 21:17	04:55 21:57	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:47 16:32	08:35 16:05
14	08:37 16:33	07:49 17:32	06:45 18:27	06:30 20:24	05:27 21:18	04:55 21:57	05:12 21:51	06:01 20:59	06:56 19:47	07:50 18:33	07:49 16:31	08:36 16:05
15	08:36 16:35	07:47 17:34	06:43 18:28	06:28 20:26	05:26 21:20	04:55 21:58	05:13 21:50	06:03 20:57	06:58 19:44	07:52 18:31	07:51 16:29	08:37 16:05
16	08:35 16:36	07:45 17:36	06:40 18:30	06:25 20:28	05:24 21:22	04:55 21:59	05:14 21:49	06:05 20:55	06:59 19:42	07:54 18:29	07:53 16:28	08:38 16:05
17	08:34 16:38	07:43 17:38	06:38 18:32	06:23 20:30	05:22 21:23	04:54 21:59	05:16 21:47	06:06 20:53	07:01 19:39	07:55 18:27	07:55 16:26	08:38 16:05
18	08:33 16:40	07:41 17:40	06:36 18:34	06:21 20:31	05:21 21:25	04:54 22:00	05:17 21:46	06:08 20:51	07:03 19:37	07:57 18:24	07:57 16:25	08:39 16:05
19	08:32 16:41	07:39 17:42	06:33 18:36	06:18 20:33	05:19 21:27	04:54 22:00	05:19 21:45	06:10 20:48	07:05 19:34	07:59 18:22	07:59 16:23	08:40 16:05
20	08:31 16:43	07:36 17:44	06:31 18:38	06:16 20:35	05:18 21:28	04:54 22:00	05:20 21:44	06:12 20:46	07:06 19:32	08:01 18:20	08:00 16:22	08:41 16:06
21	08:30 16:45	07:34 17:46	06:28 18:40	06:14 20:37	05:16 21:30	04:55 22:00	05:21 21:42	06:13 20:44	07:08 19:29	08:03 18:17	08:02 16:21	08:41 16:06
22	08:28 16:47	07:32 17:48	06:26 18:42	06:12 20:39	05:15 21:31	04:55 22:01	05:23 21:41	06:15 20:42	07:10 19:27	08:05 18:15	08:04 16:19	08:42 16:07
23	08:27 16:49	07:30 17:50	06:23 18:43	06:09 20:41	05:13 21:33	04:55 22:01	05:24 21:39	06:17 20:39	07:12 19:24	08:07 18:13	08:06 16:18	08:42 16:07
24	08:26 16:51	07:28 17:52	06:21 18:45	06:07 20:43	05:12 21:34	04:55 22:01	05:26 21:38	06:19 20:37	07:14 19:22	08:09 18:11	08:08 16:17	08:43 16:08
25	08:24 16:52	07:25 17:54	06:18 18:47	06:05 20:44	05:11 21:36	04:56 22:01	05:27 21:36	06:21 20:35	07:15 19:19	07:11 17:09	08:09 16:16	08:43 16:08
26	08:23 16:54	07:23 17:56	06:16 18:49	06:03 20:46	05:09 21:37	04:56 22:01	05:29 21:35	06:22 20:32	07:17 19:17	07:13 17:07	08:11 16:15	08:43 16:09
27	08:22 16:56	07:21 17:58	06:13 18:51	06:01 20:48	05:08 21:39	04:57 22:01	05:31 21:33	06:24 20:30	07:19 19:14	07:15 17:04	08:13 16:14	08:44 16:10
28	08:20 16:58	07:19 18:00	06:11 18:53	05:58 20:50	05:07 21:40	04:57 22:01	05:32 21:32	06:26 20:28	07:21 19:12	07:16 17:02	08:14 16:13	08:44 16:11
29	08:18 17:00		07:09 19:55	05:56 20:52	05:06 21:41	04:58 22:01	05:34 21:30	06:28 20:25	07:22 19:10	07:18 17:00	08:16 16:12	08:44 16:12
30	08:17 17:02		07:06 19:56	05:54 20:54	05:05 21:43	04:58 22:00	05:35 21:28	06:29 20:23	07:24 19:07	07:20 16:58	08:18 16:11	08:44 16:13
31	08:15 17:04		07:04 19:58		05:04 21:44		05:37 21:26	06:31 20:21		07:22 16:56		08:44 16:14
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case
Assumptions for shadow calculations

Shadow receptor: NK - H374

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	[January	[February	[March	[April	[May		[June		[July		[August	[September	[October	[November	[December	
1	08:44	08:14	07:16	07:01	05:52		05:03		20:28 (5)	04:59	20:30 (5)	05:39	06:33	07:26	07:24	08:19
	16:15	17:06	18:02	20:00	20:55		21:45	42	21:10 (5)	22:00	21:24 (5)	21:25	20:18	19:05	16:54	16:10
2	08:44	08:12	07:14	06:59	05:50		05:02		20:28 (5)	05:00	20:31 (5)	05:40	06:35	07:28	07:26	08:21
	16:16	17:08	18:04	20:02	20:57		21:46	44	21:12 (5)	22:00	21:24 (5)	21:23	20:16	19:02	16:52	16:09
3	08:43	08:10	07:12	06:56	05:48		05:01		20:28 (5)	05:00	20:31 (5)	05:42	06:36	07:30	07:28	08:22
	16:17	17:10	18:06	20:04	20:59		21:48	45	21:13 (5)	21:59	21:23 (5)	21:21	20:13	19:00	16:50	16:08
4	08:43	08:08	07:09	06:54	05:46		05:00		20:27 (5)	05:01	20:32 (5)	05:44	06:38	07:31	07:30	08:24
	16:18	17:12	18:08	20:06	21:01		21:49	47	21:14 (5)	21:59	21:23 (5)	21:19	20:11	18:57	16:48	16:08
5	08:43	08:07	07:07	06:51	05:44		04:59		20:27 (5)	05:02	20:32 (5)	05:45	06:40	07:33	07:32	08:25
	16:20	17:14	18:09	20:07	21:03		21:50	48	21:15 (5)	21:58	21:23 (5)	21:17	20:09	18:55	16:46	16:07
6	08:42	08:05	07:04	06:49	05:42		04:59		20:27 (5)	05:03	20:33 (5)	05:47	06:42	07:35	07:34	08:26
	16:21	17:16	18:11	20:09	21:04		21:51	49	21:16 (5)	21:58	21:22 (5)	21:15	20:06	18:52	16:44	16:07
7	08:42	08:03	07:02	06:47	05:40		04:58		20:26 (5)	05:04	20:34 (5)	05:49	06:43	07:37	07:36	08:28
	16:22	17:18	18:13	20:11	21:06		21:52	50	21:16 (5)	21:57	21:22 (5)	21:13	20:04	18:50	16:43	16:06
8	08:42	08:01	07:00	06:44	05:38		04:57		20:26 (5)	05:05	20:34 (5)	05:51	06:45	07:39	07:38	08:29
	16:24	17:20	18:15	20:13	21:08		21:53	51	21:17 (5)	21:56	21:21 (5)	21:12	20:01	18:48	16:41	16:06
9	08:41	07:59	06:57	06:42	05:36		04:57		20:27 (5)	05:06	20:35 (5)	05:52	06:47	07:41	07:40	08:30
	16:25	17:22	18:17	20:15	21:10		21:54	52	21:19 (5)	21:55	21:21 (5)	21:10	19:59	18:45	16:39	16:05
10	08:40	07:57	06:55	06:39	05:34		04:56		20:26 (5)	05:07	20:36 (5)	05:54	06:49	07:42	07:42	08:31
	16:27	17:24	18:19	20:17	21:11		21:55	53	21:19 (5)	21:55	21:20 (5)	21:07	19:56	18:43	16:37	16:05
11	08:40	07:55	06:53	06:37	05:33		04:56		20:26 (5)	05:08	20:36 (5)	05:56	06:51	07:44	07:44	08:33
	16:28	17:26	18:21	20:19	21:13		21:55	54	21:20 (5)	21:54	21:19 (5)	21:05	19:54	18:40	16:36	16:05
12	08:39	07:53	06:50	06:35	05:31		04:55		20:27 (5)	05:09	20:37 (5)	05:58	06:52	07:46	07:45	08:34
	16:30	17:28	18:23	20:20	21:15		21:56	54	21:21 (5)	21:53	21:18 (5)	21:03	19:51	18:38	16:34	16:05
13	08:38	07:51	06:48	06:32	05:29		04:55		20:26 (5)	05:11	20:38 (5)	05:59	06:54	07:48	07:47	08:35
	16:31	17:30	18:25	20:22	21:17		21:57	55	21:21 (5)	21:52	21:17 (5)	21:01	19:49	18:36	16:32	16:05
14	08:37	07:49	06:45	06:30	05:27		04:55		20:26 (5)	05:12	20:38 (5)	06:01	06:56	07:50	07:49	08:36
	16:33	17:32	18:27	20:24	21:18		21:57	56	21:22 (5)	21:51	21:16 (5)	21:05	19:47	18:33	16:31	16:05
15	08:36	07:47	06:43	06:28	05:26		04:55		20:26 (5)	05:13	20:39 (5)	06:03	06:58	07:52	07:51	08:37
	16:35	17:34	18:28	20:26	21:20		21:58	56	21:22 (5)	21:50	21:15 (5)	21:07	19:44	18:31	16:29	16:05
16	08:35	07:45	06:40	06:25	05:24		04:54		20:26 (5)	05:14	20:41 (5)	06:05	06:59	07:54	07:53	08:38
	16:36	17:36	18:30	20:28	21:22		21:59	57	21:23 (5)	21:49	21:15 (5)	21:05	19:42	18:29	16:28	16:05
17	08:34	07:43	06:38	06:23	05:22		04:54		20:26 (5)	05:16	20:42 (5)	06:06	07:01	07:55	07:55	08:38
	16:38	17:38	18:32	20:30	21:23		21:59	57	21:23 (5)	21:47	21:14 (5)	21:03	19:39	18:27	16:26	16:05
18	08:33	07:41	06:36	06:21	05:21		04:54		20:27 (5)	05:17	20:43 (5)	06:08	07:03	07:57	07:57	08:39
	16:40	17:40	18:34	20:31	21:25		22:00	57	21:24 (5)	21:46	21:12 (5)	21:01	19:37	18:24	16:25	16:05
19	08:32	07:39	06:33	06:18	05:19		04:54		20:27 (5)	05:19	20:44 (5)	06:10	07:05	07:59	07:59	08:40
	16:41	17:42	18:36	20:33	21:27		22:00	57	21:24 (5)	21:45	21:11 (5)	21:00	19:34	18:22	16:23	16:05
20	08:31	07:36	06:31	06:16	05:18		04:54		20:27 (5)	05:20	20:47 (5)	06:12	07:06	08:01	08:00	08:41
	16:43	17:44	18:38	20:35	21:28	9	20:55 (5)	22:00	21:24 (5)	21:44	21:10 (5)	21:06	19:32	18:20	16:22	16:06
21	08:30	07:34	06:28	06:14	05:16		04:55		20:27 (5)	05:21	20:48 (5)	06:13	07:08	08:03	08:02	08:41
	16:45	17:46	18:40	20:37	21:30	15	20:57 (5)	22:01	21:24 (5)	21:42	21:09 (5)	21:04	19:29	18:17	16:20	16:06
22	08:28	07:32	06:26	06:12	05:15		04:55		20:28 (5)	05:23	20:50 (5)	06:15	07:10	08:05	08:04	08:42
	16:47	17:48	18:42	20:39	21:31	19	20:59 (5)	22:01	21:25 (5)	21:41	21:07 (5)	21:02	19:27	18:15	16:19	16:07
23	08:27	07:30	06:23	06:09	05:13		04:55		20:28 (5)	05:24	20:54 (5)	06:17	07:12	08:07	08:06	08:42
	16:49	17:50	18:43	20:41	21:33	22	20:59 (5)	22:01	21:25 (5)	21:39	21:07 (5)	21:03	19:24	18:13	16:18	16:07
24	08:26	07:28	06:21	06:07	05:12		04:55		20:28 (5)	05:26		06:19	07:14	08:09	08:08	08:43
	16:51	17:52	18:45	20:43	21:34	25	21:01 (5)	22:01	21:25 (5)	21:38		20:37	19:22	18:11	16:17	16:08
25	08:24	07:25	06:18	06:05	05:11		04:56		20:29 (5)	05:27		06:20	07:15	07:11	08:09	08:43
	16:52	17:54	18:47	20:44	21:36	28	21:02 (5)	22:01	21:25 (5)	21:36		20:35	19:19	17:09	16:16	16:08
26	08:23	07:23	06:16	06:03	05:09		04:56		20:28 (5)	05:29		06:22	07:17	07:13	08:11	08:43
	16:54	17:56	18:49	20:46	21:37	30	21:03 (5)	22:01	21:25 (5)	21:35		20:32	19:17	17:07	16:15	16:09
27	08:22	07:21	06:13	06:01	05:08		04:56		20:29 (5)	05:31		06:24	07:19	07:15	08:13	08:44
	16:56	17:58	18:51	20:48	21:39	33	21:05 (5)	22:01	21:25 (5)	21:33		20:30	19:14	17:04	16:14	16:10
28	08:20	07:18	06:11	05:58	05:07		04:57		20:29 (5)	05:32		06:26	07:21	07:16	08:14	08:44
	16:58	18:00	18:53	20:50	21:40	35	21:06 (5)	22:01	21:25 (5)	21:32		20:28	19:12	17:02	16:13	16:11
29	08:18		07:09	05:56	05:06		04:58		20:30 (5)	05:34		06:28	07:22	07:18	08:16	08:44
	17:00		19:55	20:52	21:41	37	21:07 (5)	22:01	21:25 (5)	21:30		20:25	19:09	17:00	16:12	16:12
30	08:17		07:06	05:54	05:05		04:58		20:30 (5)	05:35		06:29	07:24	07:20	08:18	08:44
	17:02		19:56	20:54	21:43	38	21:08 (5)	22:00	21:24 (5)	21:28		20:23	19:07	16:58	16:11	16:12
31	08:15		07:04		05:04		20:29 (5)			05:37		06:31		07:22		08:44
	17:04		19:58		21:44	40	21:09 (5)			21:26		20:21		16:56		16:13
Potential sun hours	250	273	367	420	494		510		512		460	382	328	259		233
Total, worst case					331		1603			888						
Sun reduction					0.38		0.32			0.32						
Oper. time red.					1.00		1.00			1.00						
Wind dir. red.					0.61		0.61			0.61						
Total reduction					0.23		0.20			0.20						
Total, real					77		314			176						

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NL - Main Office
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	14:54 (1) 08:14	09:03 (2) 07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26	07:24	08:37 (2) 08:19
	16:15	15:32 (1) 17:06	15:42 (1) 18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05	16:54	09:16 (2) 16:10
2	08:44	09:18 (2) 08:12	09:03 (2) 07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28	07:26	08:36 (2) 08:21
	16:16	15:33 (1) 17:08	15:41 (1) 18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02	16:52	09:17 (2) 16:09
3	08:44	09:17 (2) 08:10	09:03 (2) 07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30	07:28	08:35 (2) 08:22
	16:17	15:33 (1) 17:10	15:40 (1) 18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00	16:50	09:00 (1) 16:08
4	08:43	09:17 (2) 08:09	09:04 (2) 07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32	07:30	08:35 (2) 08:24
	16:18	15:34 (1) 17:12	15:39 (1) 18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57	16:48	09:03 (2) 08:24
5	08:43	09:16 (2) 08:07	09:04 (2) 07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33	07:32	08:34 (2) 08:25
	16:20	15:34 (1) 17:14	15:38 (1) 18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55	16:46	09:02 (2) 08:27
6	08:43	09:16 (2) 08:05	09:05 (2) 07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35	07:34	08:34 (2) 08:27
	16:21	15:35 (1) 17:16	15:36 (1) 18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52	16:44	09:03 (2) 08:28
7	08:42	09:15 (2) 08:03	09:05 (2) 07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37	07:36	08:33 (2) 08:28
	16:22	15:36 (1) 17:18	15:34 (1) 18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50	16:43	09:03 (2) 08:29
8	08:42	09:14 (2) 08:01	09:06 (2) 07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39	07:38	08:33 (2) 08:29
	16:24	15:36 (1) 17:20	15:30 (1) 18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48	16:41	09:05 (2) 08:30
9	08:41	09:14 (2) 07:59	09:07 (2) 06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41	07:40	08:34 (2) 08:30
	16:25	15:38 (1) 17:22	09:47 (2) 18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45	16:39	09:06 (2) 08:31
10	08:40	09:13 (2) 07:57	09:08 (2) 06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43	07:42	08:34 (2) 08:32
	16:27	15:38 (1) 17:24	09:46 (2) 18:19	20:17	21:12	21:55	21:58	21:08	19:56	18:43	16:37	09:07 (2) 08:33
11	08:40	09:12 (2) 07:55	09:09 (2) 06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44	07:44	08:34 (2) 08:33
	16:28	15:39 (1) 17:26	09:45 (2) 18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41	16:36	09:03 (2) 08:34
12	08:39	09:11 (2) 07:53	09:10 (2) 06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46	07:46	08:34 (2) 08:34
	16:30	15:39 (1) 17:28	09:44 (2) 18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38	16:34	09:04 (2) 08:35
13	08:38	09:10 (2) 07:51	09:10 (2) 06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48	07:47	08:34 (2) 08:35
	16:31	15:40 (1) 17:30	09:42 (2) 18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36	16:32	09:05 (2) 08:36
14	08:37	09:09 (2) 07:49	09:12 (2) 06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49	08:34 (2) 08:36
	16:33	15:40 (1) 17:32	09:40 (2) 18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31	09:06 (2) 08:37
15	08:36	09:08 (2) 07:47	09:14 (2) 06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51	08:34 (2) 08:37
	16:34	15:41 (1) 17:34	09:38 (2) 18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29	09:07 (2) 08:38
16	08:35	09:07 (2) 07:45	09:17 (2) 06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53	08:35 (2) 08:38
	16:36	15:42 (1) 17:36	09:36 (2) 18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27	09:08 (2) 08:39
17	08:34	09:05 (2) 07:43	09:22 (2) 06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55	08:35 (2) 08:39
	16:38	15:41 (1) 17:38	09:31 (2) 18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26	09:09 (2) 08:40
18	08:33	09:04 (2) 07:41	09:24 (2) 06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57	08:36 (2) 08:39
	16:40	15:42 (1) 17:40	09:32 (2) 18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25	09:10 (2) 08:41
19	08:32	09:03 (2) 07:39	09:25 (2) 06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59	08:37 (2) 08:40
	16:41	15:43 (1) 17:42	09:33 (2) 18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23	09:11 (2) 08:41
20	08:31	09:02 (2) 07:37	09:26 (2) 06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01	08:38 (2) 08:41
	16:43	15:43 (1) 17:44	09:34 (2) 18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22	09:12 (2) 08:42
21	08:30	09:02 (2) 07:34	09:28 (2) 06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02	08:39 (2) 08:41
	16:45	15:43 (1) 17:46	09:36 (2) 18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20	09:13 (2) 08:42
22	08:29	09:02 (2) 07:32	09:30 (2) 06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04	08:38 (2) 08:42
	16:47	15:43 (1) 17:48	09:38 (2) 18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19	09:14 (2) 08:43
23	08:27	09:02 (2) 07:30	09:32 (2) 06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06	08:39 (2) 08:42
	16:49	15:44 (1) 17:50	09:40 (2) 18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18	09:15 (2) 08:43
24	08:26	09:02 (2) 07:28	09:34 (2) 06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08	08:41 (2) 08:43
	16:51	15:43 (1) 17:52	09:42 (2) 18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17	09:16 (2) 08:44
25	08:25	09:02 (2) 07:25	09:36 (2) 06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11	08:09	08:43 (2) 08:43
	16:52	15:44 (1) 17:54	09:44 (2) 18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09	16:16	09:17 (2) 08:44
26	08:23	09:02 (2) 07:23	09:38 (2) 06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:12	08:44 (2) 08:43
	16:54	15:44 (1) 17:56	09:46 (2) 18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:04	16:15	09:18 (2) 08:44
27	08:22	09:02 (2) 07:21	09:40 (2) 06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:14	08:45 (2) 08:44
	16:56	15:44 (1) 17:58	09:48 (2) 18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:17	09:19 (2) 08:45
28	08:20	09:02 (2) 07:19	09:42 (2) 06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:16	08:46 (2) 08:44
	16:58	15:44 (1) 18:00	09:50 (2) 18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:19	09:20 (2) 08:45
29	08:19	09:02 (2) 07:17	09:44 (2) 06:09	05:56	05:06	04:57	05:34	06:28	07:23	08:18	08:17	08:47 (2) 08:44
	17:00	15:43 (1) 18:01	09:52 (2) 18:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:20	09:21 (2) 08:45
30	08:17	09:02 (2) 07:15	09:46 (2) 06:07	05:54	05:05	04:58	05:35	06:29	07:24	08:19	08:18	08:48 (2) 08:44
	17:02	15:43 (1) 18:02	09:54 (2) 18:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:21	09:22 (2) 08:45
31	08:15	09:02 (2) 07:13	09:48 (2) 06:04	05:52	05:04	04:59	05:37	06:31	07:26	08:21	08:20	08:49 (2) 08:44
	17:04	15:42 (1) 18:03	09:56 (2) 18:58	20:56	21:44	22:01	21:27	20:21	19:06	18:00	16:22	09:23 (2) 08:45
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	2227	829										1277
Sun reduction	0.24	0.23									0.27	0.21
Oper. time red.	1.00	1.00									1.00	1.00
Wind dir. red.	0.63	0.62									0.63	0.65
Total reduction	0.15	0.14									0.17	0.13
Total, real	342	119									385	171

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NM - Small Hut
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December		
1	08:44		09:18 (2)	08:14		09:17 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26					07:24		08:55 (2)	08:19		08:56 (2)	
	16:15	62	15:34 (1)	17:06	78	15:44 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05					16:54	29	09:24 (2)	16:10	80	15:23 (1)	
2	08:44		09:18 (2)	08:12		09:18 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28					07:26		08:54 (2)	08:21		08:57 (2)	
	16:16	63	15:35 (1)	17:08	75	15:43 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02					16:52	32	09:26 (2)	16:09	79	15:24 (1)	
3	08:44		09:17 (2)	08:10		09:18 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30					07:28		08:52 (2)	08:22		08:57 (2)	
	16:17	65	15:35 (1)	17:10	72	15:42 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00					16:50	35	09:27 (2)	16:08	77	15:23 (1)	
4	08:43		09:17 (2)	08:09		09:19 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32					07:30		08:51 (2)	08:24		08:59 (2)	
	16:18	67	15:36 (1)	17:12	68	15:41 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57					16:48	49	15:04 (1)	16:08	76	15:24 (1)	
5	08:43		09:16 (2)	08:07		09:20 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33					07:32		08:50 (2)	08:25		09:00 (2)	
	16:20	68	15:36 (1)	17:14	62	15:39 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55					16:46	58	15:07 (1)	16:07	73	15:23 (1)	
6	08:43		09:16 (2)	08:05		09:21 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35					07:34		08:49 (2)	08:27		09:02 (2)	
	16:21	72	15:38 (1)	17:16	56	15:37 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52					16:44	64	15:09 (1)	16:07	71	15:24 (1)	
7	08:42		09:15 (2)	08:03		09:22 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37					07:36		08:49 (2)	08:28		09:03 (2)	
	16:22	73	15:38 (1)	17:18	47	15:34 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50					16:43	69	15:11 (1)	16:06	68	15:23 (1)	
8	08:42		09:14 (2)	08:01		09:23 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39					07:38		08:48 (2)	08:29		09:05 (2)	
	16:24	75	15:38 (1)	17:20	34	09:57 (2)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48					16:41	72	15:12 (1)	16:06	67	15:24 (1)	
9	08:41		09:14 (2)	07:59		09:24 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41					07:40		08:49 (2)	08:30		09:06 (2)	
	16:25	77	15:40 (1)	17:22	32	09:56 (2)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45					16:39	76	15:14 (1)	16:05	65	15:24 (1)	
10	08:40		09:14 (2)	07:57		09:26 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43					07:42		08:48 (2)	08:32		09:07 (2)	
	16:27	78	15:40 (1)	17:24	28	09:54 (2)	18:19	20:17	21:12	21:55	21:55	21:08	19:56	18:43					16:37	79	15:15 (1)	16:05	63	15:24 (1)	
11	08:40		09:14 (2)	07:55		09:28 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44					07:44		08:48 (2)	08:33		09:08 (2)	
	16:28	80	15:41 (1)	17:26	24	09:52 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41					16:36	81	15:16 (1)	16:05	62	15:24 (1)	
12	08:39		09:13 (2)	07:53		09:31 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46					07:46		08:48 (2)	08:34		09:09 (2)	
	16:30	82	15:42 (1)	17:28	19	09:50 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38					16:34	83	15:17 (1)	16:05	60	15:24 (1)	
13	08:38		09:13 (2)	07:51		09:34 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48					07:47		08:47 (2)	08:35		09:11 (2)	
	16:31	83	15:42 (1)	17:30	11	09:45 (2)	18:27	20:22	21:17	21:57	21:52	21:01	19:49	18:36					16:32	85	15:17 (1)	16:04	59	15:25 (1)	
14	08:37		09:14 (2)	07:49			06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50					07:49		08:47 (2)	08:36		09:12 (2)	
	16:33	83	15:43 (1)	17:32		18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33						16:31	86	15:18 (1)	16:05	57	15:25 (1)	
15	08:36		09:14 (2)	07:47		06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52						07:51		08:47 (2)	08:37		09:13 (2)	
	16:34	84	15:43 (1)	17:34		18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31						16:29	88	15:18 (1)	16:05	56	15:26 (1)	
16	08:35		09:14 (2)	07:45		06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54						07:53		08:47 (2)	08:38		09:13 (2)	
	16:36	86	15:44 (1)	17:36		18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29						16:27	89	15:19 (1)	16:05	54	15:25 (1)	
17	08:34		09:13 (2)	07:43		06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56						07:55		08:48 (2)	08:39		09:14 (2)	
	16:38	87	15:44 (1)	17:38		18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27						16:26	88	15:19 (1)	16:05	54	15:25 (1)	
18	08:33		09:13 (2)	07:41		06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57						07:57		08:48 (2)	08:39		09:15 (2)	
	16:40	89	15:45 (1)	17:40		18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24						16:25	89	15:20 (1)	16:05	53	15:26 (1)	
19	08:32		09:14 (2)	07:39		06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59						07:59		08:48 (2)	08:40		09:16 (2)	
	16:41	88	15:45 (1)	17:42		18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22						16:23	89	15:20 (1)	16:05	53	15:27 (1)	
20	08:31		09:13 (2)	07:37		06:32	06:13	05:17	04:54	05:20	06:12	07:06	08:01	08:51					16:24		08:48 (2)	08:41		09:17 (2)	
	16:43	89	15:45 (1)	17:44		18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20						16:22	89	15:20 (1)	16:06	52	15:26 (1)	
21	08:30		09:14 (2)	07:34		06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02					16:22		08:49 (2)	08:41		09:17 (2)	
	16:45	89	15:46 (1)	17:46		18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17						16:20	89	15:21 (1)	16:06	52	15:27 (1)	
22	08:29		09:13 (2)	07:32		06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04					16:20		08:49 (2)	08:42		09:17 (2)	
	16:47	89	15:45 (1)	17:48		18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15						16:19	88	15:21 (1)	16:06	52	15:27 (1)	
23	08:27		09:14 (2)	07:30		06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:07					16:18		08:50 (2)	08:42		09:18 (2)	
	16:49	89	15:46 (1)	17:50		18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13						16:18	88	15:21 (1)	16:07	52	15:28 (1)	
24	08:26		09:14 (2)	07:28		06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08					16:18		08:50 (2)	08:43		09:18 (2)	
	16:51	89	15:46 (1)	17:52		18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11						16:17	89	15:22 (1)	16:08	53	15:29 (1)	
25	08:25		09:15 (2)	07:25		06:18	06:05	05:11	04:56	05:27	06:20	07:15	07:11	07:10					16:17		08:51 (2)	08:43		09:18 (2)	
	16:52	88	15:46 (1)	17:54		18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09						16:16	87	15:22 (1)	16:08	53	15:29 (1)	
26	08:23		09:14 (2)	07:23		06:16	06:03	05:09	04:56	05:29	06:22	07:17	07:13	07:13					16:16		08:52 (2)	08:43		09:19 (2)	
	16:54	89	15:46 (1)	17:56		18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:07						16:15	86	15:22 (1)	16:09	54	15:30 (1)	
27	08:22		09:15 (2)	07:21		06:13	06:00	05:08	04:56	05:30	06:23	07:18	08:13	08:13					16:15		08:53 (2)	08:44		09:19 (2)	
	16:56	87	15:46 (1)	17:58		18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04						16:13	85	15:23 (1)	16:10	55	15:31 (1)	
28	08:20		09:15 (2)	07:19		06:11	05:58	05:07	04:57	05:32	06:26	07:21	07:17	07:17					16:14		08:54 (2)	08:44		09:19 (2)	
	16:58	87	15:46 (1)	18:00		18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02						16:13	83	15:23 (1)	16:11	55	15:31 (1)	
29	08:19		09:16 (2)			07:09	06:56	05:06	04:57	05:34	06:28	07:23	07:18						09:03 (2)	08:16		08:54 (2)	08:44		09:19 (2)
	17:00	84	15:45 (1)			19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00						12	09:15 (2)					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NN - Welfare Facilities
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January		February		March		April		May		June		July		August		September		October		November		December	
1	08:44 16:15	63	09:19 (2) 15:37 (1)	08:14 17:06	82	09:26 (2) 15:55 (1)	07:16 18:02	07:01 20:00	05:52 20:55	05:03 21:45	04:59 22:00	05:39 21:25	06:33 20:18	07:26 19:05					07:24 16:54	26	09:06 (2) 19:32 (2)	08:19 16:10	80	09:30 (2) 15:30 (1)
2	08:44 16:16	65	09:19 (2) 15:39 (1)	08:12 17:08	79	09:27 (2) 15:51 (1)	07:14 18:04	06:59 20:02	05:50 20:57	05:02 21:47	05:00 22:00	05:40 21:23	06:35 20:16	07:28 19:02					07:26 16:52	44	09:04 (2) 15:15 (1)	08:21 16:09	79	09:03 (2) 15:31 (1)
3	08:44 16:17	66	09:19 (2) 15:39 (1)	08:10 17:10	77	09:27 (2) 15:54 (1)	07:12 18:06	06:56 20:04	05:48 20:59	05:01 21:48	05:00 21:59	05:42 21:21	06:36 20:14	07:30 19:00					07:28 16:50	53	09:02 (2) 15:18 (1)	08:22 16:08	77	09:03 (2) 15:30 (1)
4	08:43 16:18	68	09:19 (2) 15:41 (1)	08:09 17:12	73	09:28 (2) 15:53 (1)	07:09 18:08	06:54 20:06	05:46 21:01	05:00 21:49	05:01 21:59	05:44 21:19	06:38 20:11	07:32 18:57					07:30 16:48	60	09:01 (2) 15:20 (1)	08:24 16:08	76	09:04 (2) 15:30 (1)
5	08:43 16:20	71	09:19 (2) 15:42 (1)	08:07 17:14	69	09:29 (2) 15:52 (1)	07:07 18:09	06:52 20:08	05:44 21:03	05:04 21:50	05:02 21:58	05:45 21:17	06:40 20:09	07:33 18:55					07:32 16:46	65	09:00 (2) 15:21 (1)	08:25 16:07	75	09:04 (2) 15:30 (1)
6	08:43 16:21	72	09:20 (2) 15:44 (1)	08:05 17:16	65	09:30 (2) 15:51 (1)	07:05 18:11	06:49 20:09	05:42 21:04	05:04 21:51	05:03 21:58	05:47 21:16	06:42 20:06	07:35 18:52					07:34 16:44	70	08:59 (2) 15:22 (1)	08:27 16:07	72	09:06 (2) 15:30 (1)
7	08:42 16:22	75	09:19 (2) 15:45 (1)	08:03 17:18	60	09:31 (2) 15:50 (1)	07:02 18:13	06:47 20:11	05:40 21:06	05:04 21:52	05:04 21:57	05:49 21:14	06:43 20:04	07:37 18:50					07:36 16:43	74	08:58 (2) 15:23 (1)	08:28 16:06	71	09:06 (2) 15:29 (1)
8	08:42 16:24	76	09:19 (2) 15:45 (1)	08:01 17:20	51	09:33 (2) 15:48 (1)	07:00 18:15	06:44 20:13	05:38 21:08	05:05 21:53	05:51 21:12	06:45 20:01	07:39 18:48	07:39 18:48					07:38 16:41	77	08:57 (2) 15:24 (1)	08:29 16:06	68	09:07 (2) 15:29 (1)
9	08:41 16:25	77	09:20 (2) 15:47 (1)	07:59 17:22	43	09:34 (2) 15:45 (1)	06:57 18:17	06:42 20:15	05:36 21:10	05:06 21:54	05:52 21:10	06:47 19:59	07:41 18:45	07:41 18:45					07:40 16:39	81	08:57 (2) 15:26 (1)	08:30 16:05	66	09:08 (2) 15:28 (1)
10	08:40 16:27	80	09:20 (2) 15:48 (1)	07:57 17:24	25	09:37 (2) 15:46 (1)	06:55 18:19	06:39 20:17	05:34 21:12	05:07 21:55	05:54 21:08	06:49 19:56	07:43 18:43	07:43 18:43					07:42 16:37	82	08:57 (2) 15:26 (1)	08:32 16:05	65	09:08 (2) 15:28 (1)
11	08:40 16:28	80	09:20 (2) 15:48 (1)	07:55 17:26	20	09:39 (2) 15:48 (1)	06:53 18:21	06:37 20:19	05:33 21:13	05:08 21:56	05:56 21:06	06:51 19:54	07:44 18:41	07:44 18:41					07:44 16:36	85	08:56 (2) 15:27 (1)	08:33 16:05	63	09:09 (2) 15:27 (1)
12	08:39 16:30	82	09:20 (2) 15:49 (1)	07:53 17:28	11	09:44 (2) 15:49 (1)	06:50 18:23	06:35 20:20	05:31 21:15	05:09 21:56	05:58 21:53	06:52 21:03	07:46 19:52	07:46 18:38					07:46 16:34	86	08:56 (2) 15:27 (1)	08:34 16:05	62	09:09 (2) 15:27 (1)
13	08:38 16:31	84	09:20 (2) 15:50 (1)	07:51 17:30		09:55 (2) 15:50 (1)	06:48 18:25	06:32 20:22	05:29 21:17	05:11 21:52	05:59 21:01	06:54 19:49	07:48 18:36	07:48 18:36					07:47 16:32	88	08:56 (2) 15:28 (1)	08:35 16:05	59	09:11 (2) 15:30 (1)
14	08:37 16:33	85	09:20 (2) 15:51 (1)	07:49 17:32			06:45 18:27	06:30 20:24	05:27 21:18	05:12 21:58	06:01 20:59	06:56 19:47	07:50 18:33	07:50 18:33					07:49 16:31	88	08:56 (2) 15:28 (1)	08:36 16:05	57	09:12 (2) 15:30 (1)
15	08:36 16:34	85	09:21 (2) 15:52 (1)	07:47 17:34			06:43 18:29	06:28 20:26	05:26 21:20	05:13 21:58	06:03 20:57	06:58 19:44	07:52 18:31	07:52 18:31					07:51 16:29	90	08:55 (2) 15:29 (1)	08:37 16:05	56	09:13 (2) 15:30 (1)
16	08:35 16:36	86	09:21 (2) 15:52 (1)	07:45 17:36			06:40 18:30	06:25 20:28	05:24 21:22	05:14 21:59	06:05 20:55	06:59 19:42	07:54 18:29	07:54 18:29					07:53 16:27	91	08:55 (2) 15:29 (1)	08:38 16:05	55	09:13 (2) 15:30 (1)
17	08:34 16:38	88	09:20 (2) 15:52 (1)	07:43 17:38			06:38 18:32	06:23 20:30	05:22 21:23	05:16 21:59	06:06 20:53	07:01 19:39	07:56 18:27	07:56 18:27					07:55 16:26	91	08:55 (2) 15:29 (1)	08:39 16:05	54	09:14 (2) 15:30 (1)
18	08:33 16:40	89	09:21 (2) 15:53 (1)	07:41 17:40			06:36 18:34	06:21 20:32	05:21 21:25	05:17 22:00	06:08 20:51	07:03 19:37	07:57 18:24	07:57 18:24					07:55 16:25	90	08:56 (2) 15:29 (1)	08:39 16:05	53	09:15 (2) 15:30 (1)
19	08:32 16:41	89	09:21 (2) 15:54 (1)	07:39 17:42			06:33 18:36	06:18 20:33	05:19 21:27	05:18 22:00	06:10 21:45	07:05 19:34	07:59 18:22	07:59 18:22					07:57 16:23	91	08:56 (2) 15:29 (1)	08:40 16:05	53	09:16 (2) 15:30 (1)
20	08:31 16:43	90	09:21 (2) 15:54 (1)	07:37 17:44			06:31 18:38	06:16 20:35	05:18 21:28	05:20 22:00	06:12 21:44	07:06 19:32	08:01 18:20	08:01 18:20					07:57 16:22	91	08:56 (2) 15:30 (1)	08:41 16:06	51	09:17 (2) 15:30 (1)
21	08:30 16:45	91	09:21 (2) 15:55 (1)	07:34 17:46			06:28 18:40	06:14 20:37	05:16 21:30	05:21 22:01	06:13 21:42	07:08 19:29	08:03 18:17	08:03 18:17					08:02 16:20	91	08:56 (2) 15:30 (1)	08:41 16:05	51	09:17 (2) 15:30 (1)
22	08:29 16:47	91	09:21 (2) 15:55 (1)	07:32 17:48			06:26 18:42	06:12 20:39	05:15 21:31	05:23 22:01	06:15 21:42	07:10 19:27	08:05 18:15	08:05 18:15					08:04 16:19	90	08:57 (2) 15:30 (1)	08:42 16:06	51	09:17 (2) 15:30 (1)
23	08:27 16:49	91	09:22 (2) 15:55 (1)	07:30 17:50			06:23 18:43	06:09 20:41	05:13 21:33	05:24 22:01	06:17 21:40	07:12 19:24	08:07 18:13	08:07 18:13					08:06 16:18	89	08:57 (2) 15:30 (1)	08:42 16:07	51	09:18 (2) 15:30 (1)
24	08:26 16:51	90	09:22 (2) 15:55 (1)	07:28 17:52			06:21 18:45	06:07 20:43	05:12 21:34	05:25 22:01	06:19 21:38	07:14 19:22	08:09 18:11	08:09 18:11					08:08 16:17	89	08:58 (2) 15:30 (1)	08:43 16:08	51	09:19 (2) 15:30 (1)
25	08:25 16:52	90	09:23 (2) 15:56 (1)	07:25 17:54			06:18 18:47	06:05 20:44	05:11 21:36	05:27 22:01	06:20 21:37	07:15 19:19	08:11 17:09	08:11 17:09					08:09 16:16	88	08:58 (2) 15:30 (1)	08:43 16:08	53	09:18 (2) 15:30 (1)
26	08:23 16:54	90	09:23 (2) 15:56 (1)	07:23 17:56			06:16 18:49	06:03 20:46	05:09 21:37	05:29 22:01	06:22 21:35	07:17 19:17	07:03 17:07	07:03 17:07					08:11 16:15	86	08:59 (2) 15:30 (1)	08:43 16:09	53	09:19 (2) 15:31 (1)
27	08:22 16:56	90	09:24 (2) 15:57 (1)	07:21 17:58			06:15 18:51	06:01 20:48	05:08 21:39	05:30 22:01	06:24 21:33	07:19 19:14	07:09 17:04	07:09 17:04					08:13 16:13	85	09:00 (2) 15:31 (1)	08:44 16:10	55	09:20 (2) 15:32 (1)
28	08:20 16:58	88	09:24 (2) 15:56 (1)	07:19 18:00			06:11 18:53	05:58 20:50	05:07 21:40	05:32 22:01	06:26 21:32	07:21 19:12	07:17 17:02	07:17 17:02					08:14 16:13	85	09:00 (2) 15:31 (1)	08:44 16:11	56	09:21 (2) 15:33 (1)
29	08:19 17:00	88	09:24 (2) 15:56 (1)				07:09 19:55	06:05 20:52	05:06 21:42	05:34 22:01	06:28 21:30	07:22 19:10	07:18 17:00	07:18 17:00					08:16 16:12	84	09:00 (2) 15:30 (1)	08:44 16:11	57	09:22 (2) 15:34 (1)
30	08:17 17:02	86	09:24 (2) 15:55 (1)				07:06 19:56	06:04 20:54	05:05 21:43	05:35 22:00	06:29 21:28	07:24 19:07	07:20 17:00	07:20 17:00					08:18 16:58	14	09:01 (2) 15:30 (1)	08:44 16:12	59	09:23 (2) 15:35 (1)
31	08:15 17:04	84	09:25 (2) 15:55 (1)				07:04 19:58	06:04 21:04	05:04 21:44	05:37 21:27	06:31 20:21	07:22 19:07	07:22 17:00	07:22 17:00					08:18 16:56	21	09:02 (2) 15:30 (1)	08:44 16:13	61	09:24 (2) 15:35 (1)
Potential sun hours	250		273			367	420	494	510	512	460	382	328	259					35	2392		233	1890	
Total, worst case		2550	655																0.24	0.27			0.21	
Sun reduction		1.00	1.00																1.00	1.00			1.00	
Oper. time red.		0.62	0.62																0.60	0.62			0.62	
Wind dir. red.		0.15	0.14																0.18	0.17			0.13	
Total reduction		387	95																.6	.396			243	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar

Calculation: Kellystown SG155 Worst Case Shadow receptor: NO - Shipping Office
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

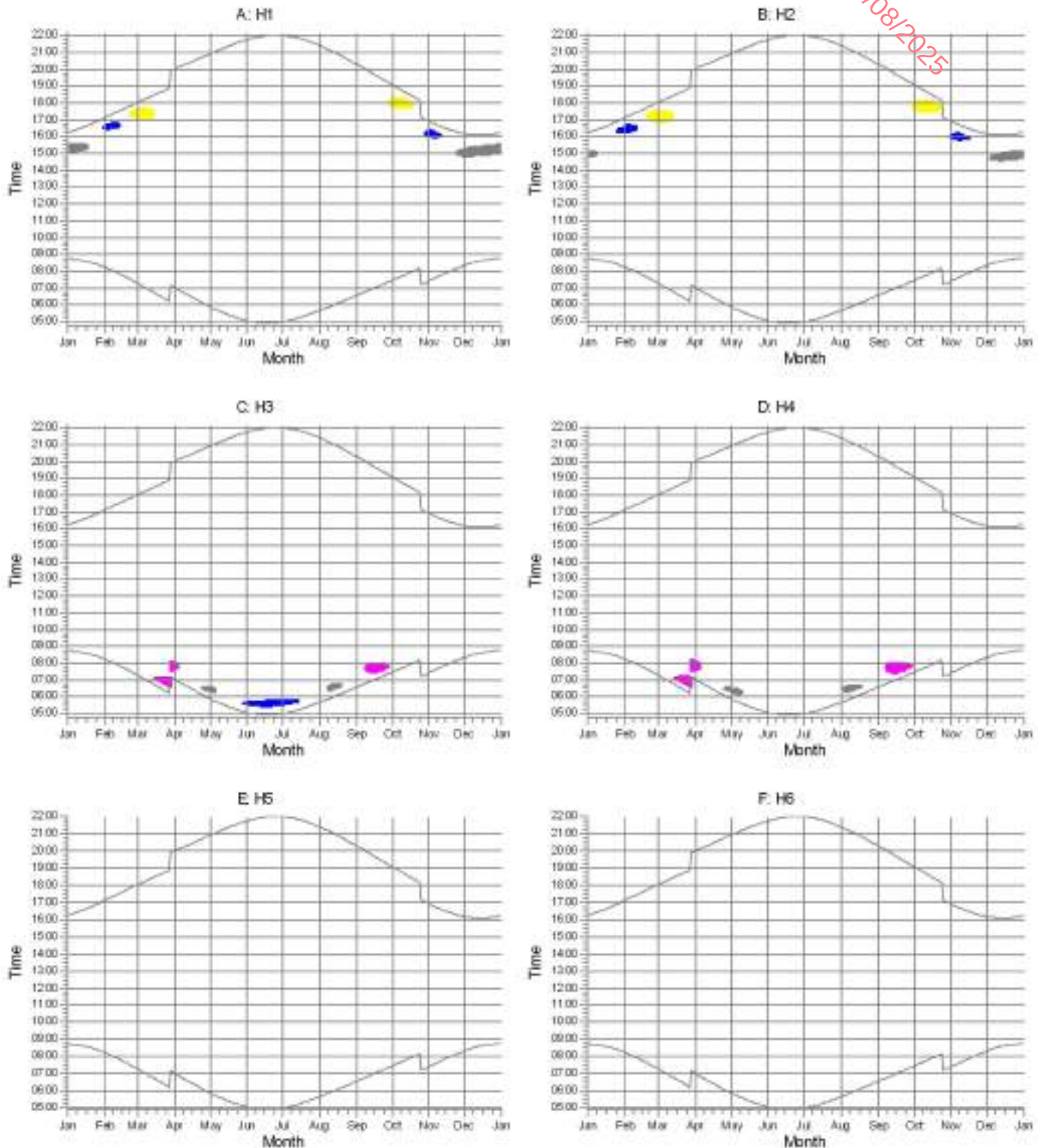
	January	February	March	April	May	June	July	August	September	October	November	December
1	08:44	09:18 (2)	08:14	09:22 (2)	07:16	07:01	05:52	05:03	04:59	05:39	06:33	07:26
2	16:15	15:37 (1)	17:06	15:53 (1)	18:02	20:00	20:55	21:45	22:00	21:25	20:18	19:05
3	08:44	09:18 (2)	08:12	09:23 (2)	07:14	06:59	05:50	05:02	05:00	05:40	06:35	07:28
4	16:16	15:39 (1)	17:08	15:52 (1)	18:04	20:02	20:57	21:47	22:00	21:23	20:16	19:02
5	08:44	09:17 (2)	08:10	09:24 (2)	07:12	06:56	05:48	05:01	05:00	05:42	06:36	07:30
6	16:17	15:39 (1)	17:10	15:51 (1)	18:06	20:04	20:59	21:48	21:59	21:21	20:14	19:00
7	08:43	09:17 (2)	08:09	09:24 (2)	07:09	06:54	05:46	05:00	05:01	05:44	06:38	07:32
8	16:18	15:41 (1)	17:12	15:50 (1)	18:08	20:06	21:01	21:49	21:59	21:19	20:11	18:57
9	08:43	09:17 (2)	08:07	09:25 (2)	07:07	06:52	05:44	04:59	05:02	05:45	06:40	07:33
10	16:20	15:41 (1)	17:14	15:49 (1)	18:09	20:08	21:03	21:50	21:58	21:17	20:09	18:55
11	08:43	09:17 (2)	08:05	09:26 (2)	07:05	06:49	05:42	04:59	05:03	05:47	06:42	07:35
12	16:21	15:43 (1)	17:16	15:48 (1)	18:11	20:09	21:04	21:51	21:58	21:16	20:06	18:52
13	08:42	09:17 (2)	08:03	09:27 (2)	07:02	06:47	05:40	04:58	05:04	05:49	06:43	07:37
14	16:22	15:43 (1)	17:18	15:46 (1)	18:13	20:11	21:06	21:52	21:57	21:14	20:04	18:50
15	08:42	09:17 (2)	08:01	09:28 (2)	07:00	06:44	05:38	04:57	05:05	05:51	06:45	07:39
16	16:24	15:44 (1)	17:20	15:44 (1)	18:15	20:13	21:08	21:53	21:56	21:12	20:01	18:48
17	08:41	09:18 (2)	07:59	09:30 (2)	06:57	06:42	05:36	04:57	05:06	05:52	06:47	07:41
18	16:25	15:45 (1)	17:22	15:40 (1)	18:17	20:15	21:10	21:54	21:56	21:10	19:59	18:45
19	08:40	09:17 (2)	07:57	09:32 (2)	06:55	06:39	05:34	04:56	05:07	05:54	06:49	07:43
20	16:27	15:46 (1)	17:24	09:59 (2)	18:19	20:17	21:12	21:55	21:58	21:08	19:56	18:43
21	08:40	09:17 (2)	07:55	09:34 (2)	06:53	06:37	05:33	04:56	05:08	05:56	06:51	07:44
22	16:28	15:46 (1)	17:26	09:57 (2)	18:21	20:19	21:13	21:56	21:54	21:06	19:54	18:41
23	08:39	09:17 (2)	07:53	09:37 (2)	06:50	06:35	05:31	04:55	05:09	05:58	06:52	07:46
24	16:30	15:47 (1)	17:28	09:54 (2)	18:23	20:20	21:15	21:56	21:53	21:03	19:52	18:38
25	08:38	09:17 (2)	07:51	09:43 (2)	06:48	06:32	05:29	04:55	05:11	05:59	06:54	07:48
26	16:31	15:48 (1)	17:30	09:47 (2)	18:25	20:22	21:17	21:57	21:52	21:01	19:49	18:36
27	08:37	09:18 (2)	07:49	06:45	06:30	05:27	04:55	05:12	06:01	06:56	07:50	07:49
28	16:33	15:49 (1)	17:32	18:27	20:24	21:18	21:58	21:51	20:59	19:47	18:33	16:31
29	08:36	09:18 (2)	07:47	06:43	06:28	05:26	04:55	05:13	06:03	06:58	07:52	07:51
30	16:34	15:49 (1)	17:34	18:29	20:26	21:20	21:58	21:50	20:57	19:44	18:31	16:29
31	08:35	09:18 (2)	07:45	06:40	06:25	05:24	04:54	05:14	06:05	06:59	07:54	07:53
32	16:36	15:50 (1)	17:36	18:30	20:28	21:22	21:59	21:49	20:55	19:42	18:29	16:27
33	08:34	09:17 (2)	07:43	06:38	06:23	05:22	04:54	05:16	06:06	07:01	07:56	07:55
34	16:38	15:50 (1)	17:38	18:32	20:30	21:23	21:59	21:48	20:53	19:39	18:27	16:26
35	08:33	09:18 (2)	07:41	06:36	06:21	05:21	04:54	05:17	06:08	07:03	07:57	07:57
36	16:40	15:51 (1)	17:40	18:34	20:32	21:25	22:00	21:46	20:51	19:37	18:24	16:25
37	08:32	09:18 (2)	07:39	06:33	06:18	05:19	04:54	05:18	06:10	07:05	07:59	07:59
38	16:41	15:52 (1)	17:42	18:36	20:33	21:27	22:00	21:45	20:48	19:34	18:22	16:23
39	08:31	09:18 (2)	07:37	06:31	06:16	05:18	04:54	05:20	06:12	07:06	08:01	08:01
40	16:43	15:52 (1)	17:44	18:38	20:35	21:28	22:00	21:44	20:46	19:32	18:20	16:22
41	08:30	09:18 (2)	07:34	06:28	06:14	05:16	04:54	05:21	06:13	07:08	08:03	08:02
42	16:45	15:52 (1)	17:46	18:40	20:37	21:30	22:01	21:42	20:44	19:29	18:17	16:20
43	08:29	09:18 (2)	07:32	06:26	06:12	05:15	04:55	05:23	06:15	07:10	08:05	08:04
44	16:47	15:52 (1)	17:48	18:42	20:39	21:31	22:01	21:41	20:42	19:27	18:15	16:19
45	08:27	09:19 (2)	07:30	06:23	06:09	05:13	04:55	05:24	06:17	07:12	08:07	08:06
46	16:49	15:53 (1)	17:50	18:43	20:41	21:33	22:01	21:40	20:39	19:24	18:13	16:18
47	08:26	09:18 (2)	07:28	06:21	06:07	05:12	04:55	05:26	06:19	07:14	08:09	08:08
48	16:51	15:53 (1)	17:52	18:45	20:43	21:34	22:01	21:38	20:37	19:22	18:11	16:17
49	08:25	09:19 (2)	07:25	06:18	06:05	05:11	04:56	05:27	06:20	07:15	08:11	08:09
50	16:52	15:53 (1)	17:54	18:47	20:44	21:36	22:01	21:37	20:35	19:19	18:09	16:16
51	08:23	09:19 (2)	07:23	06:16	06:03	05:09	04:56	05:29	06:22	07:17	08:13	08:11
52	16:54	15:53 (1)	17:56	18:49	20:46	21:37	22:01	21:35	20:32	19:17	18:07	16:15
53	08:22	09:20 (2)	07:21	06:13	06:01	05:08	04:56	05:30	06:24	07:19	08:15	08:13
54	16:56	15:54 (1)	17:58	18:51	20:48	21:39	22:01	21:33	20:30	19:14	18:04	16:13
55	08:20	09:20 (2)	07:19	06:11	05:58	05:07	04:57	05:32	06:26	07:21	08:17	08:14
56	16:58	15:54 (1)	18:00	18:53	20:50	21:40	22:01	21:32	20:28	19:12	18:02	16:13
57	08:19	09:20 (2)	07:18	07:09	05:56	05:06	04:57	05:34	06:28	07:22	08:18	08:16
58	17:00	15:53 (1)	17:59	19:55	20:52	21:42	22:01	21:30	20:25	19:10	18:00	16:12
59	08:17	09:21 (2)	07:17	07:06	05:54	05:05	04:58	05:35	06:29	07:24	08:20	08:18
60	17:02	15:53 (1)	17:59	19:56	20:54	21:43	22:00	21:28	20:23	19:07	18:00	16:11
61	08:15	09:21 (2)	07:16	07:04	05:54	05:04	04:57	05:37	06:31	07:22	08:18	08:16
62	17:04	15:52 (1)	17:59	19:58	20:54	21:44	22:01	21:27	20:21	19:06	18:00	16:13
Potential sun hours	250	273	367	420	494	510	512	460	382	328	259	233
Total, worst case	2550	668										
Sun reduction	0.24	0.23										
Oper. time red.	1.00	1.00										
Wind dir. red.	0.63	0.62										
Total reduction	0.15	0.14										
Total, real	388	96										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

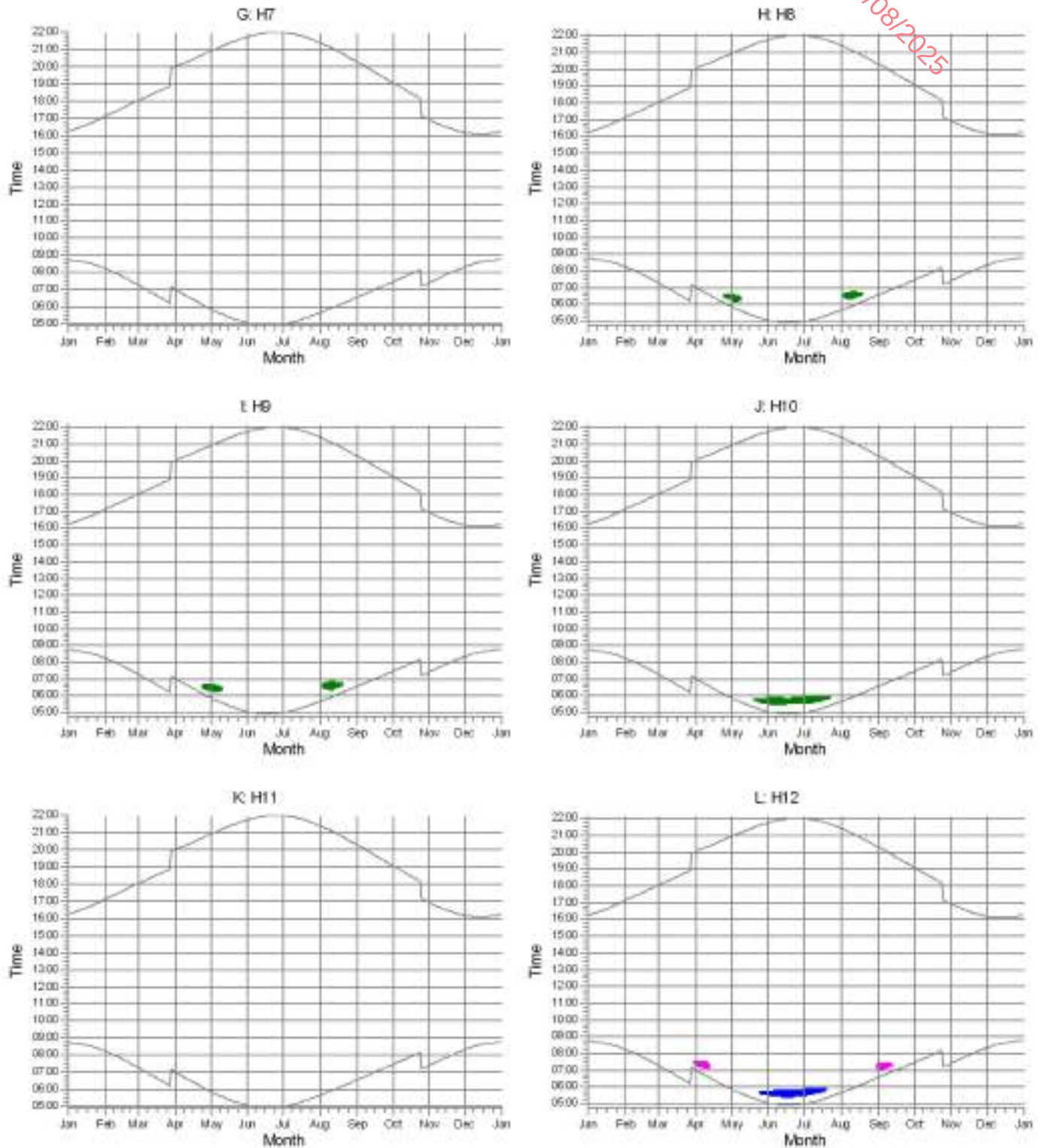


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

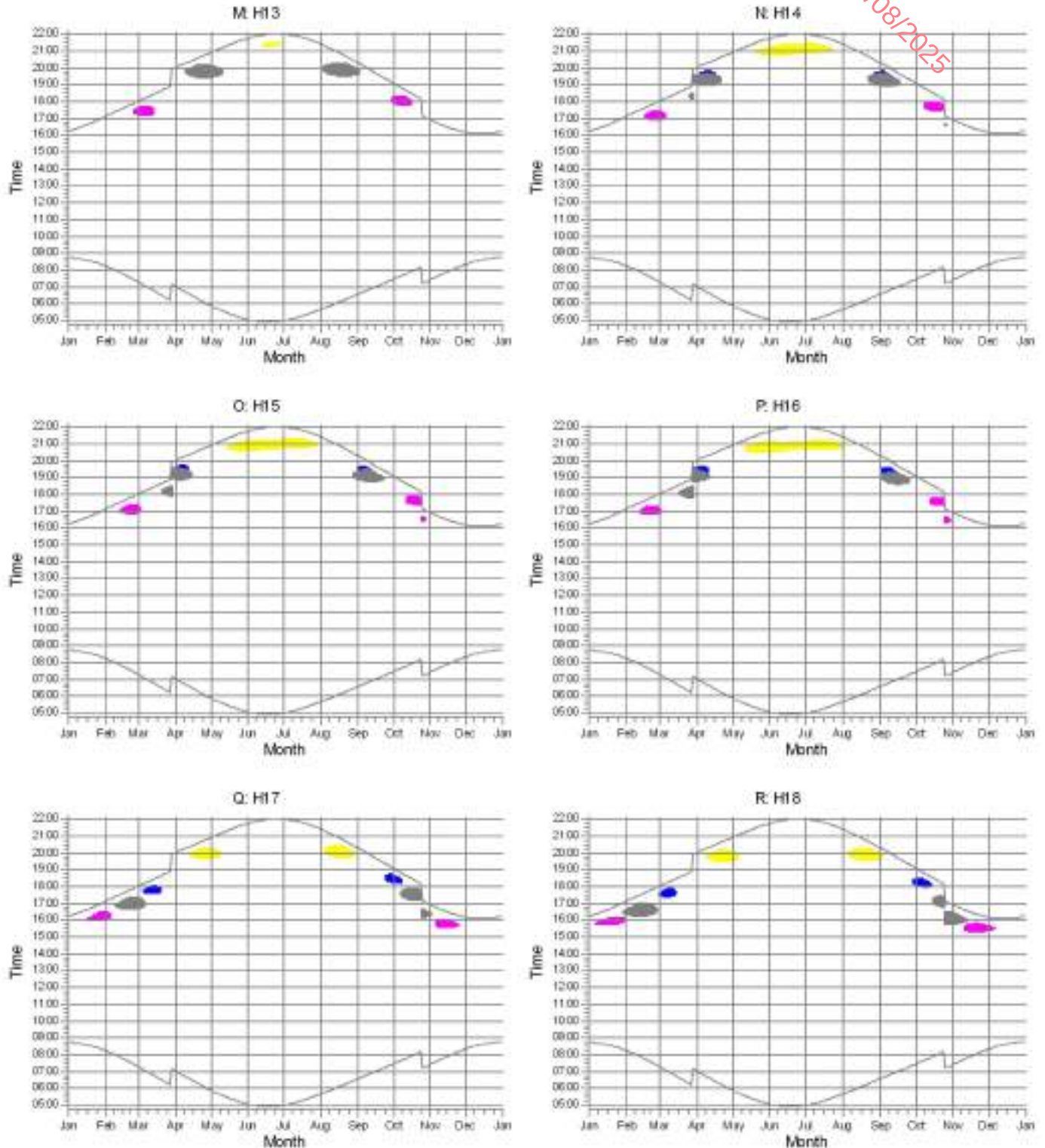


WTGs

1: T01 3: T03 5: T05

SHADOW - Calendar, graphical

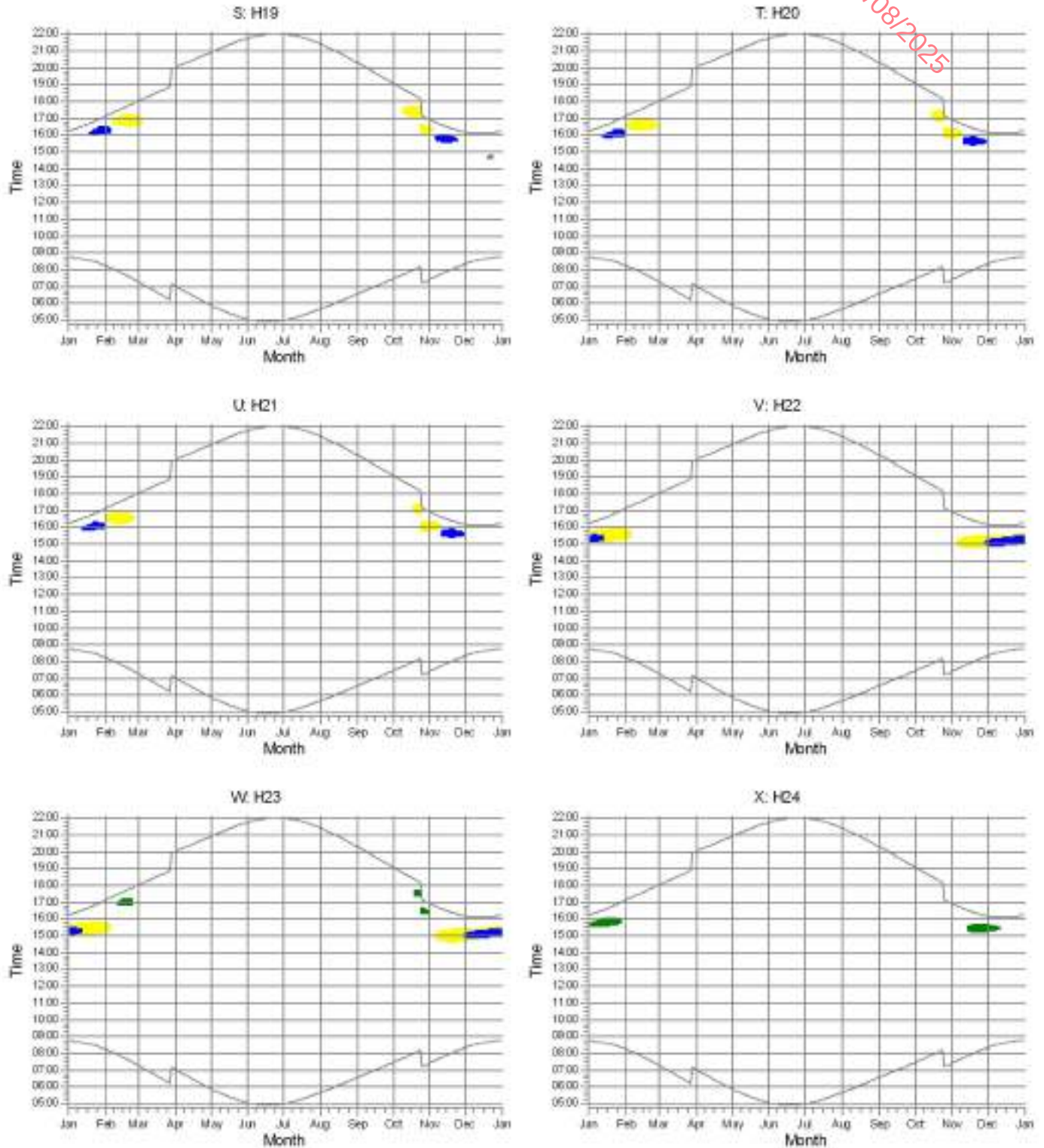
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

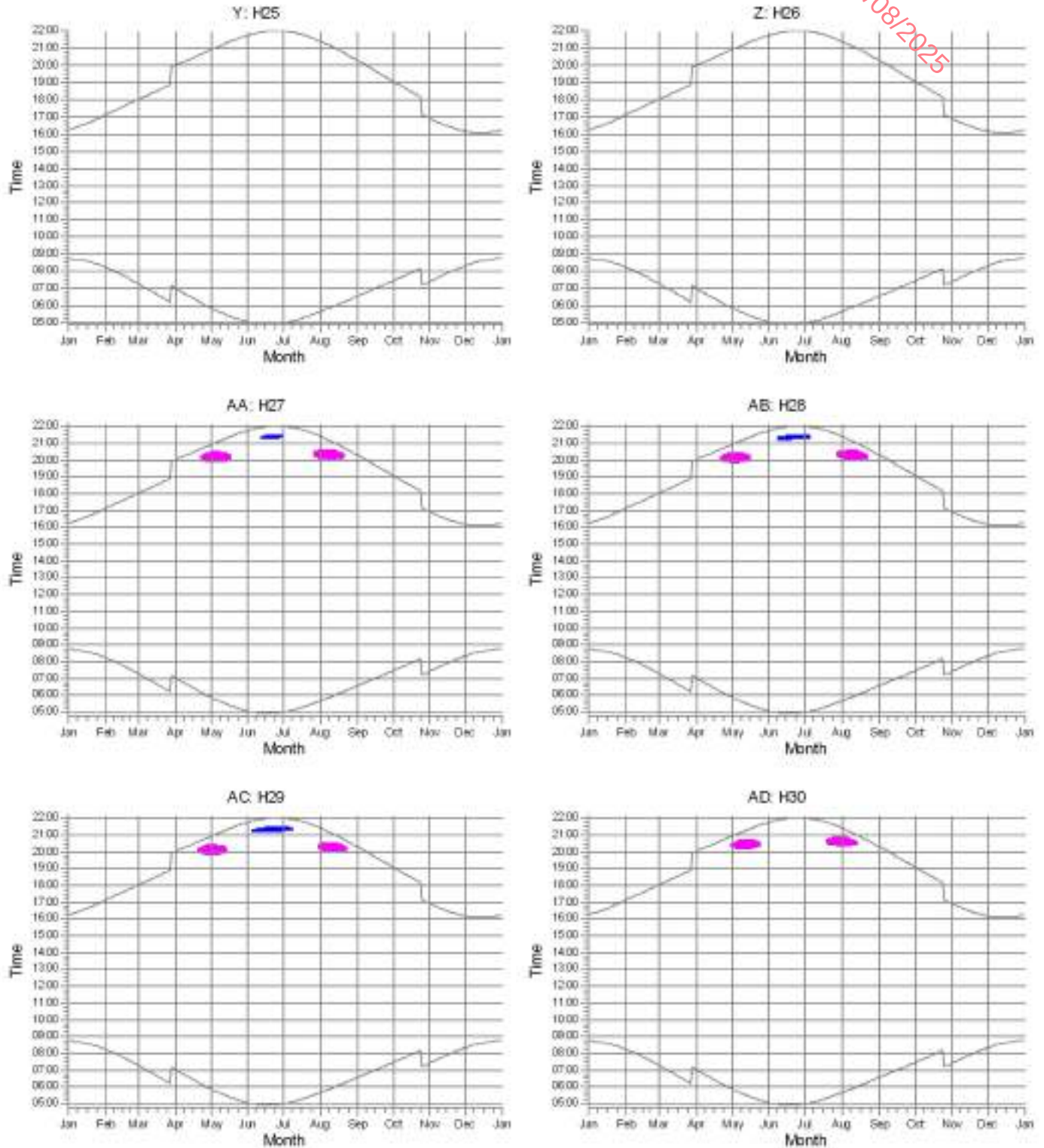


WTGs

1: T01 2: T02 3: T03 4: T04

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

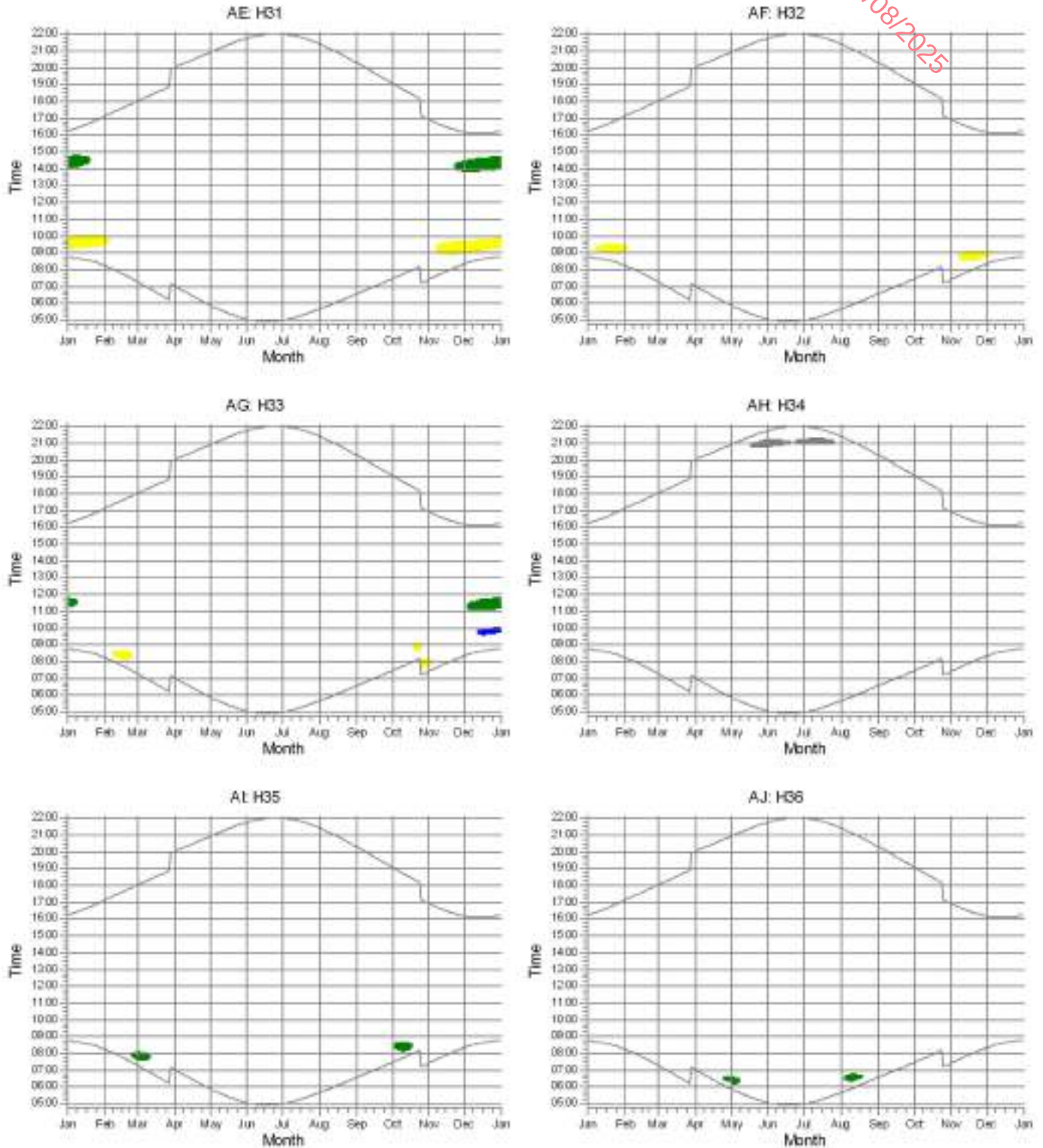


WTGs

3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

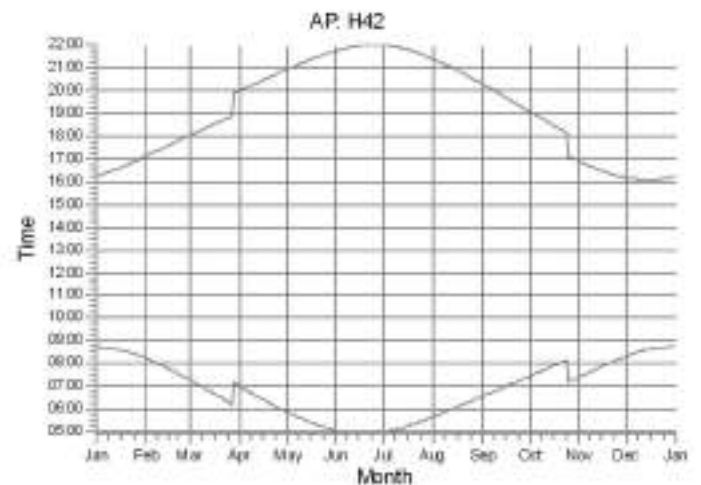
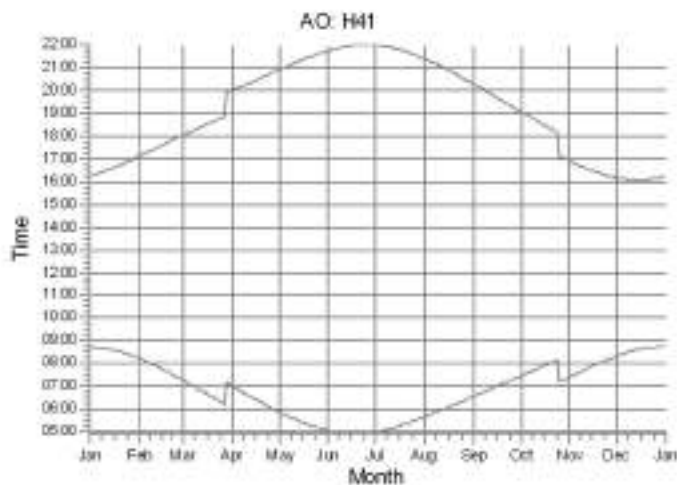
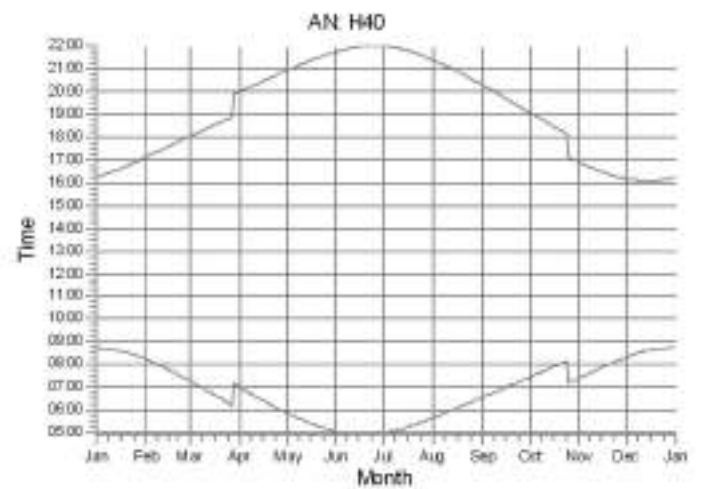
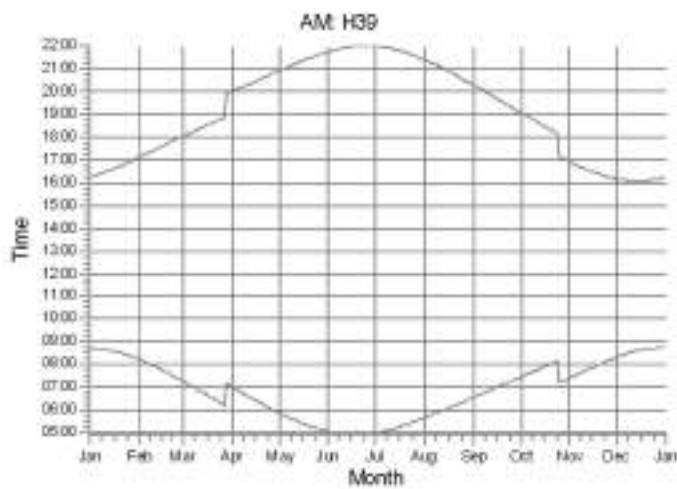
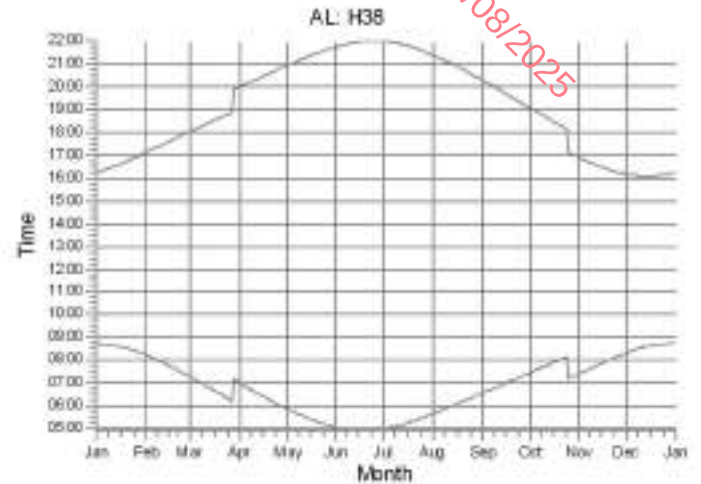
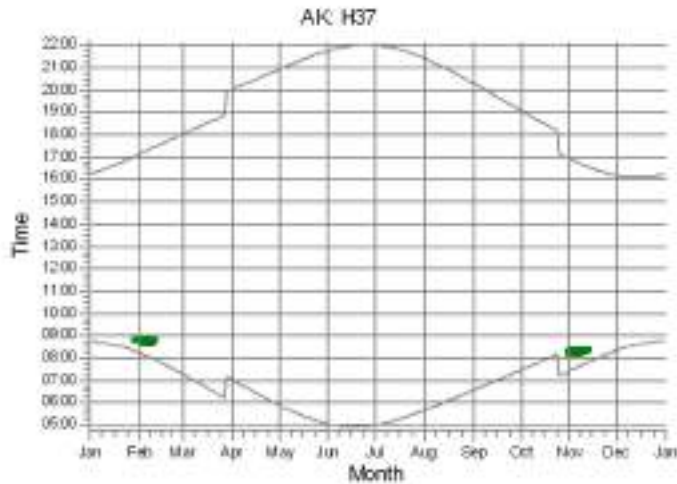


WTGs

1: T01 2: T02 3: T03 4: T04

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

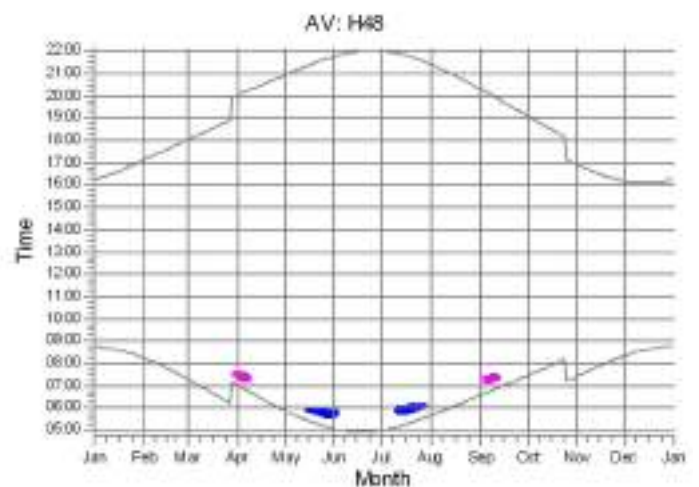
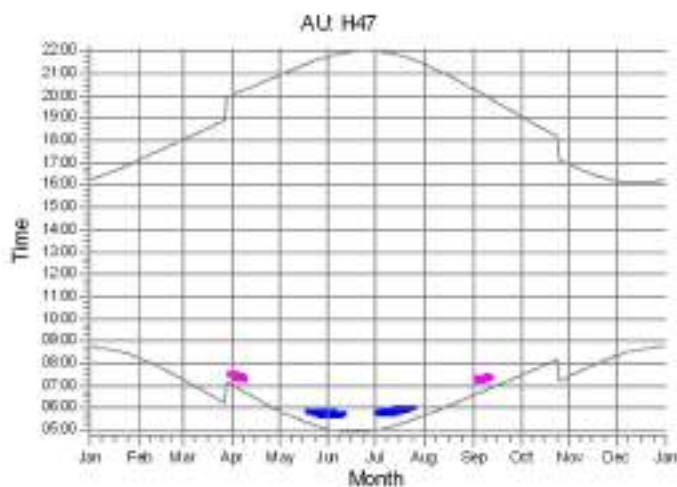
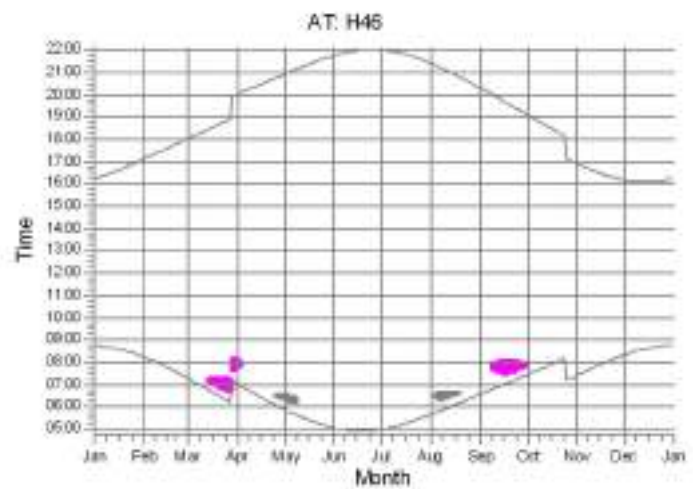
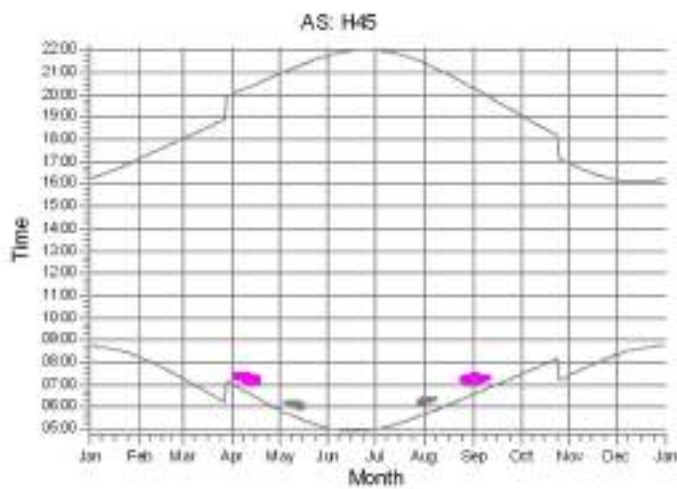
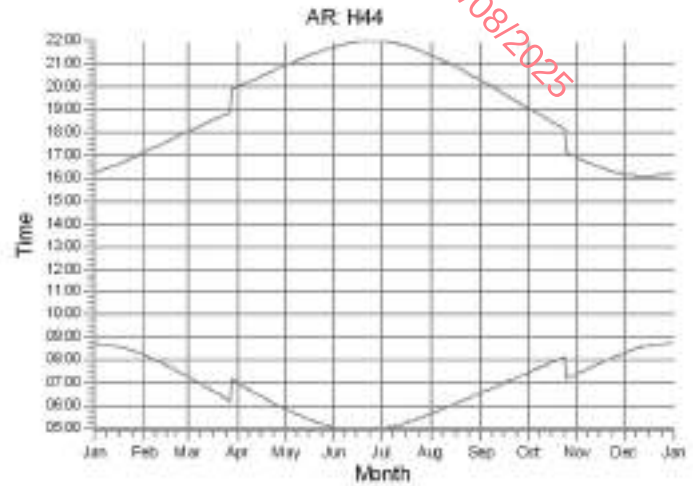
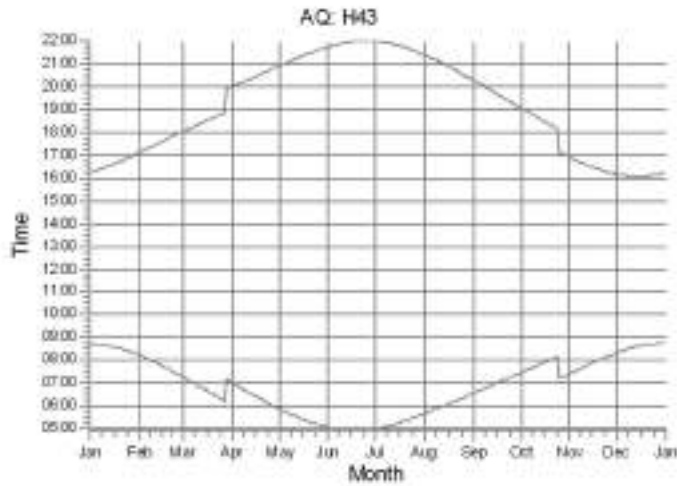


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

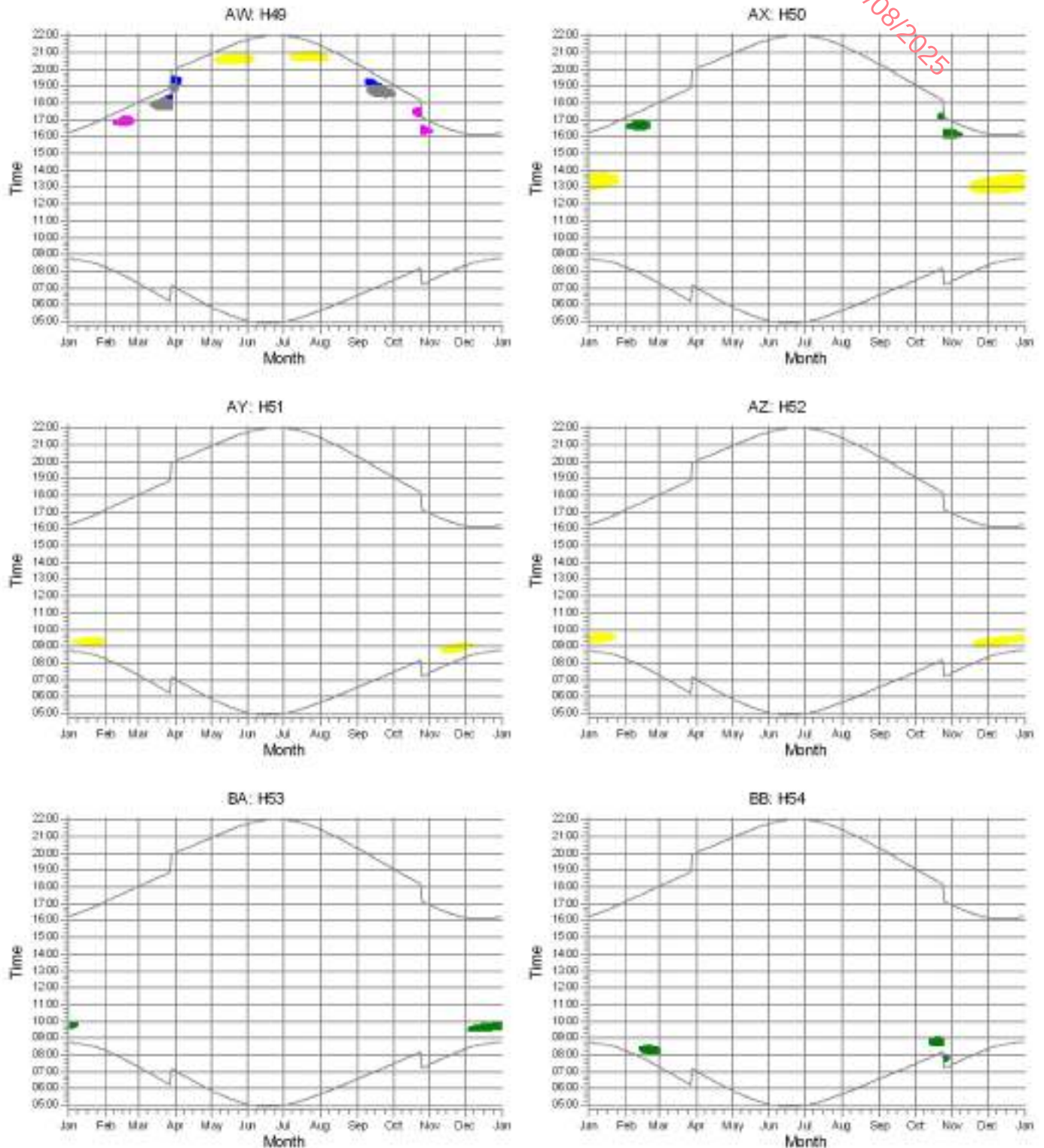


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

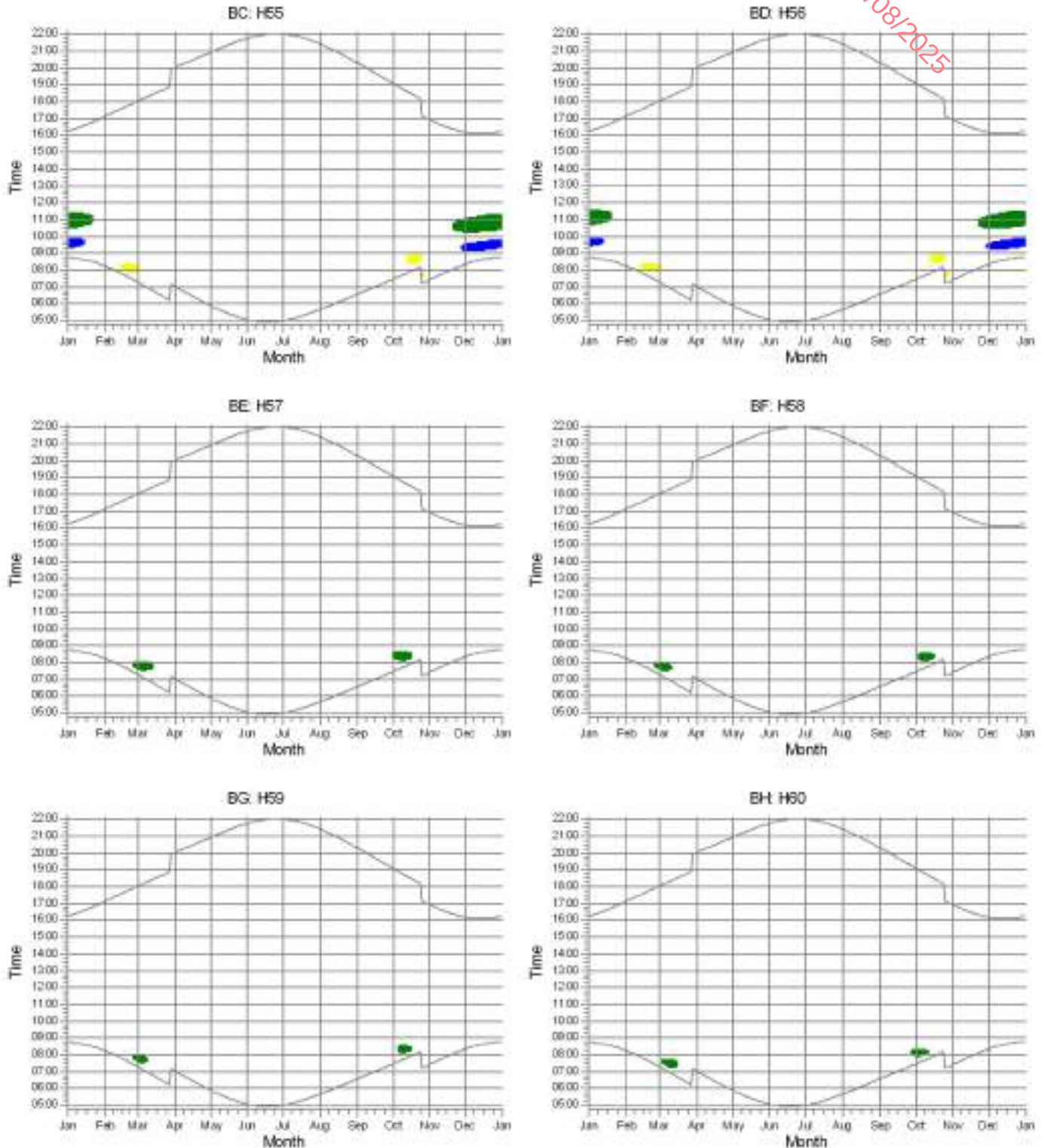


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

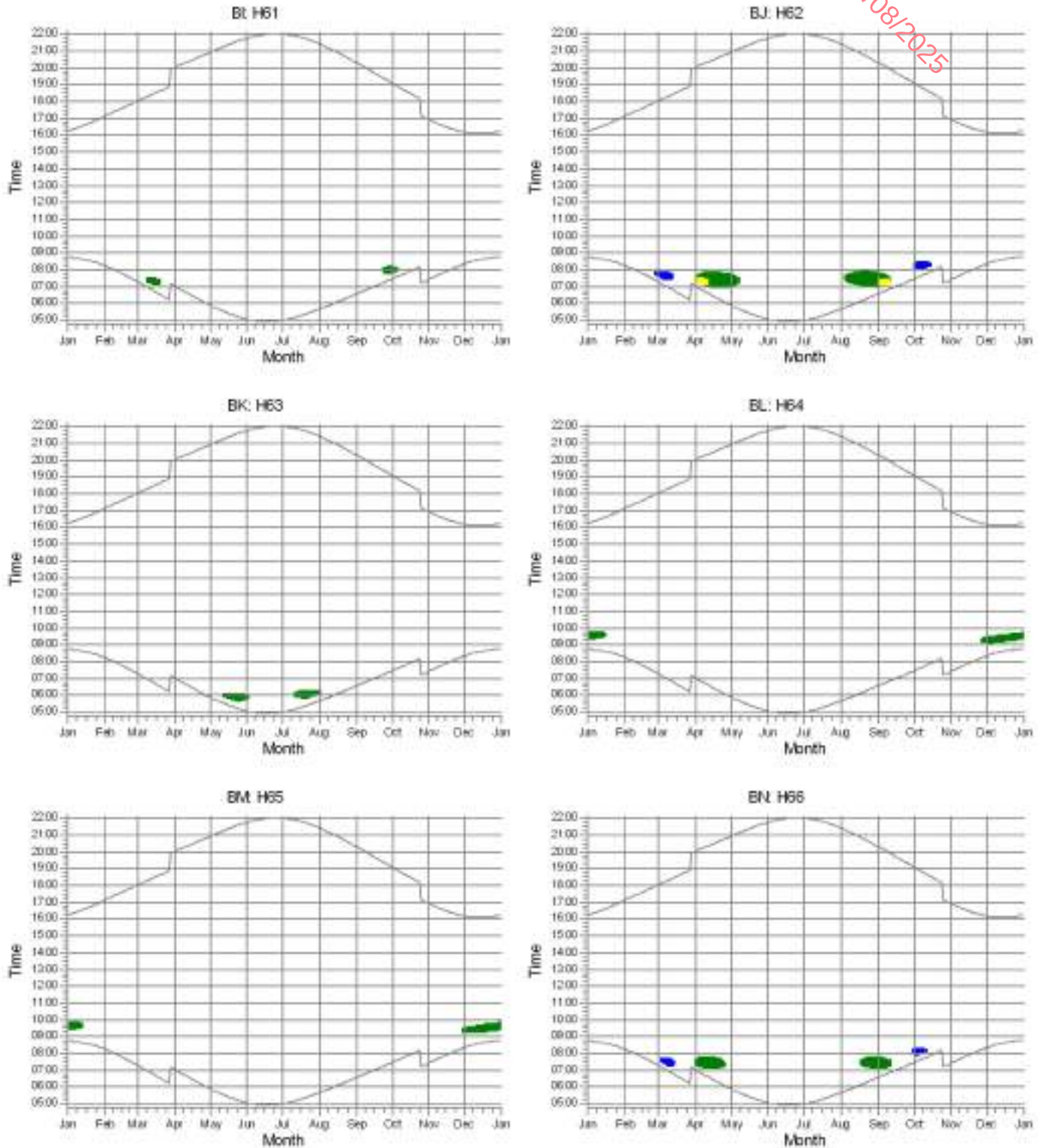


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

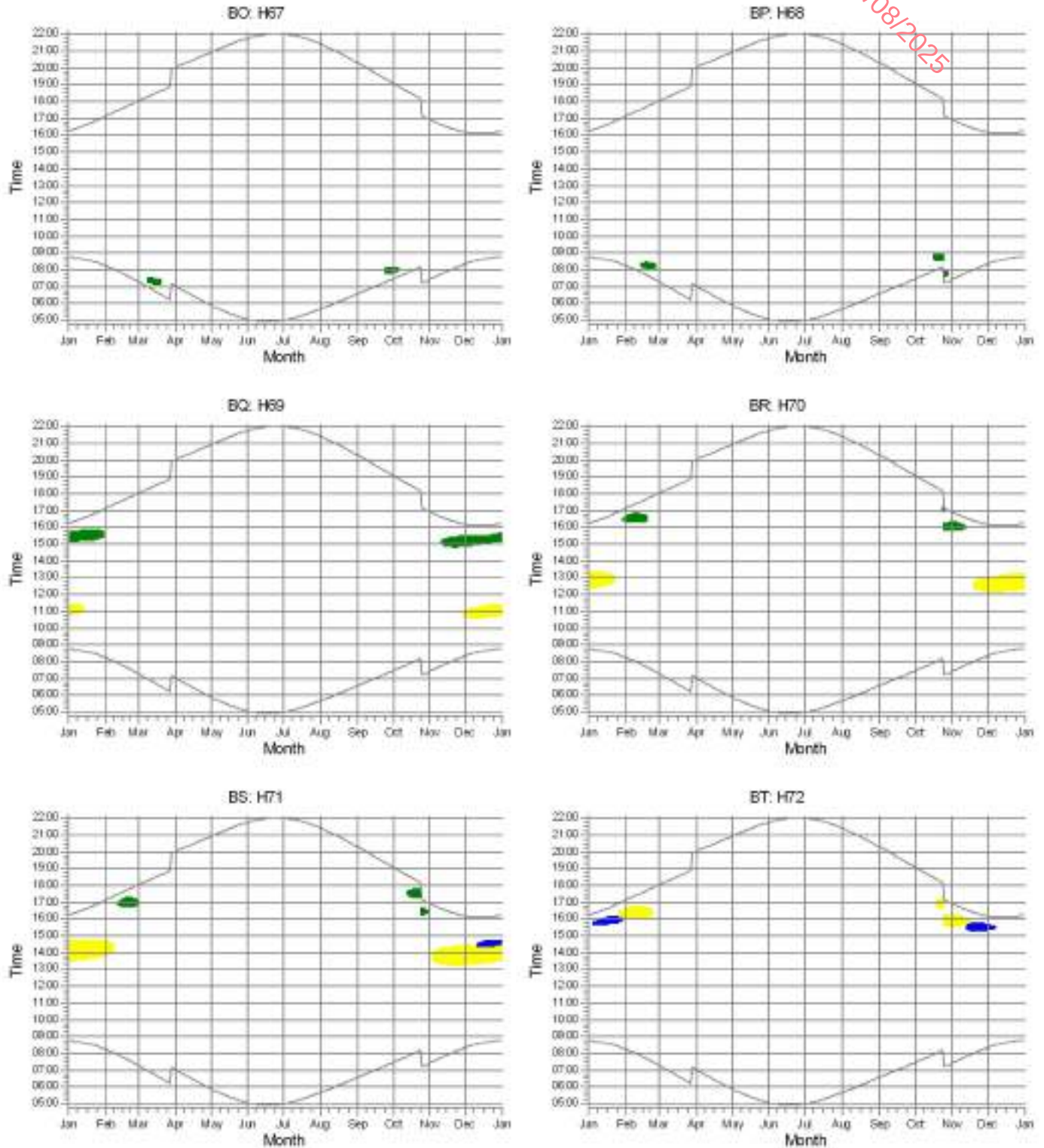


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

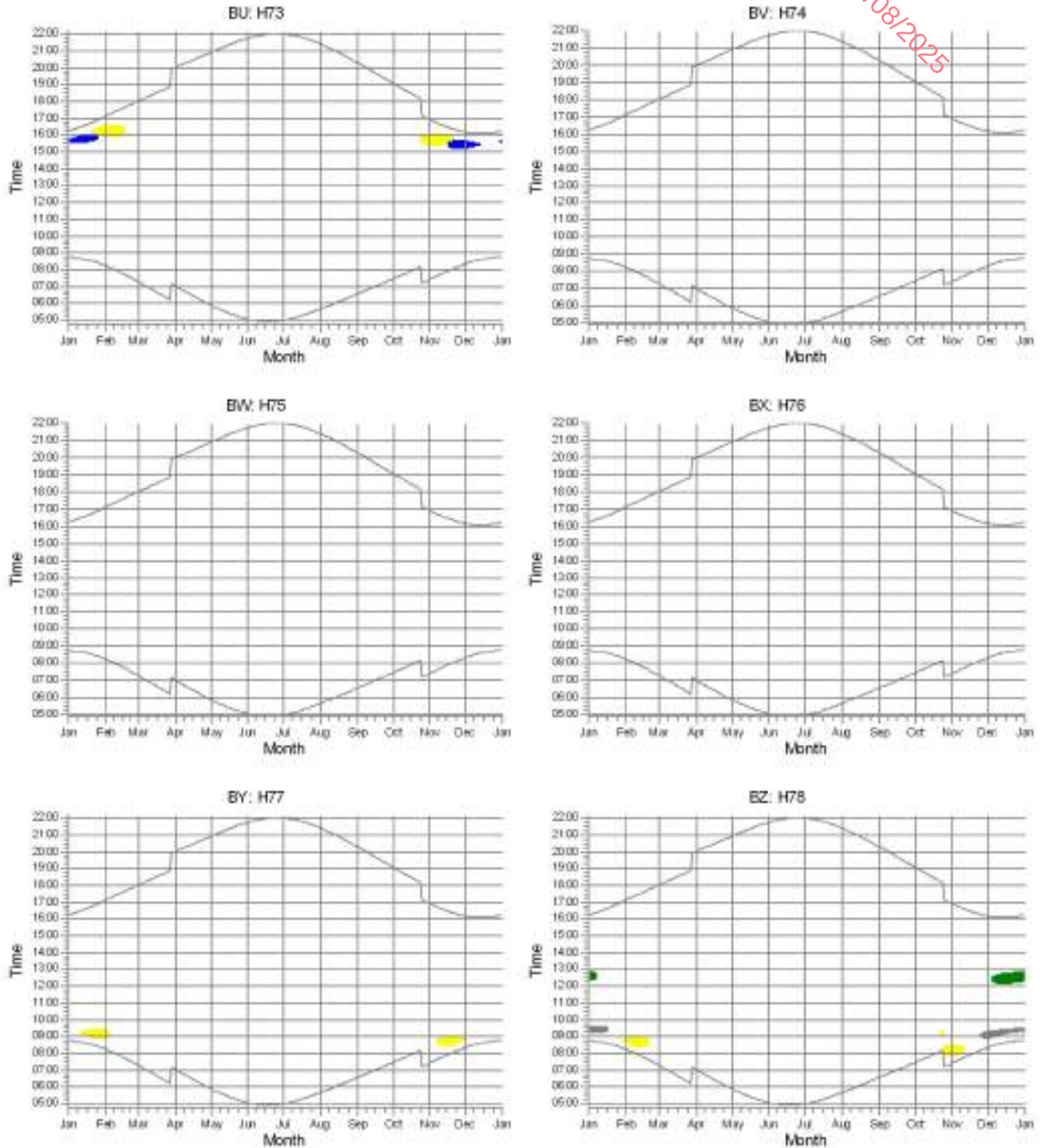


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

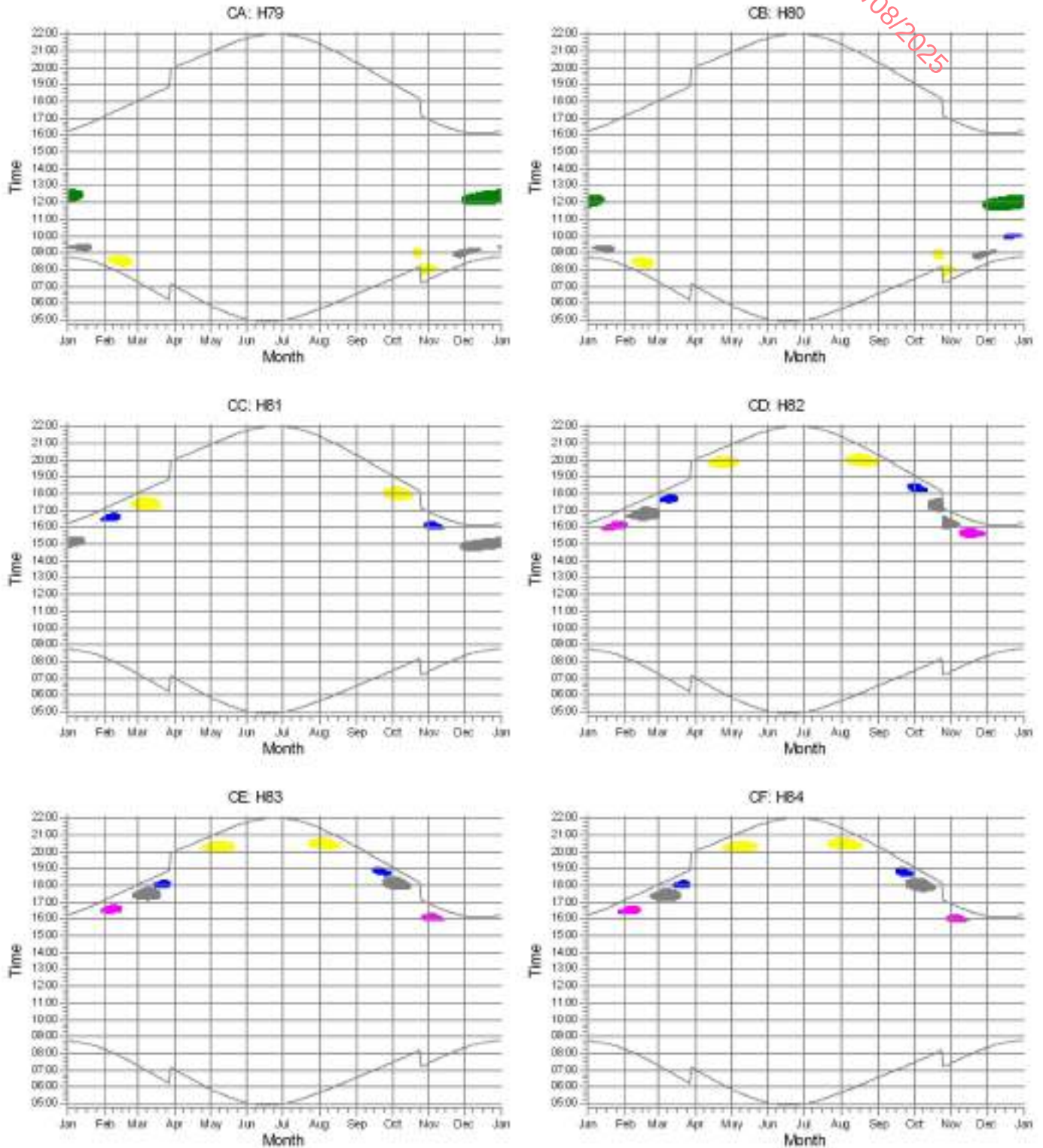


WTGs

1: T01 2: T02 3: T03 4: T04

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

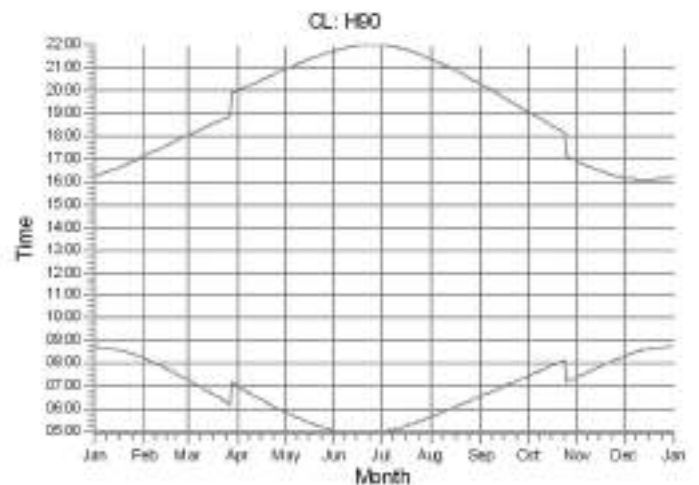
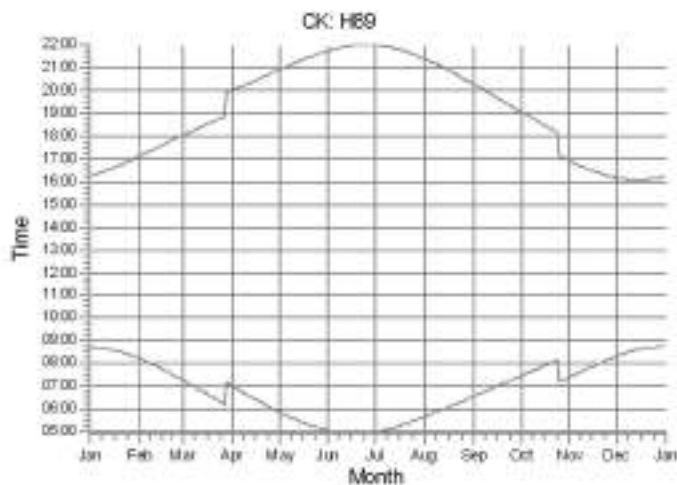
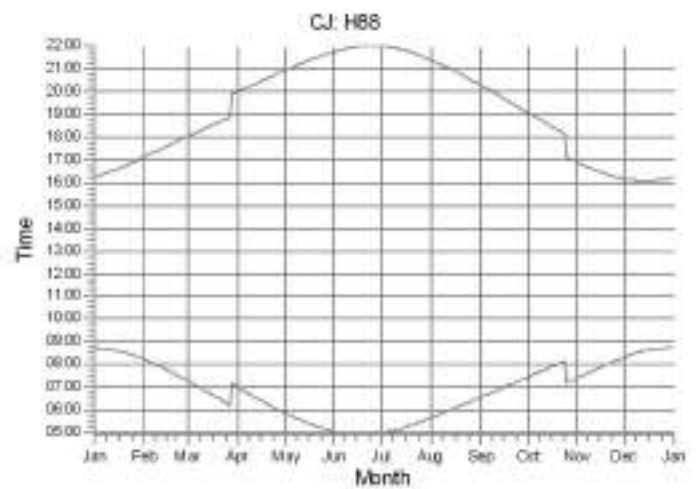
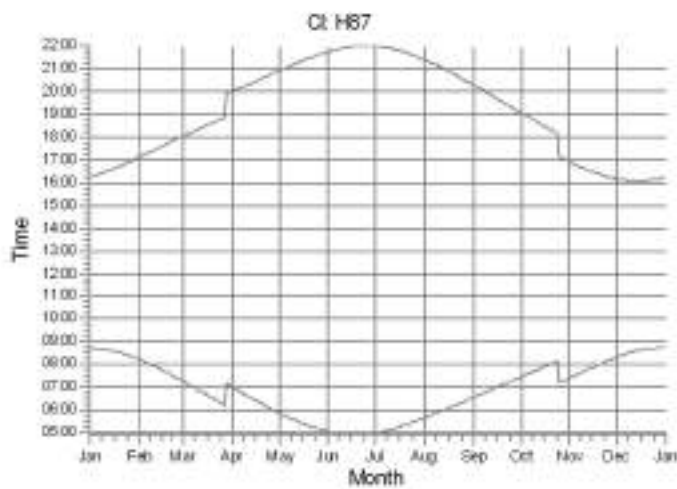
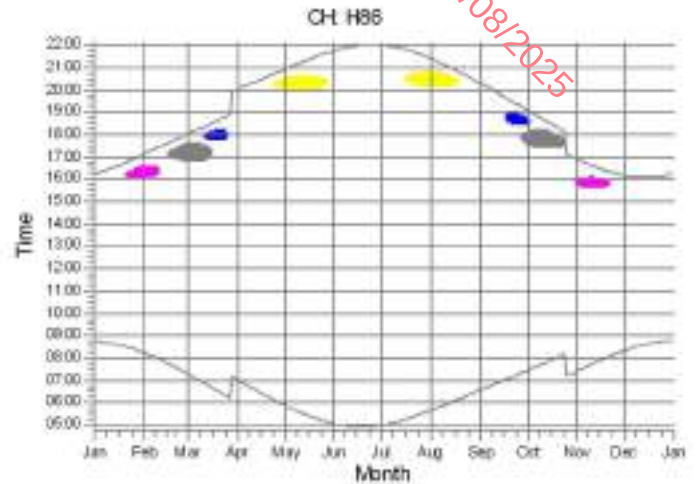
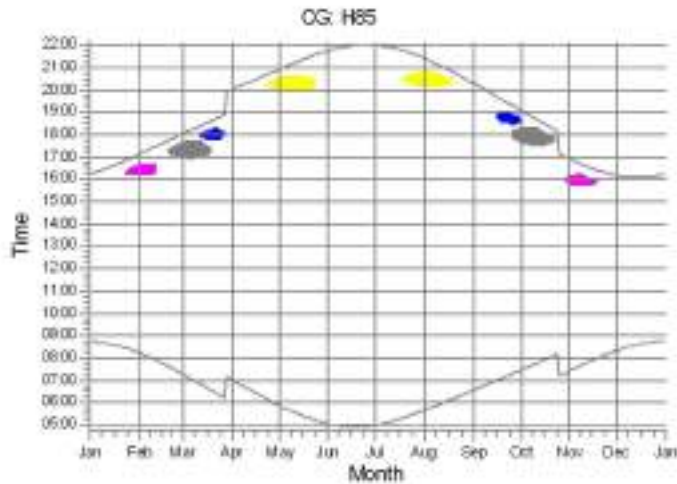


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

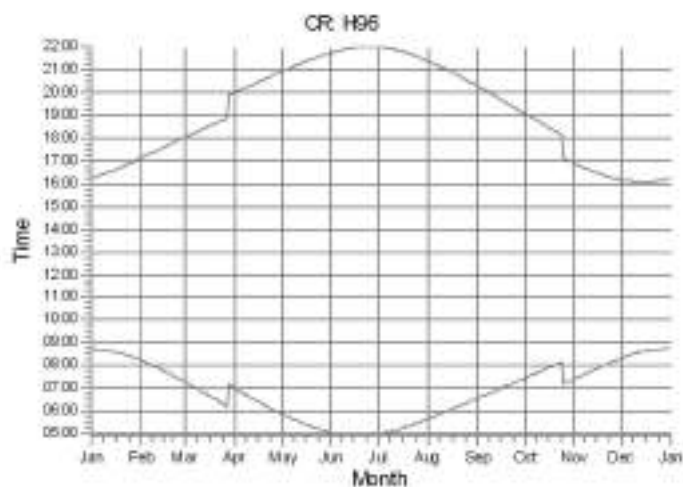
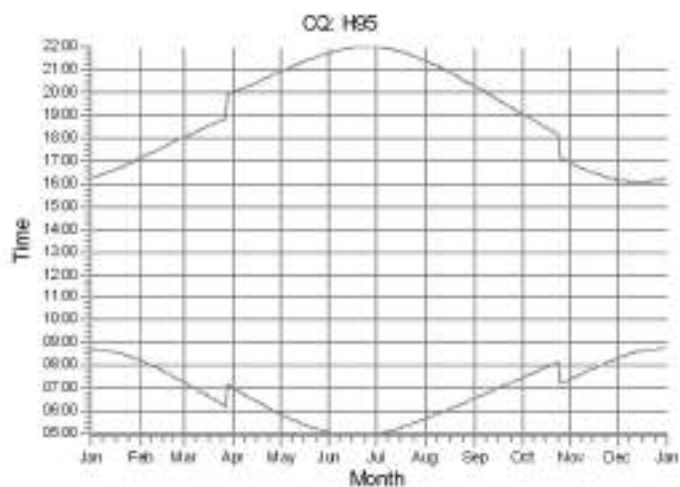
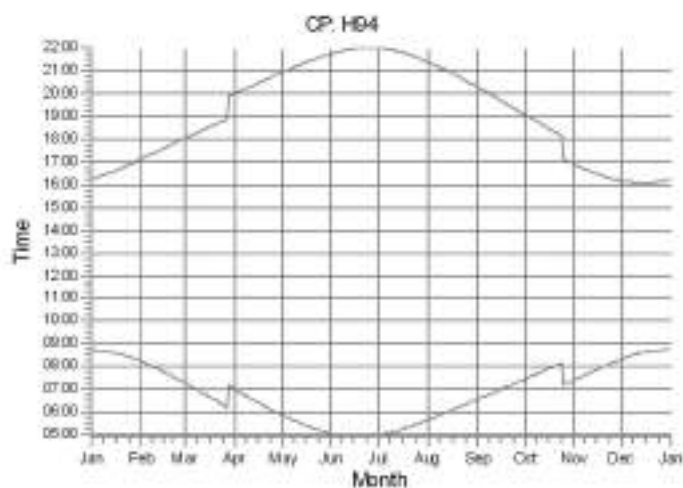
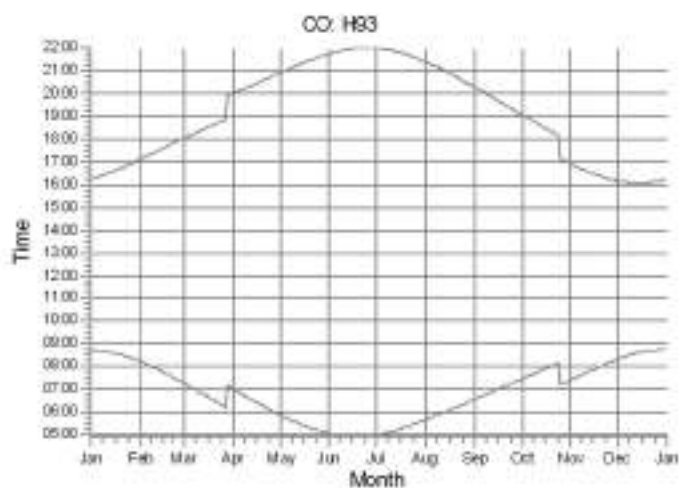
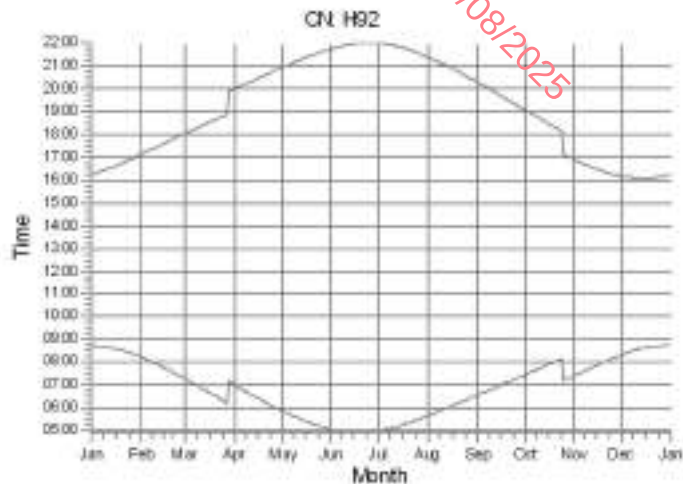
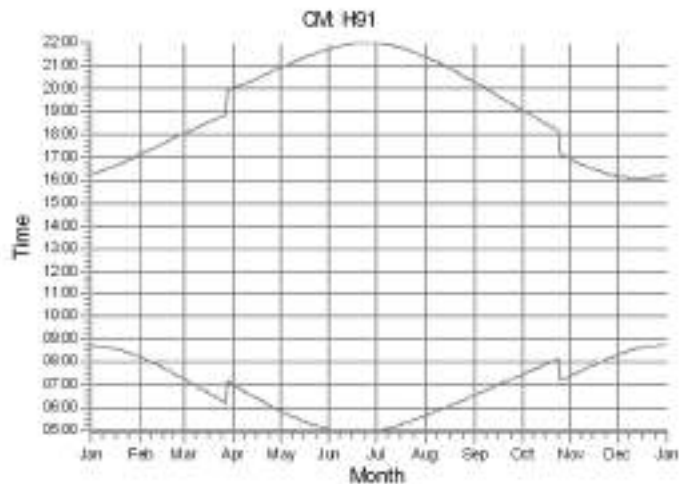


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

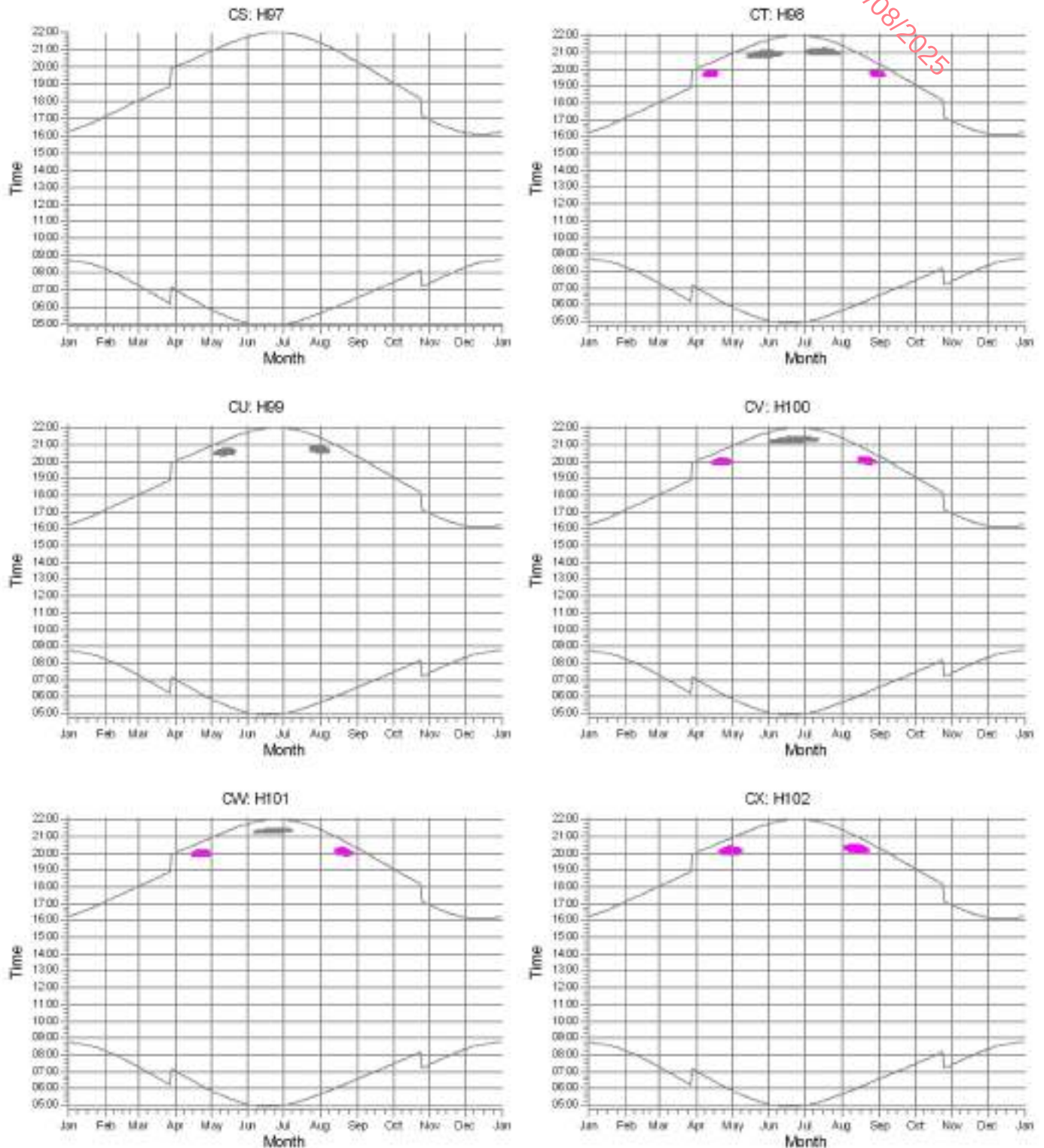
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

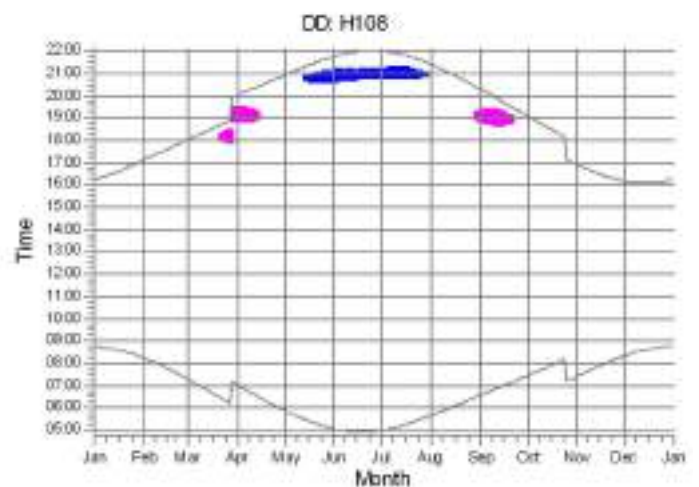
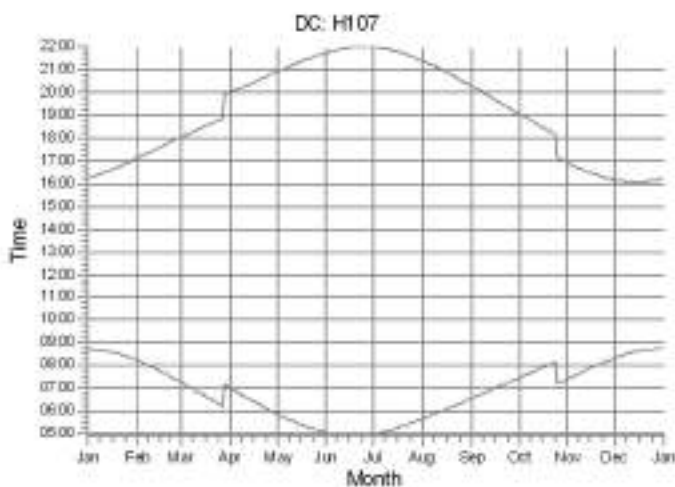
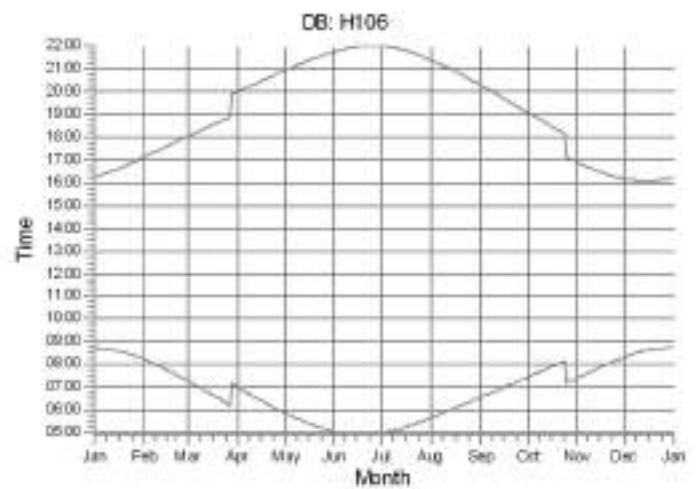
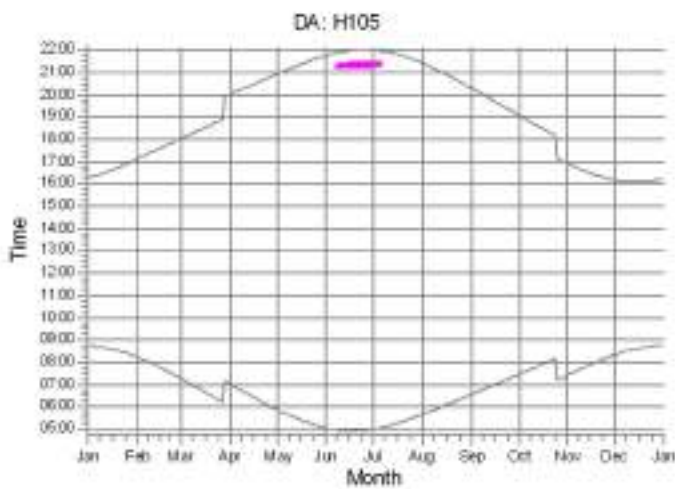
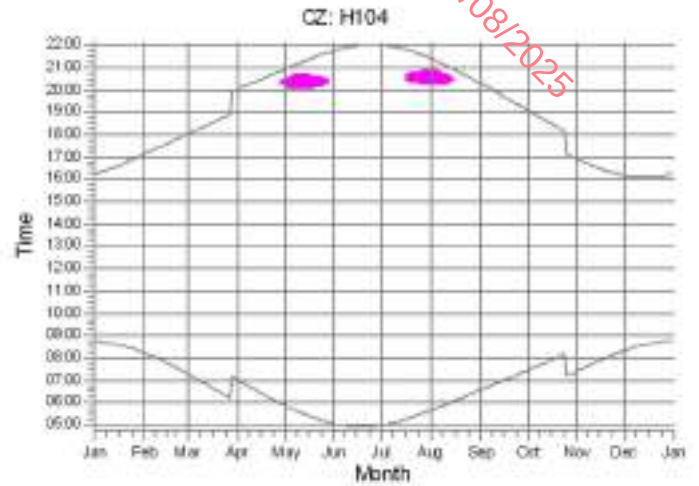
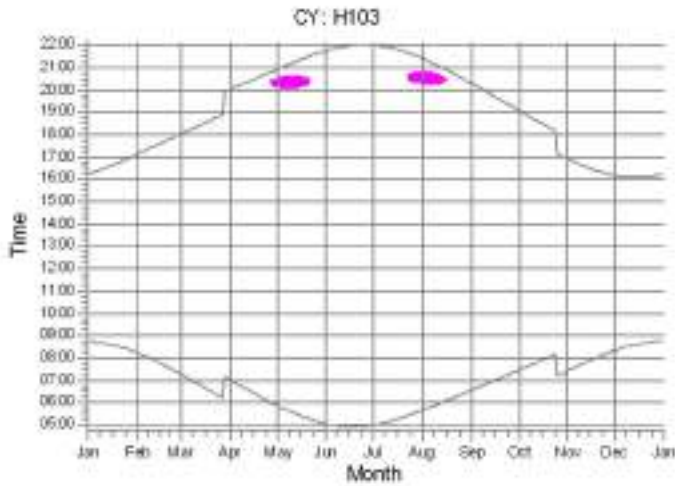


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

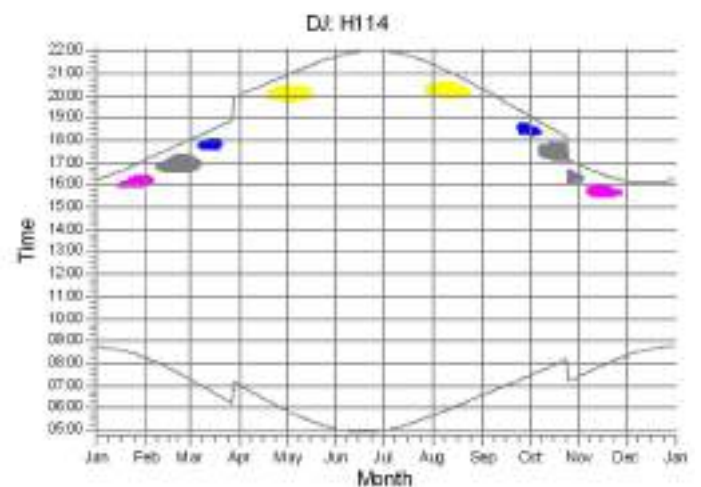
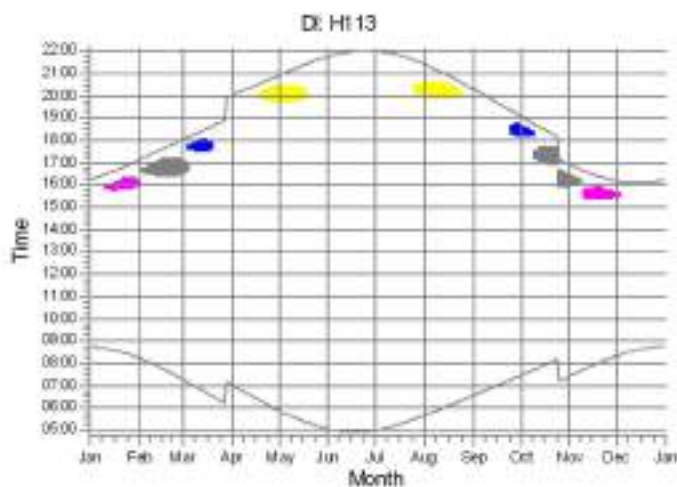
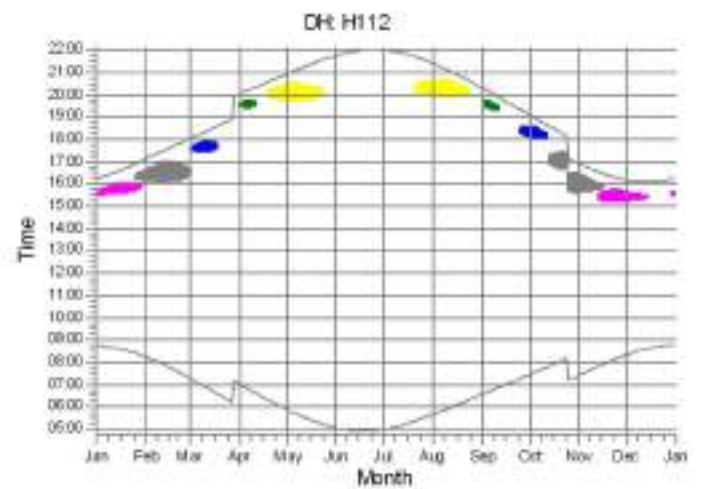
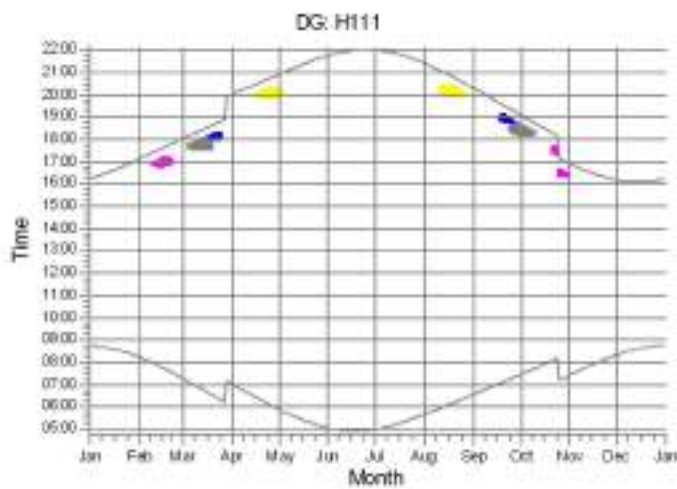
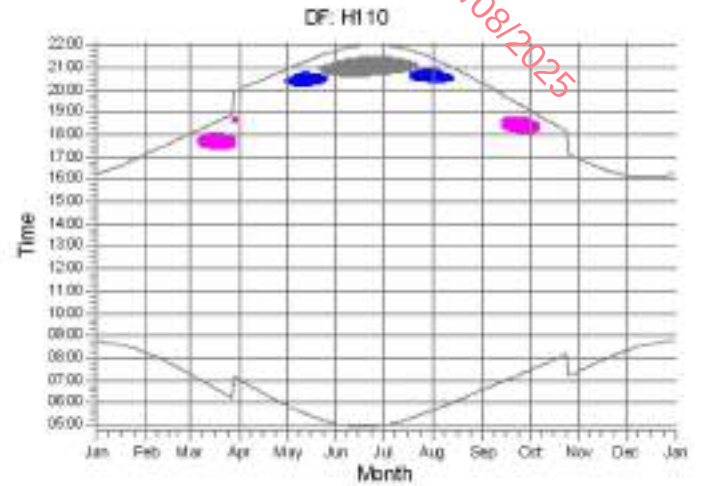
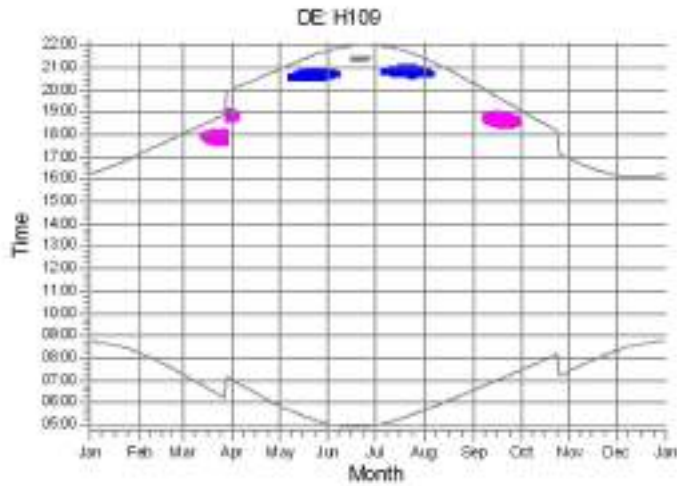


WTGs

3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

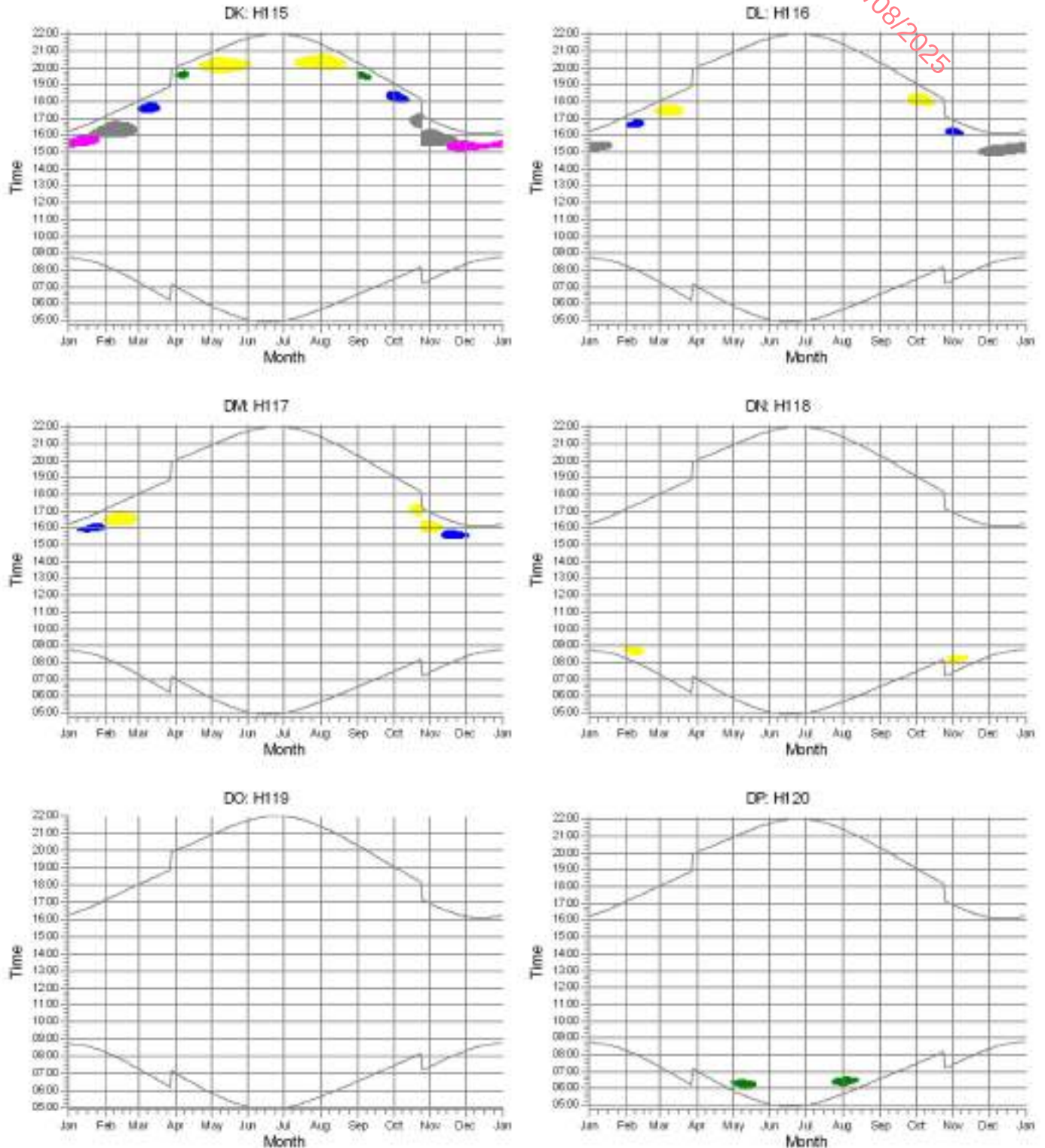


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

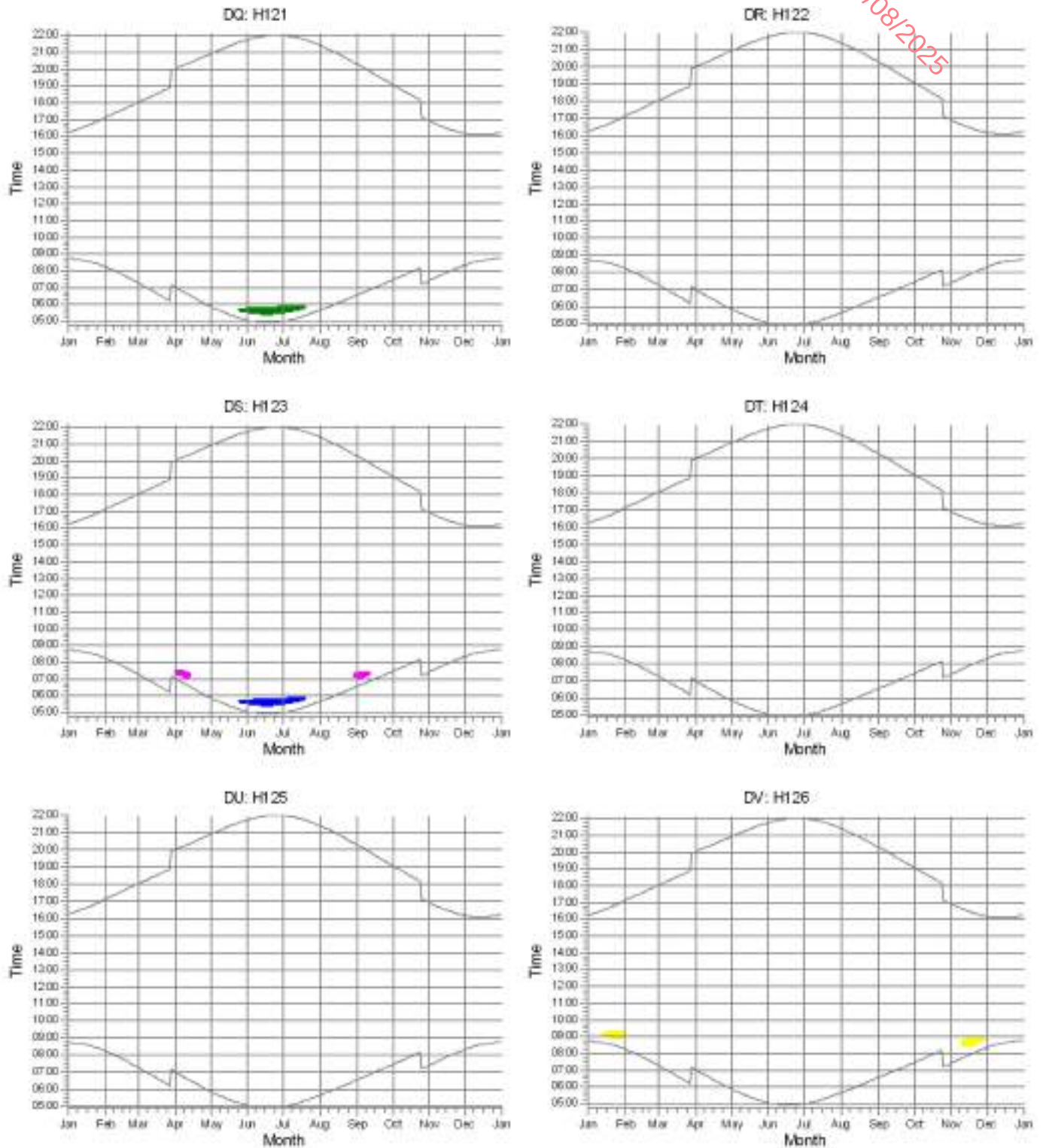


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

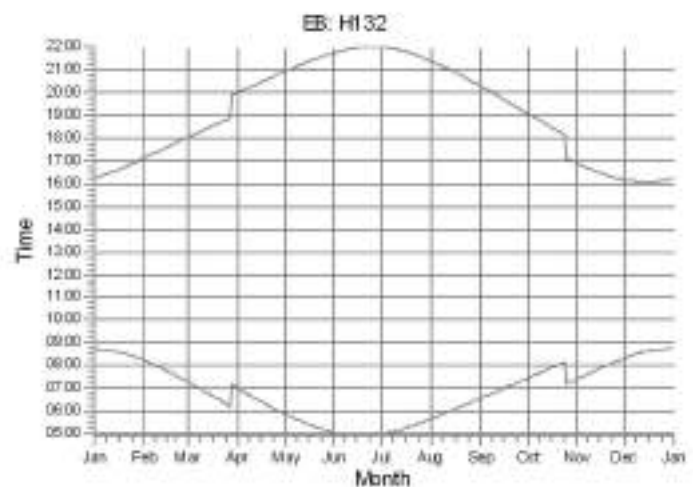
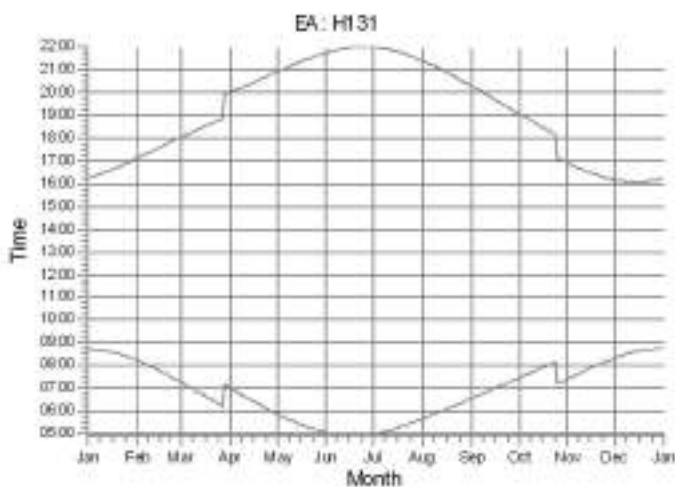
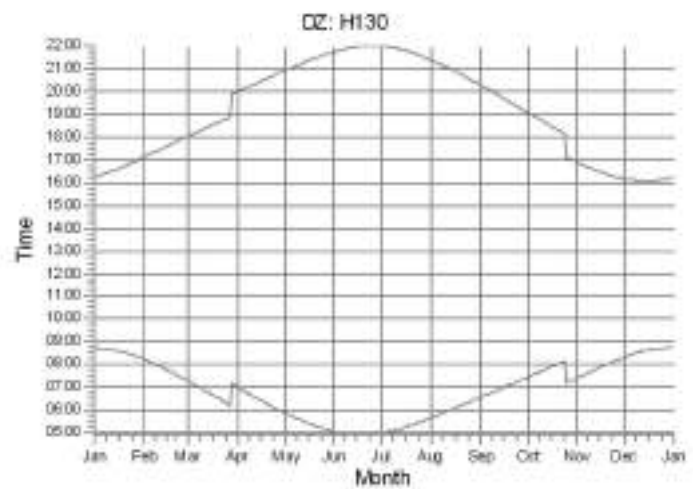
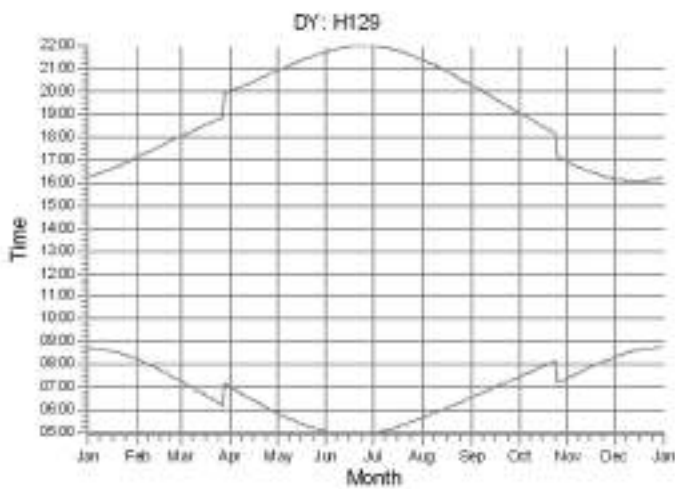
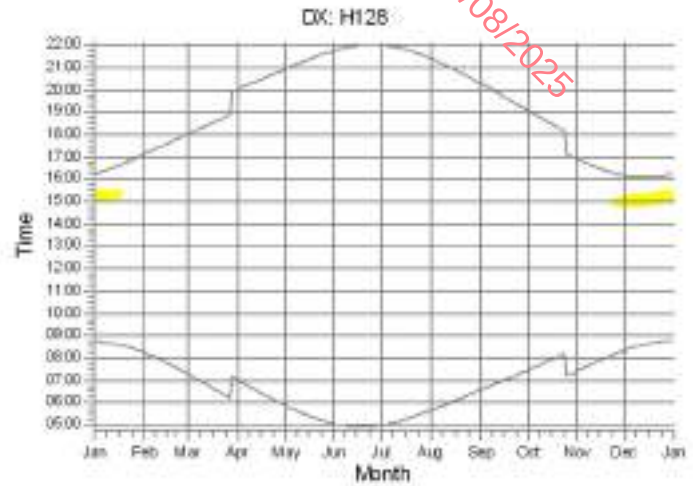
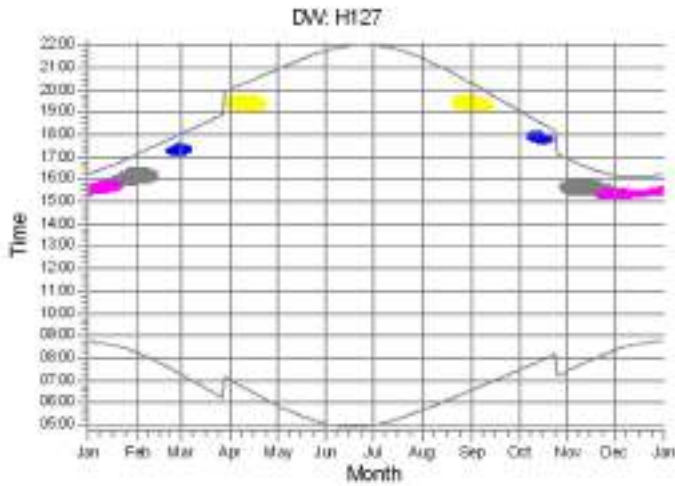


WTGs

1: T01 2: T02 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

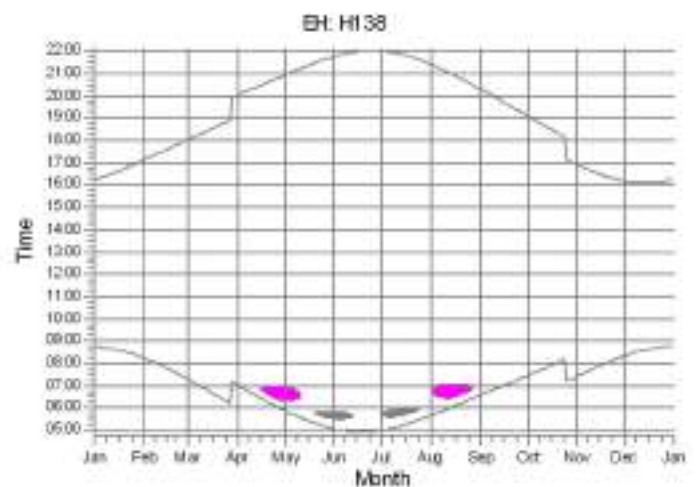
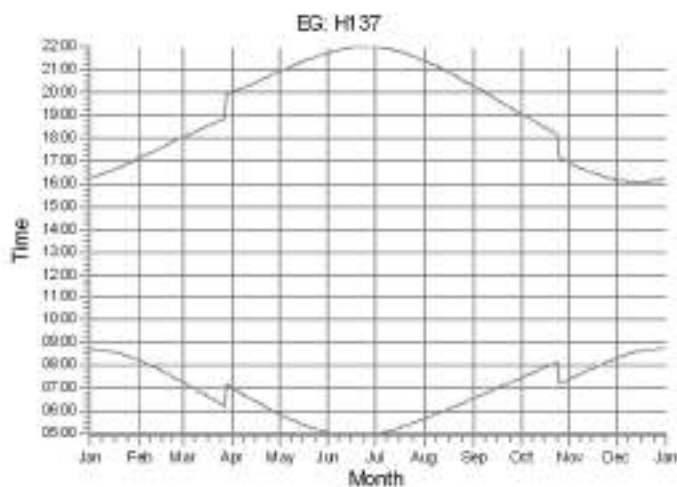
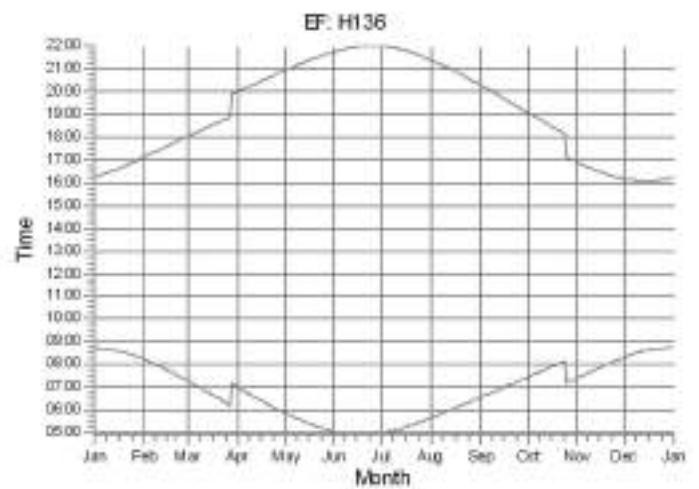
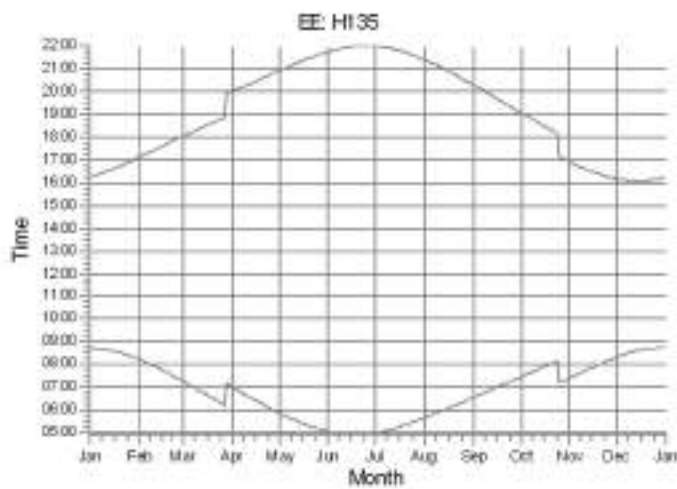
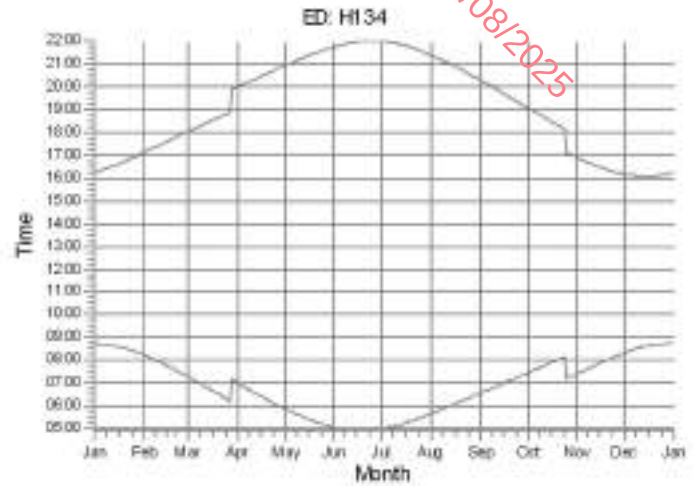
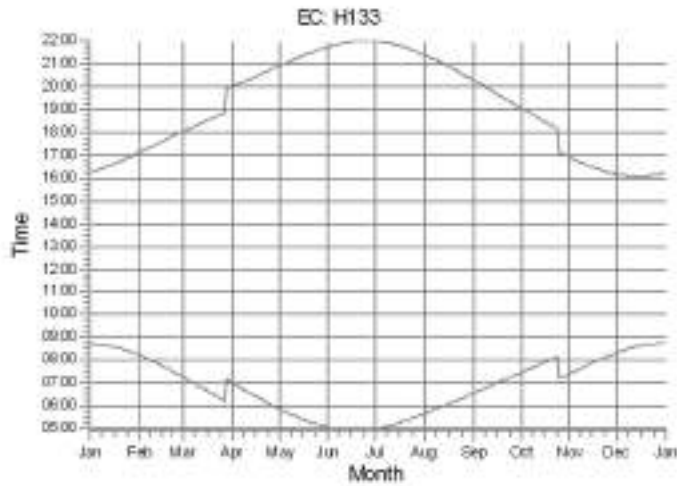


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

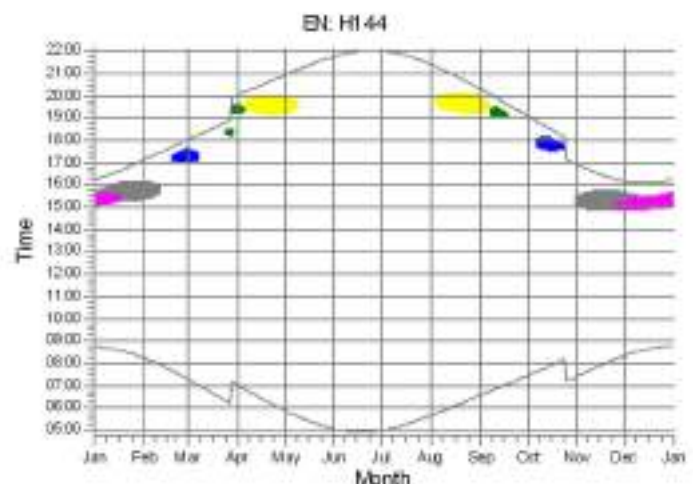
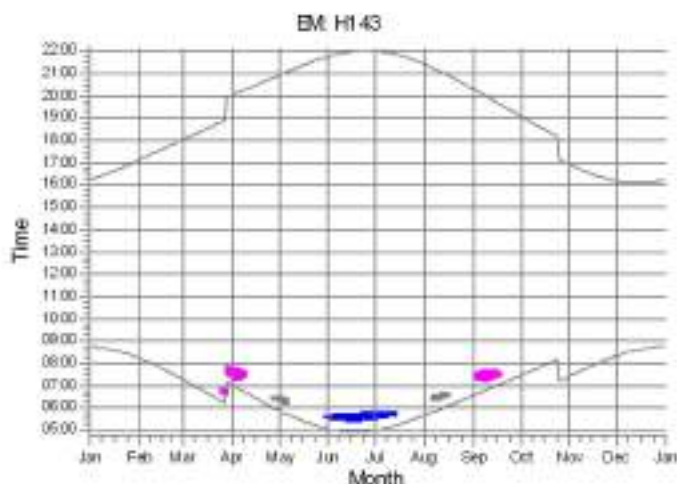
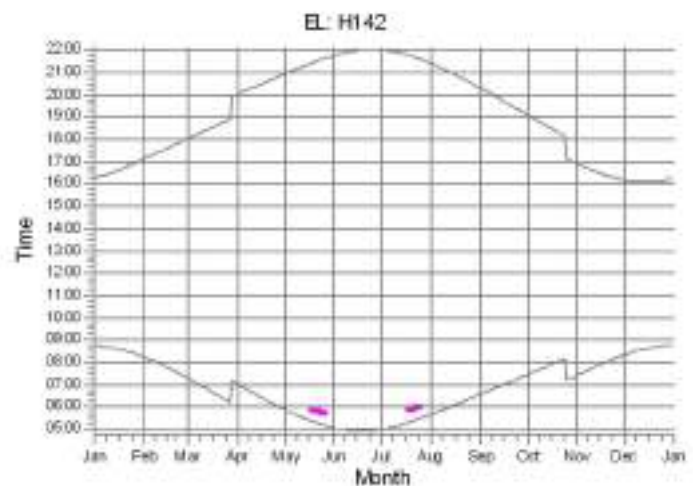
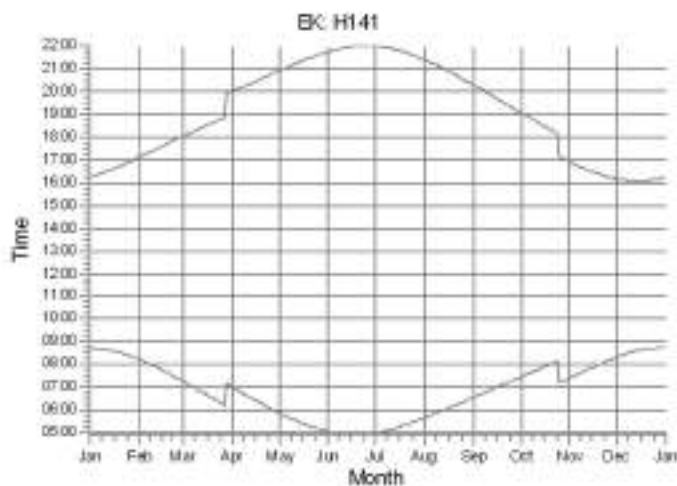
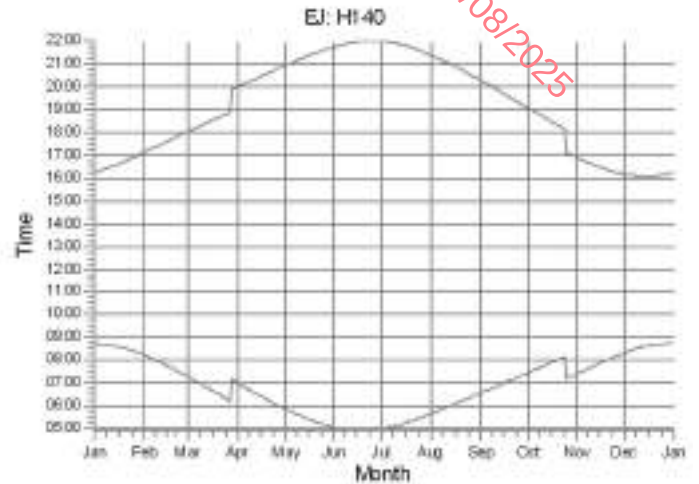
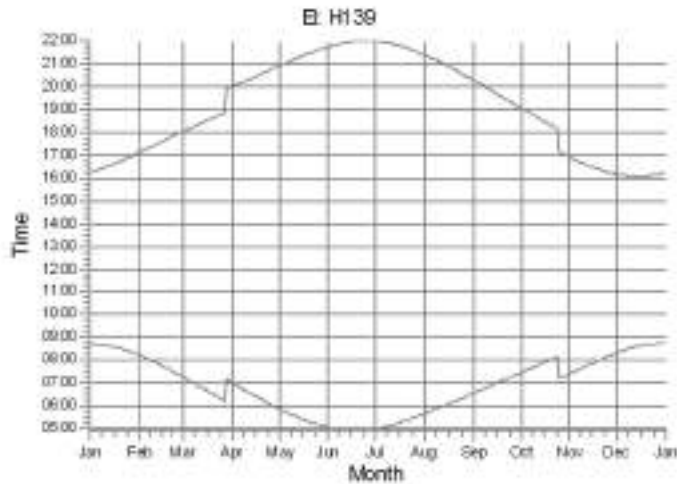


WTGs

4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

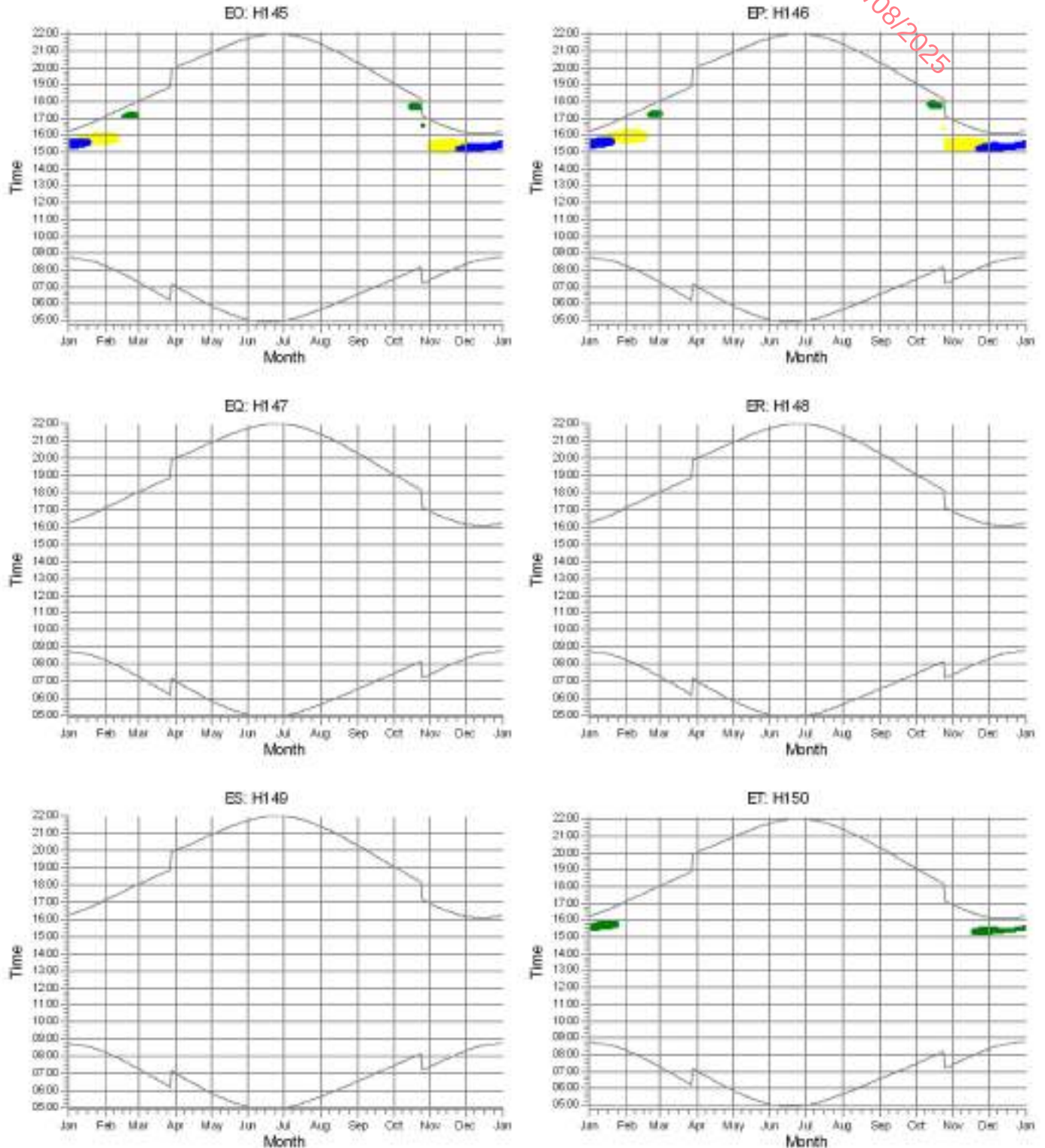


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

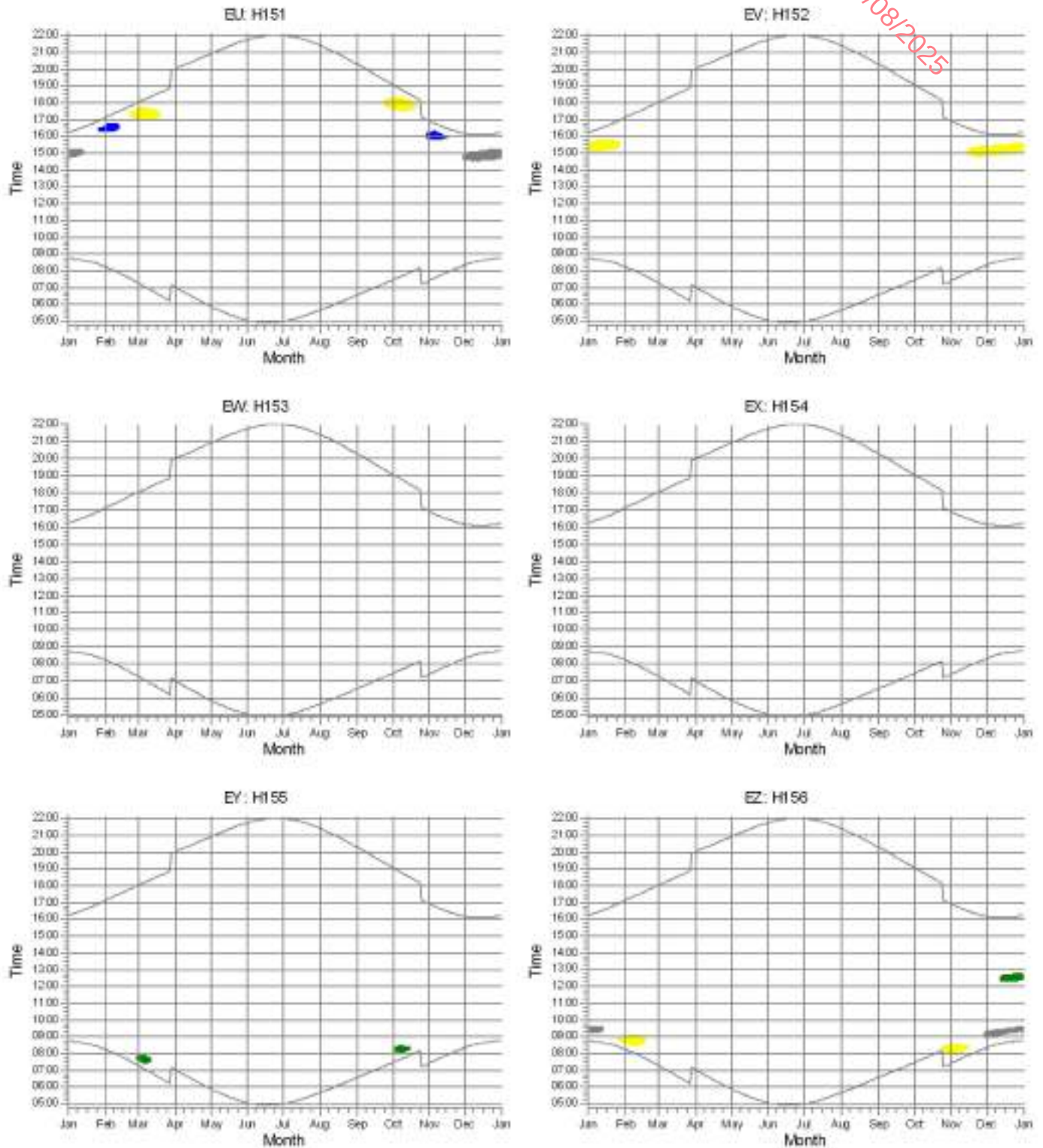


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

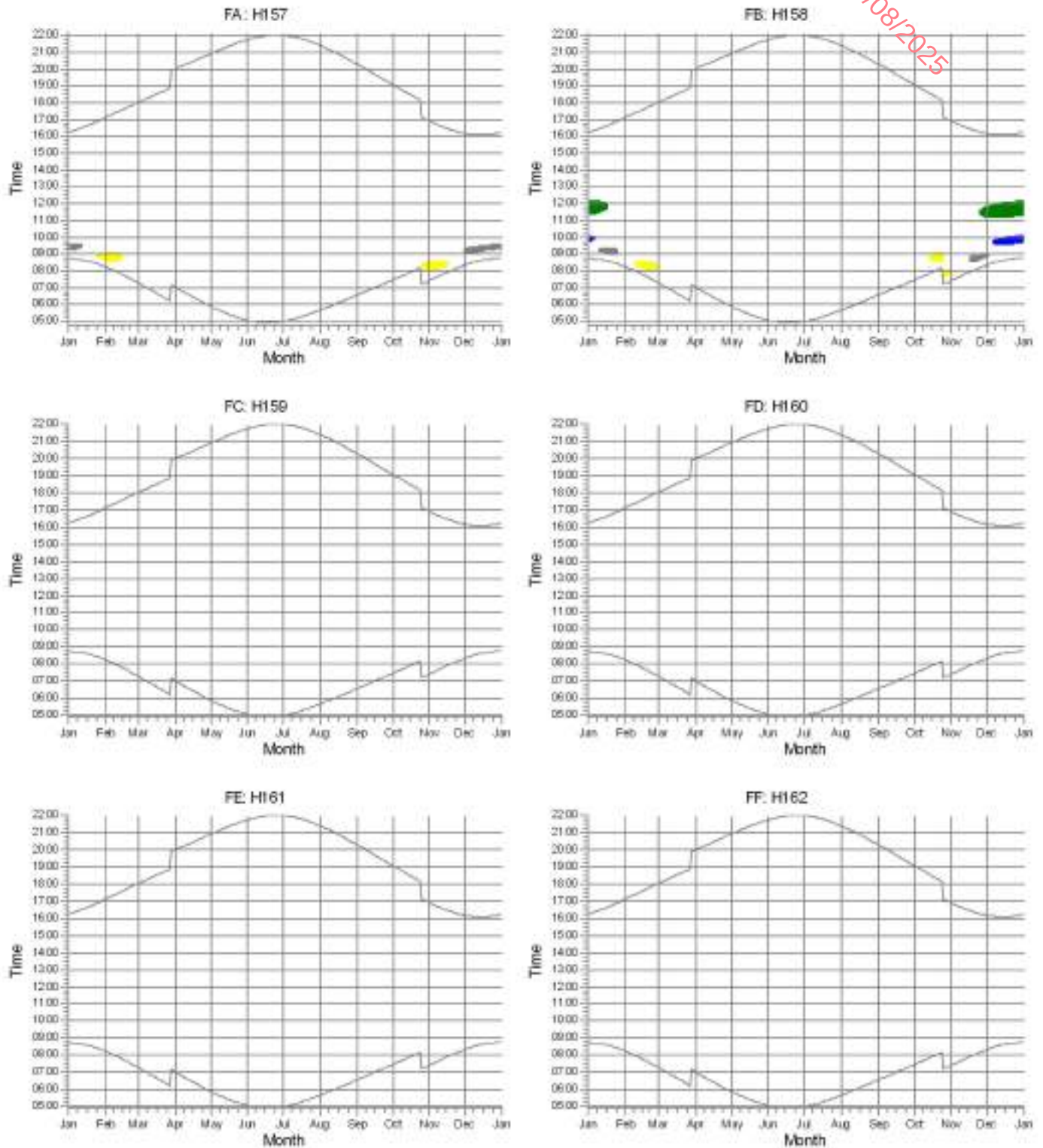


WTGs

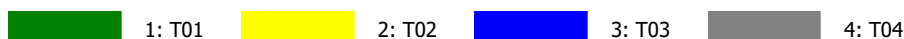
1: T01 2: T02 3: T03 4: T04

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

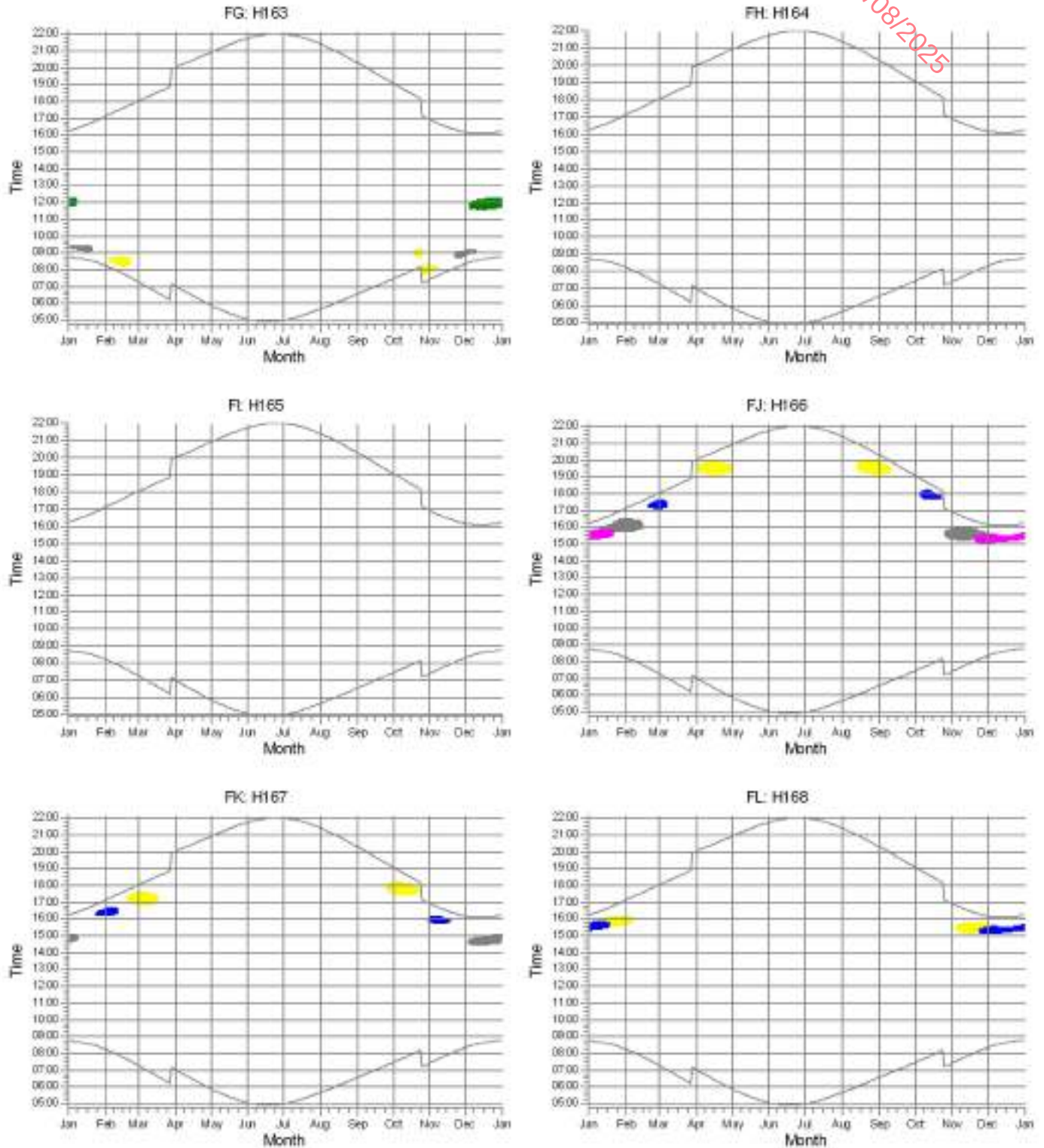


WTGs



SHADOW - Calendar, graphical

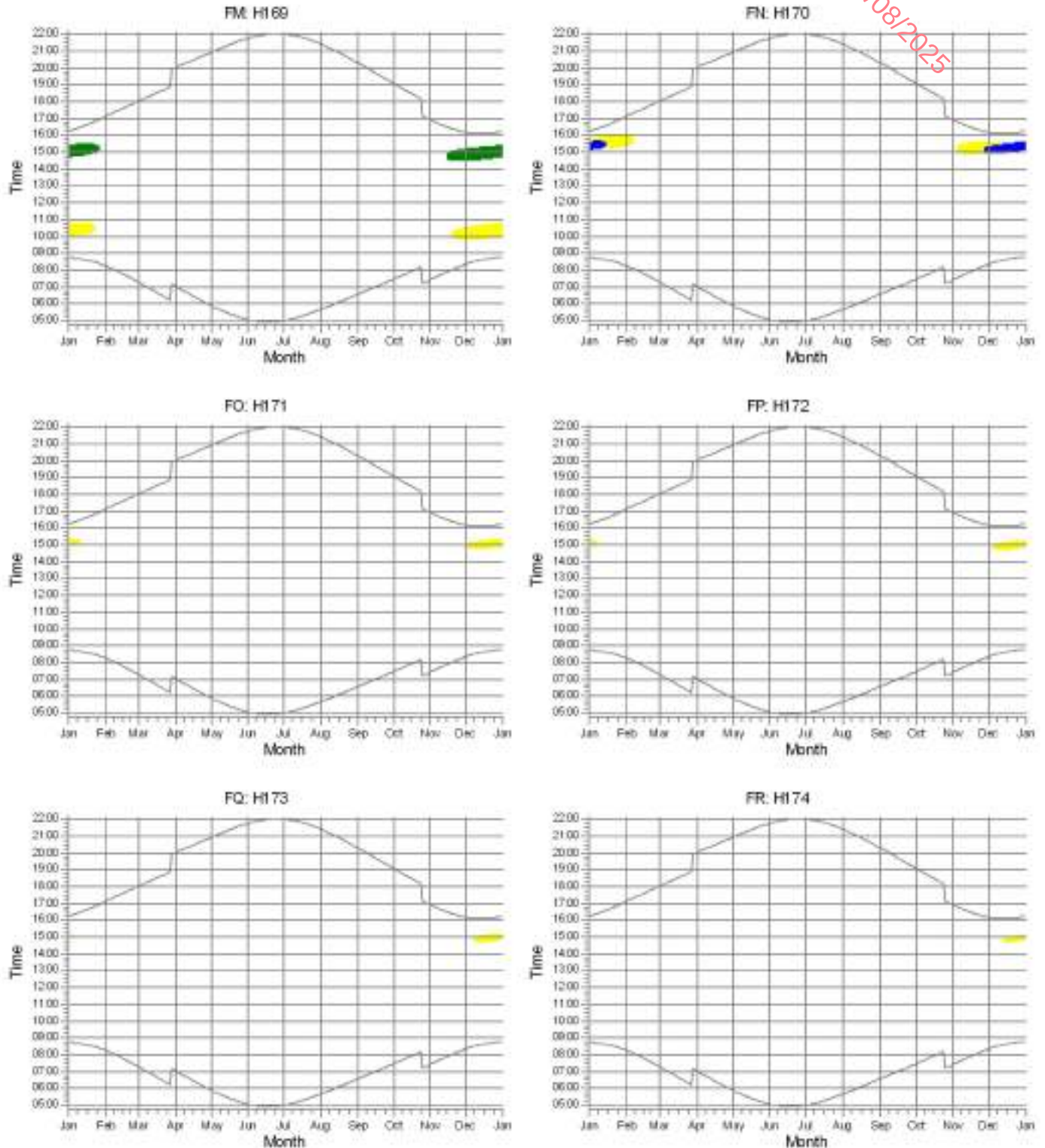
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

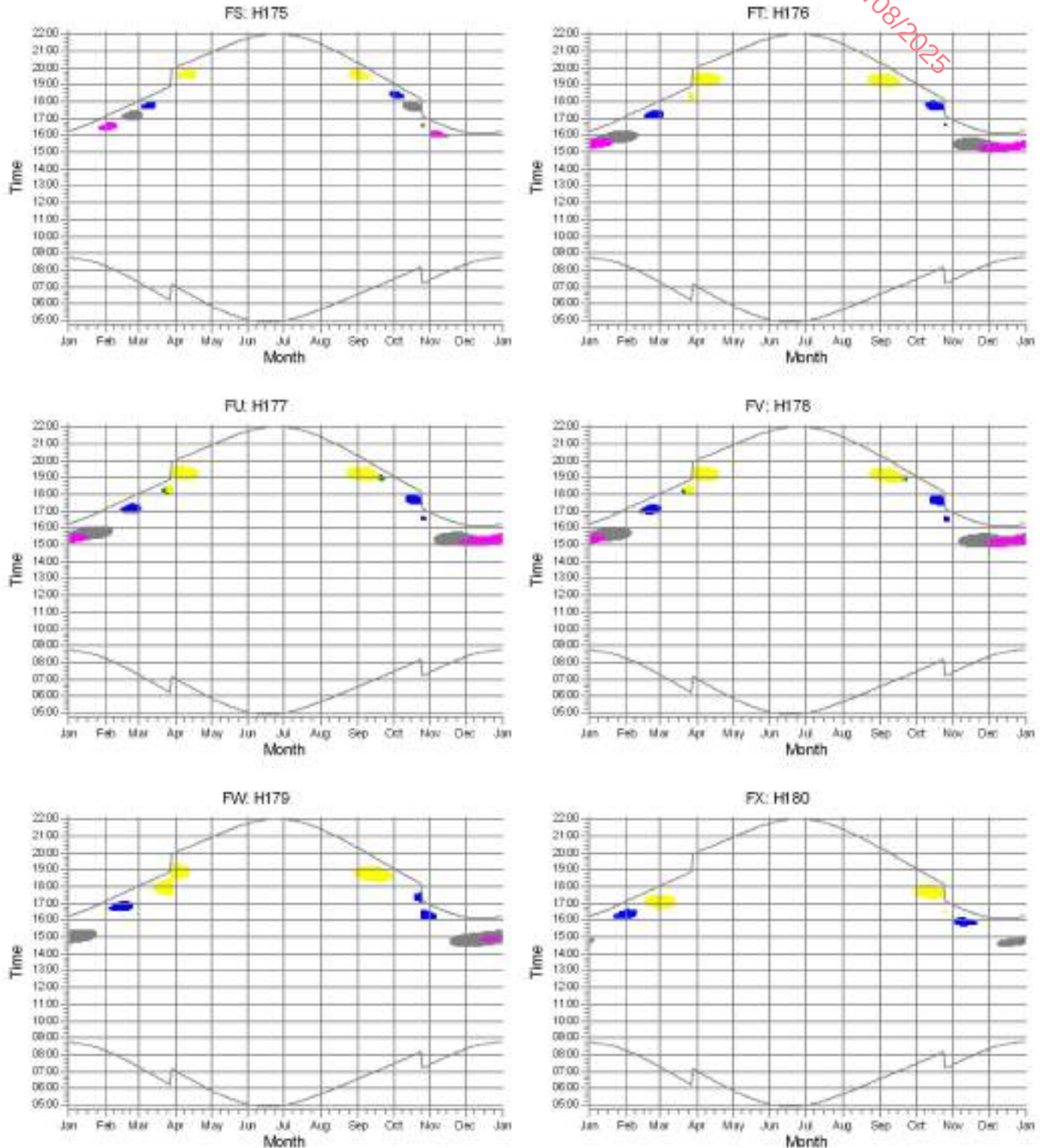


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

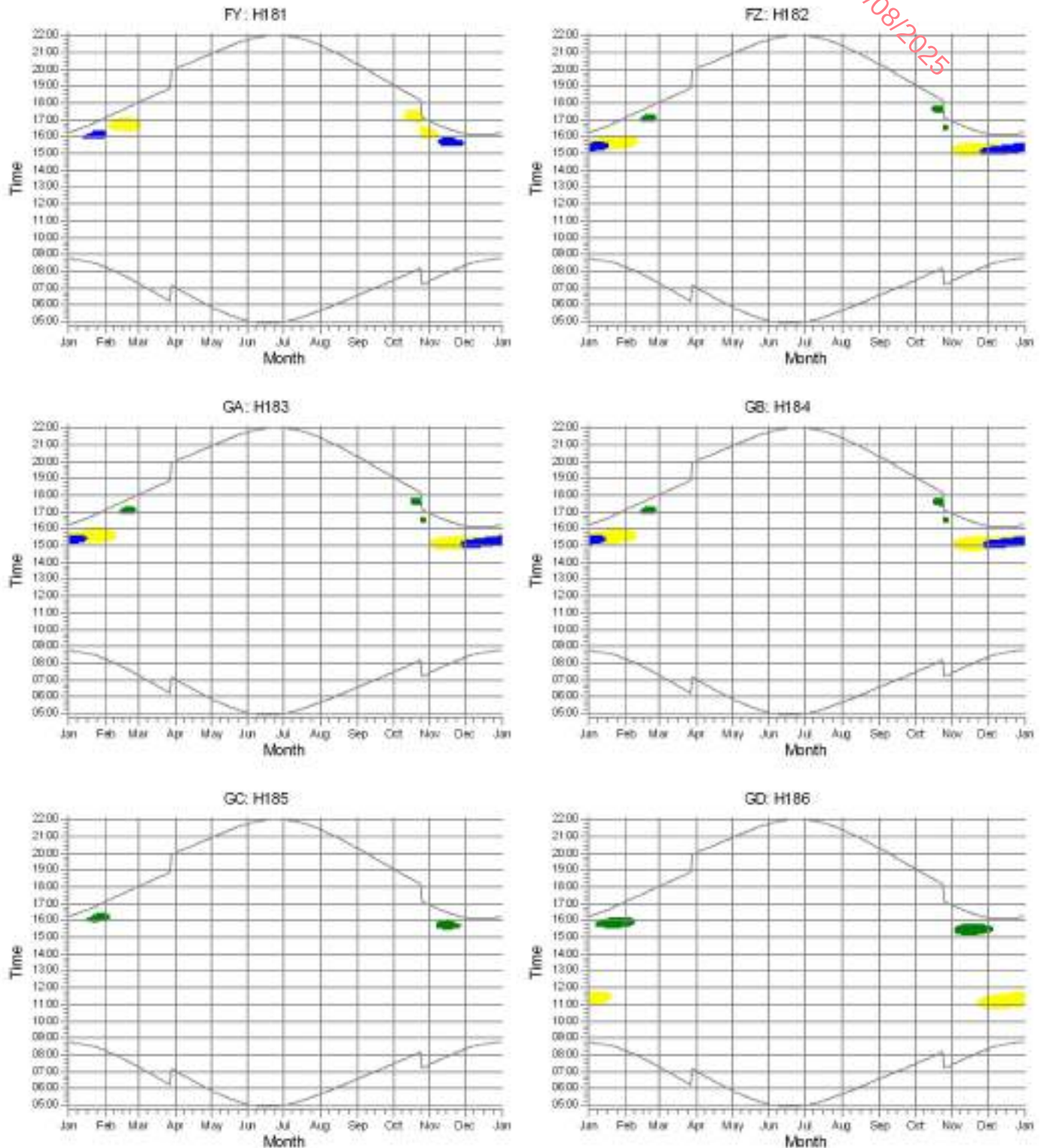


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

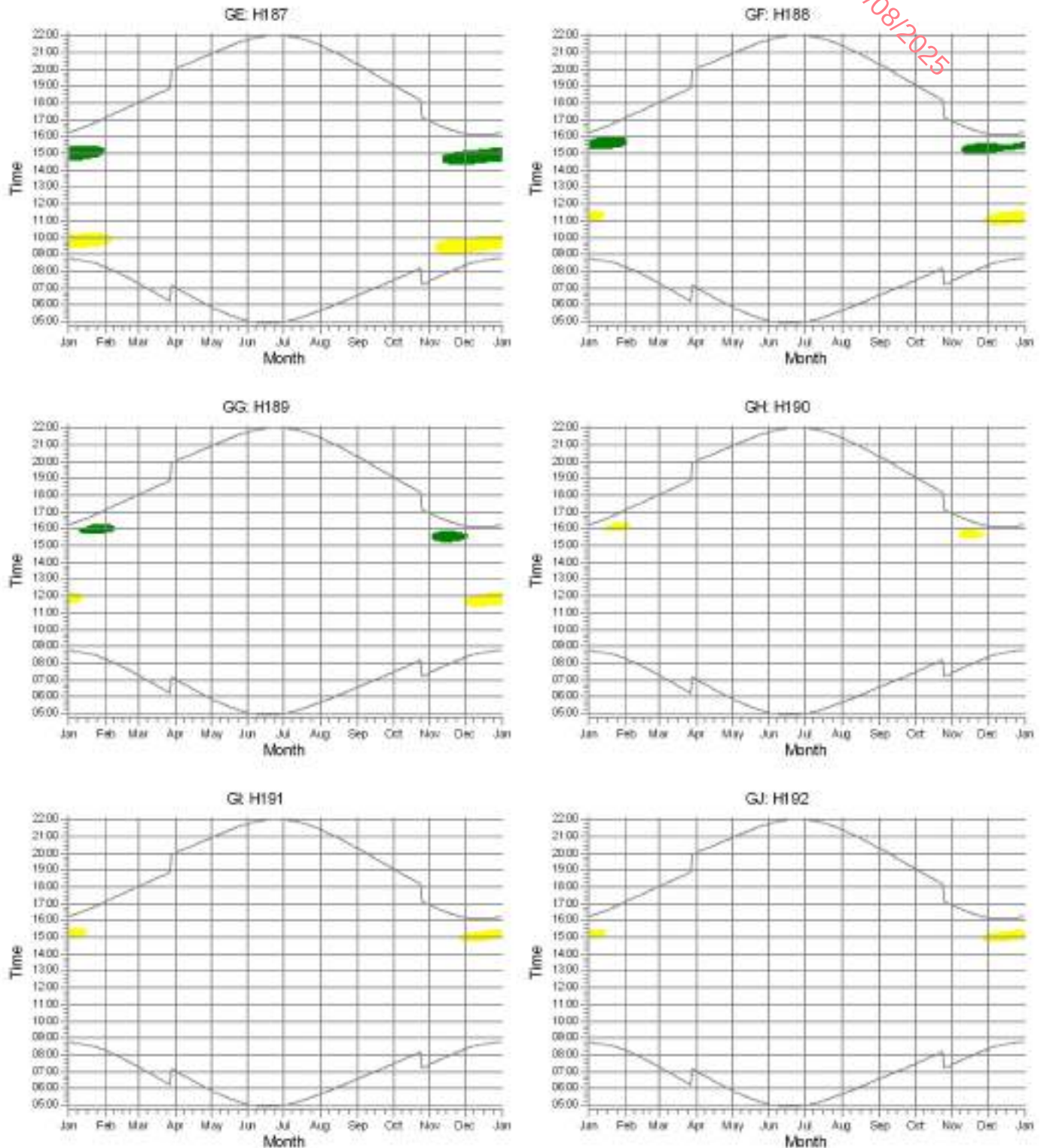


WTGs

1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

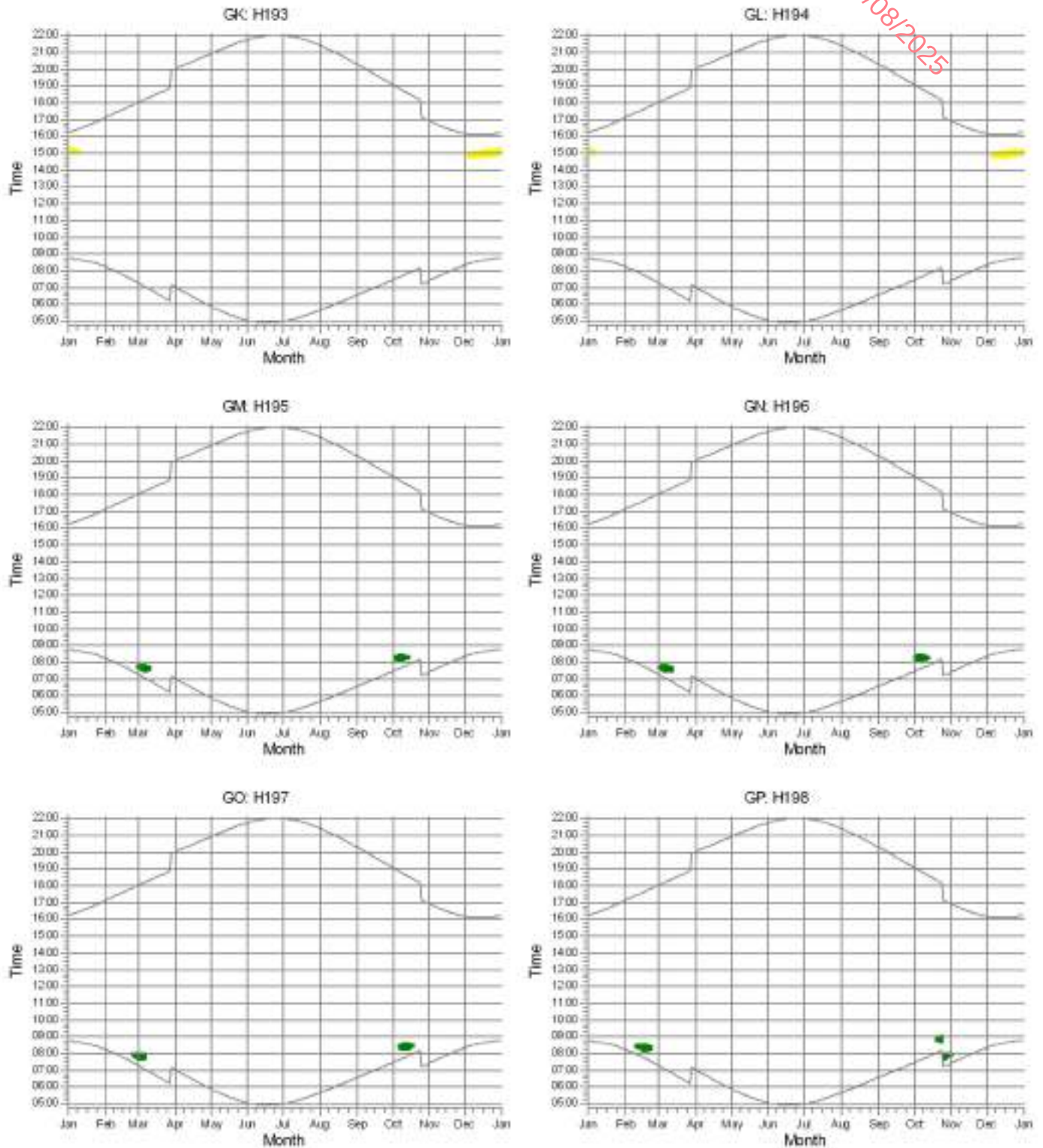


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

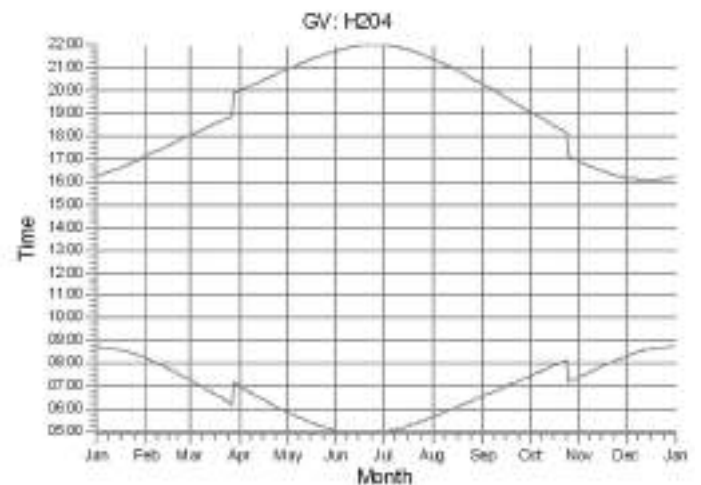
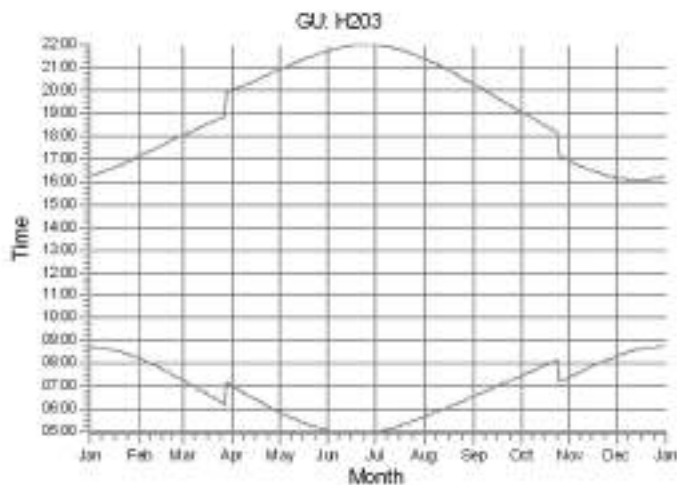
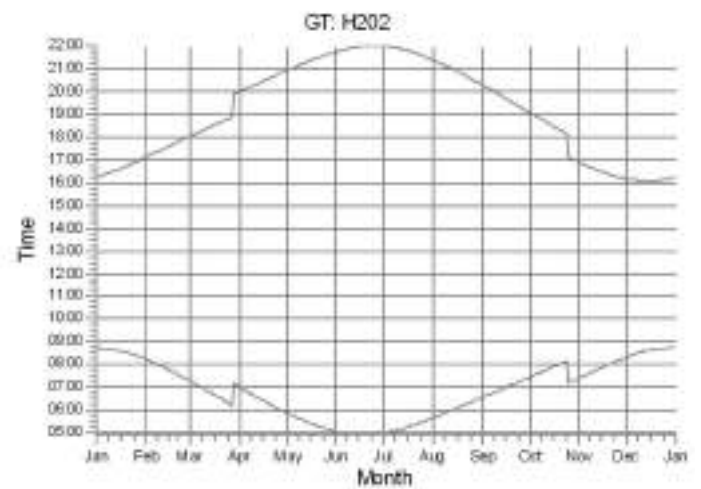
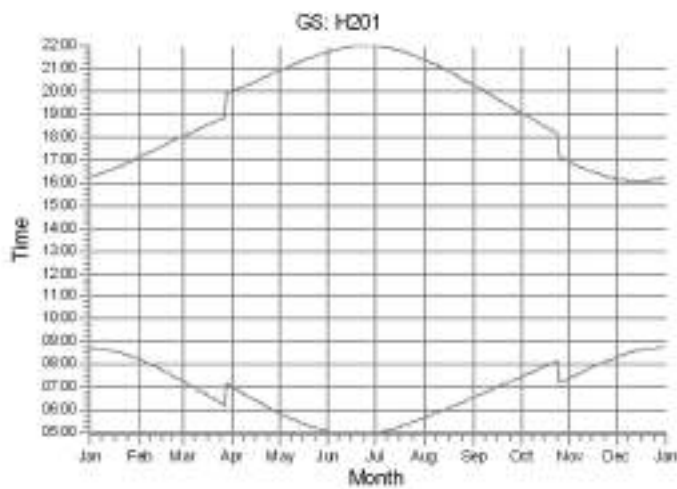
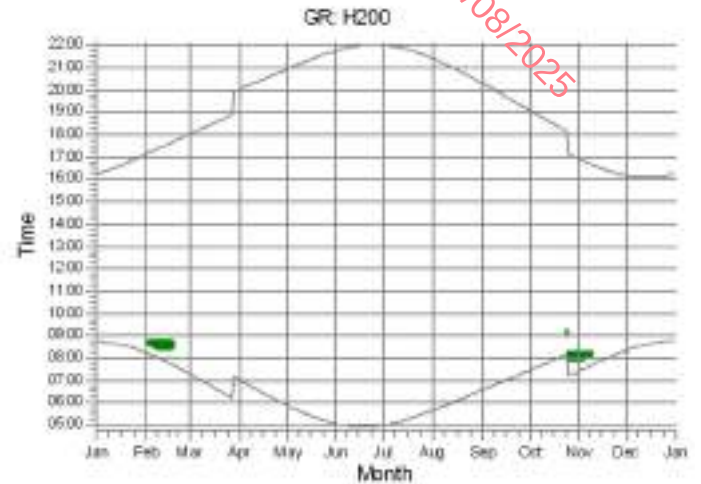
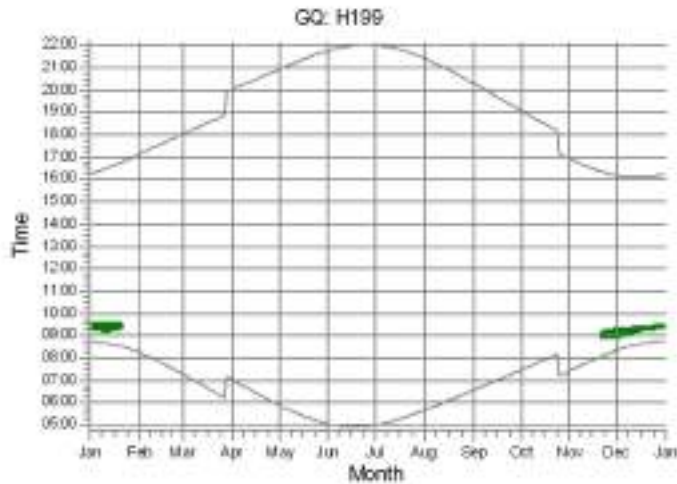


WTGs

1: T01 2: T02

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

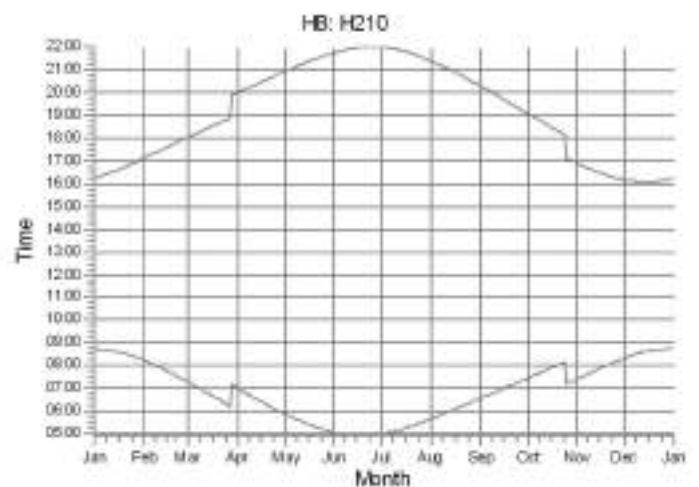
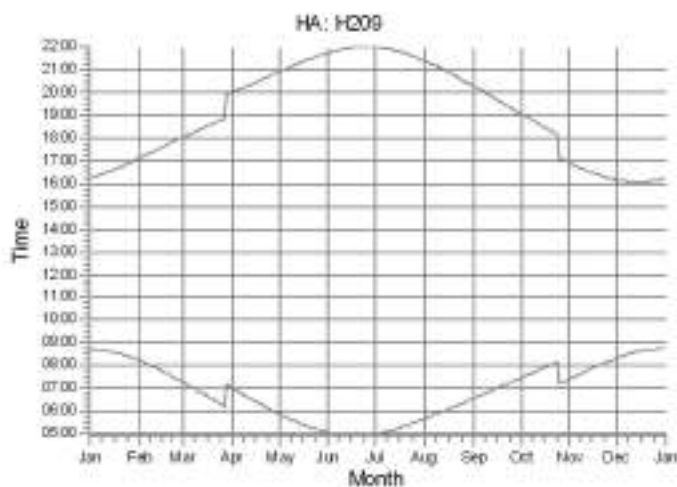
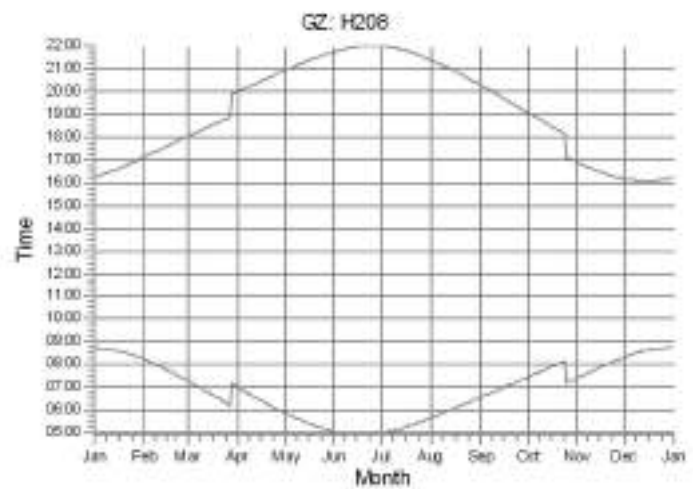
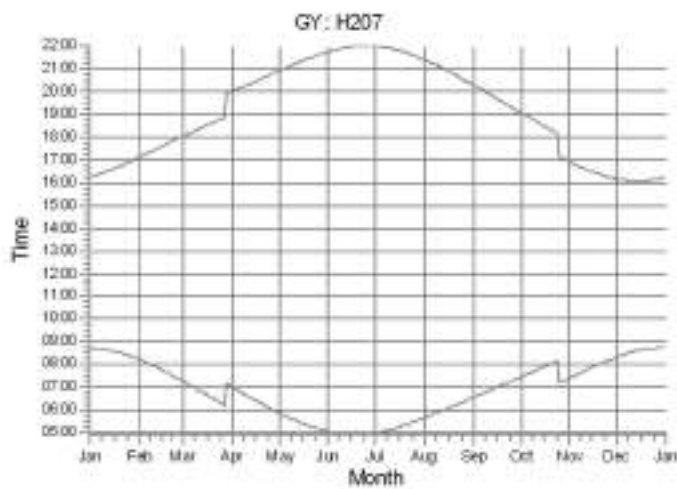
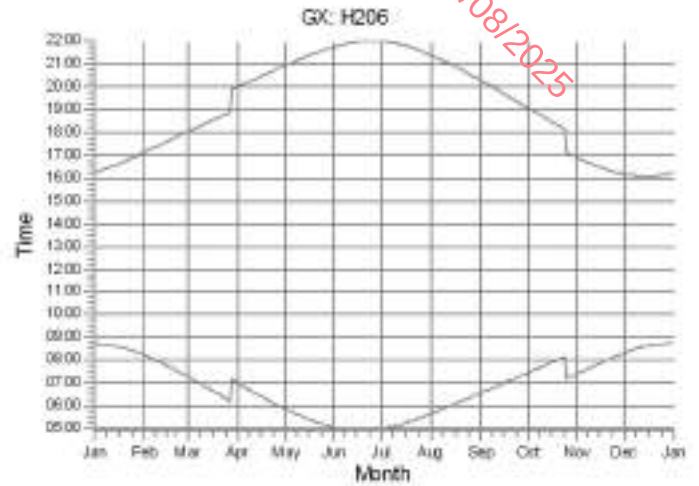
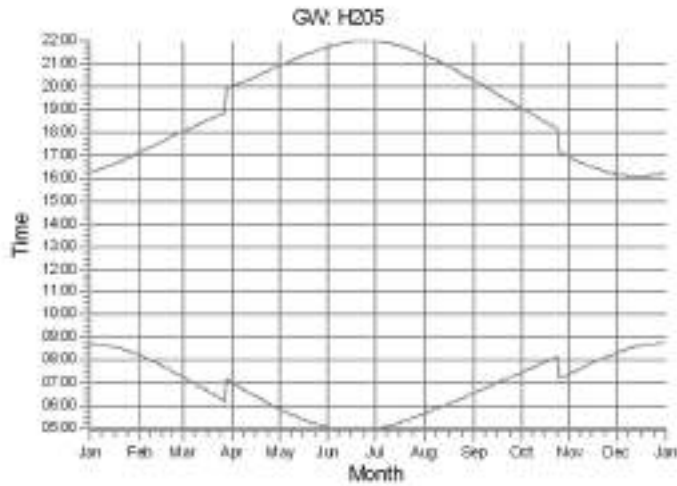


WTGs

1: T01

SHADOW - Calendar, graphical

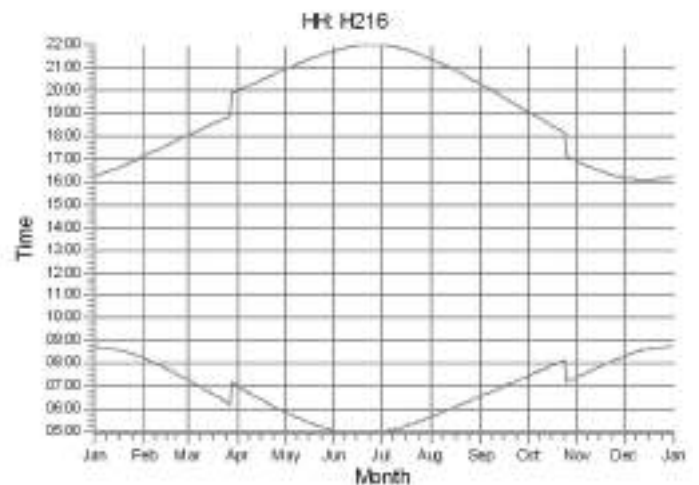
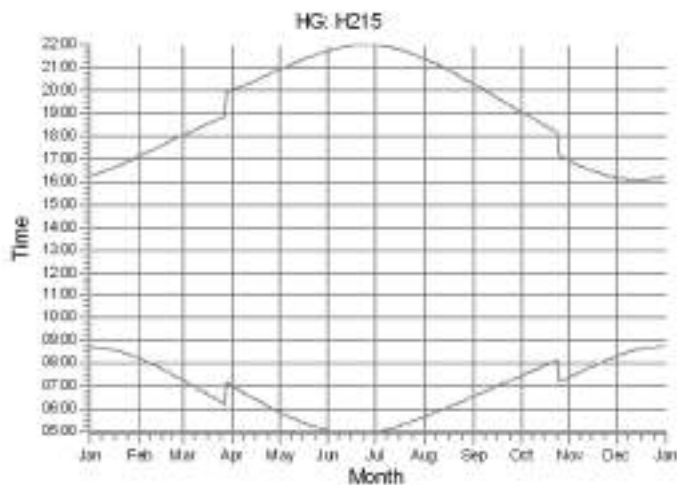
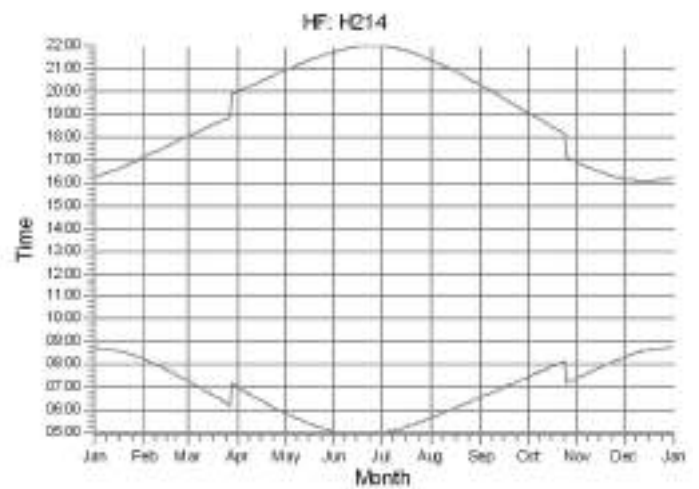
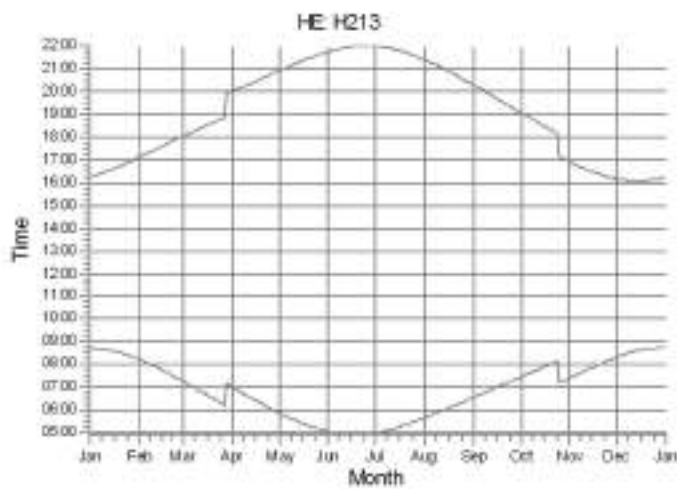
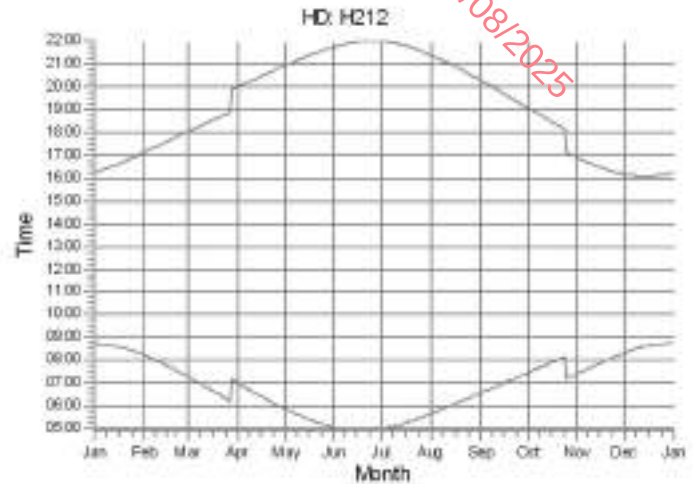
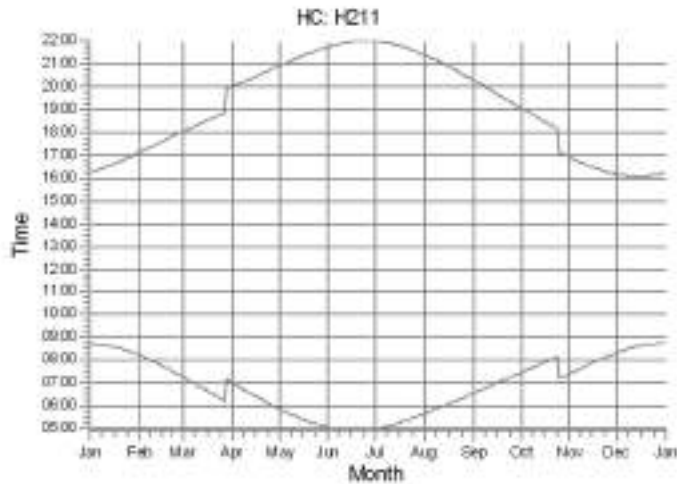
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

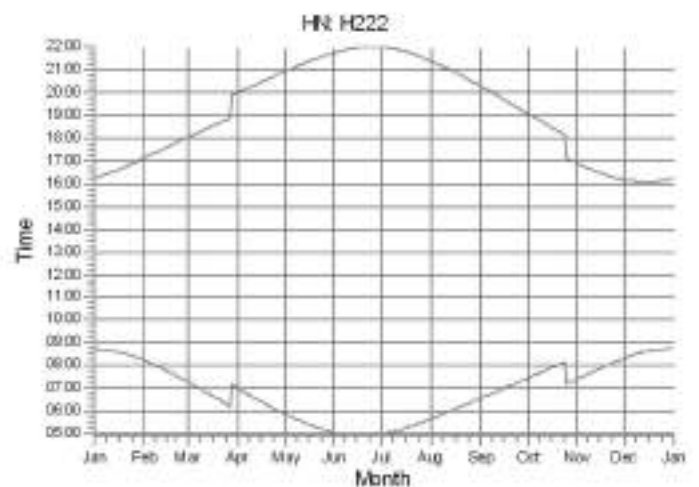
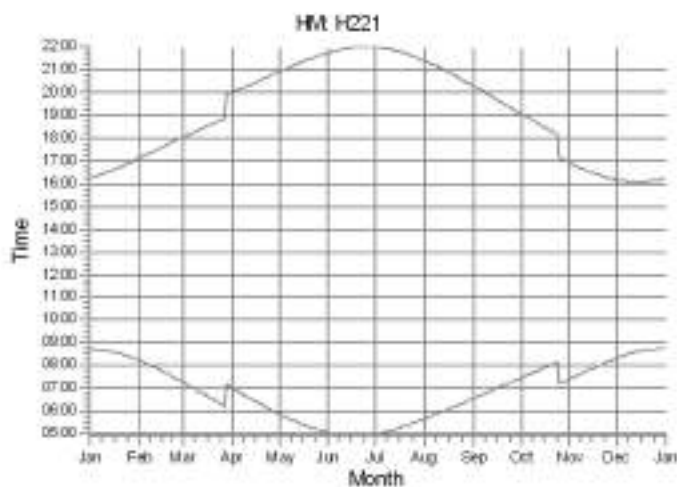
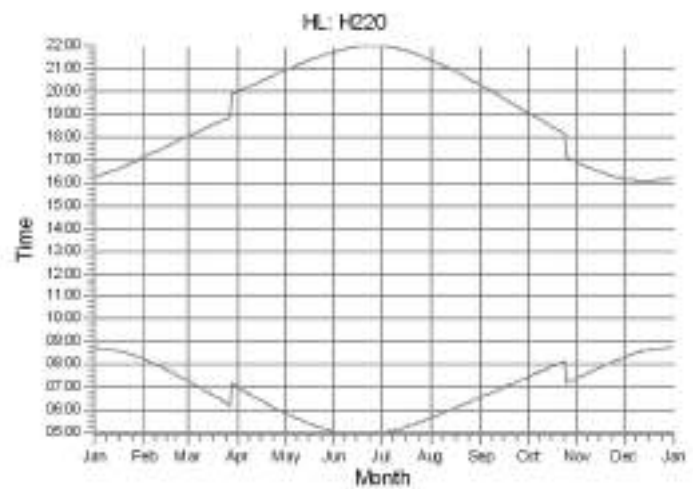
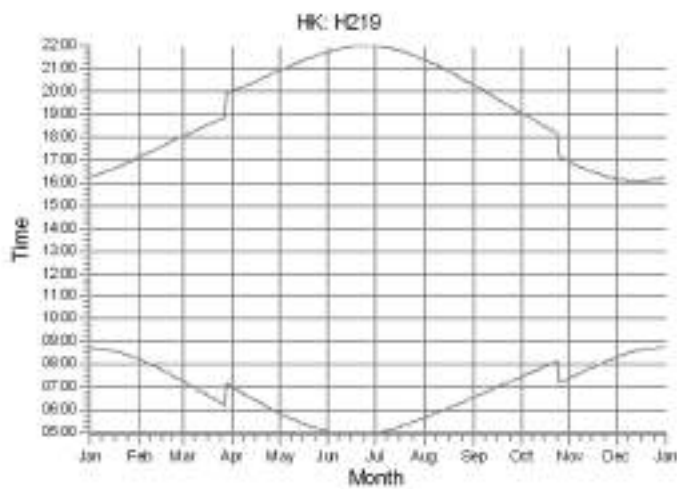
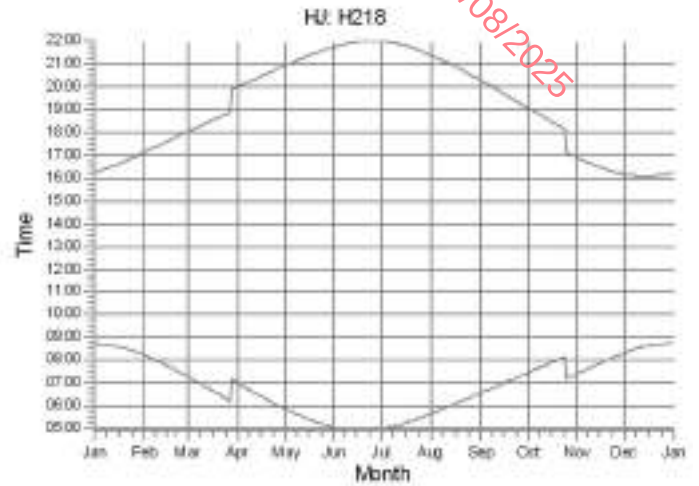
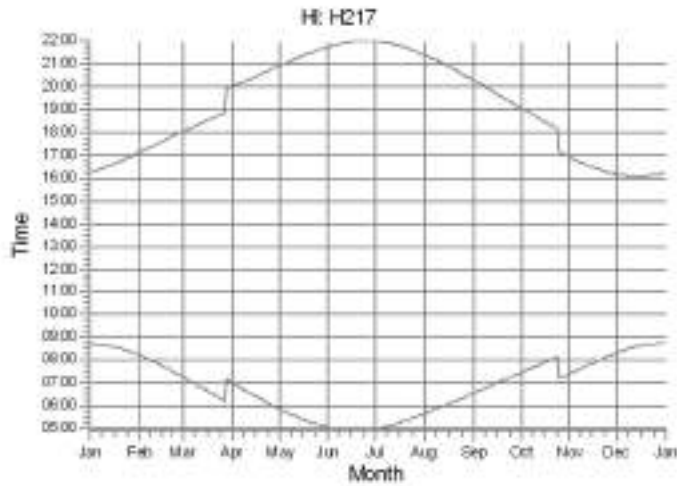
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

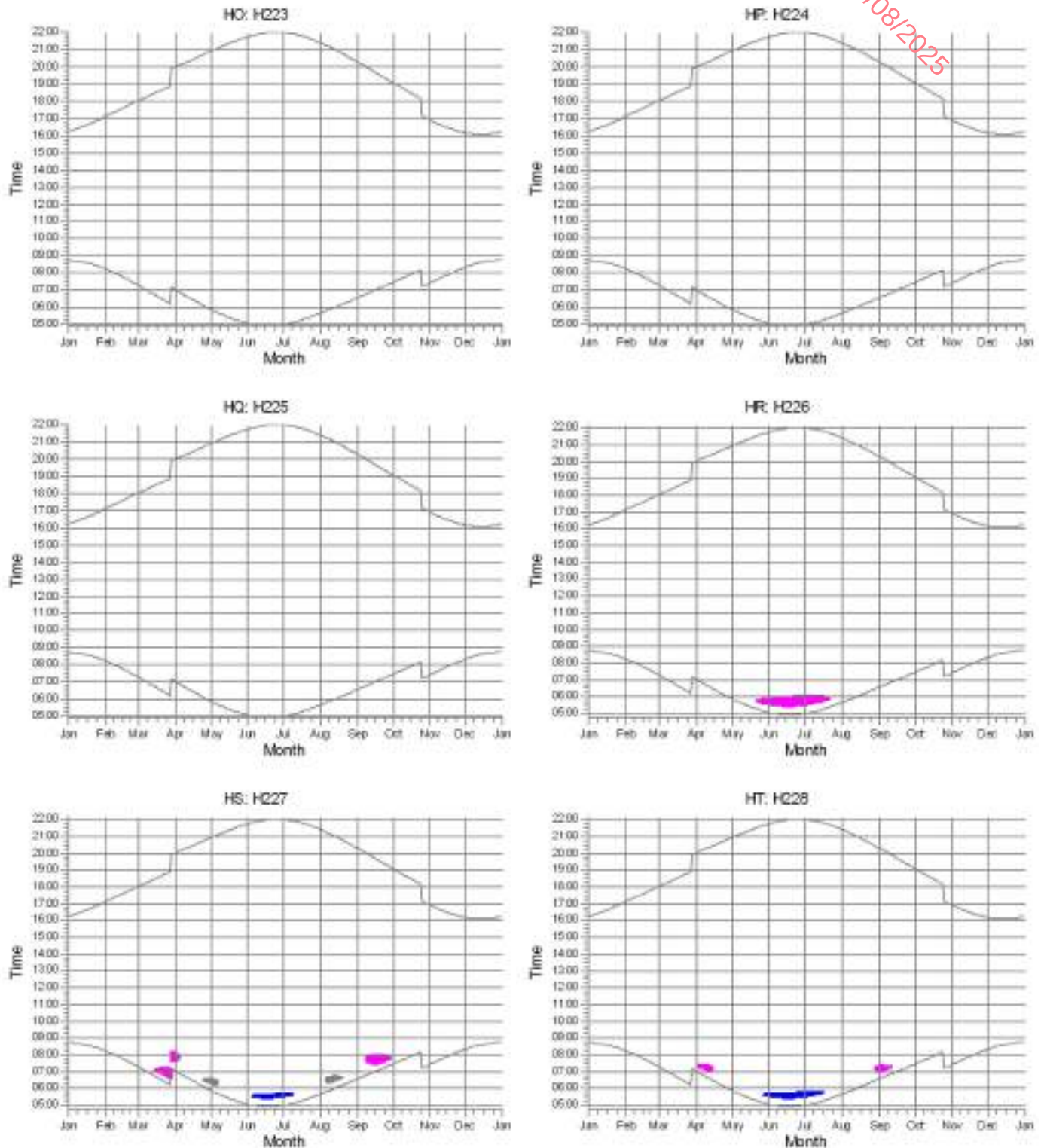
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

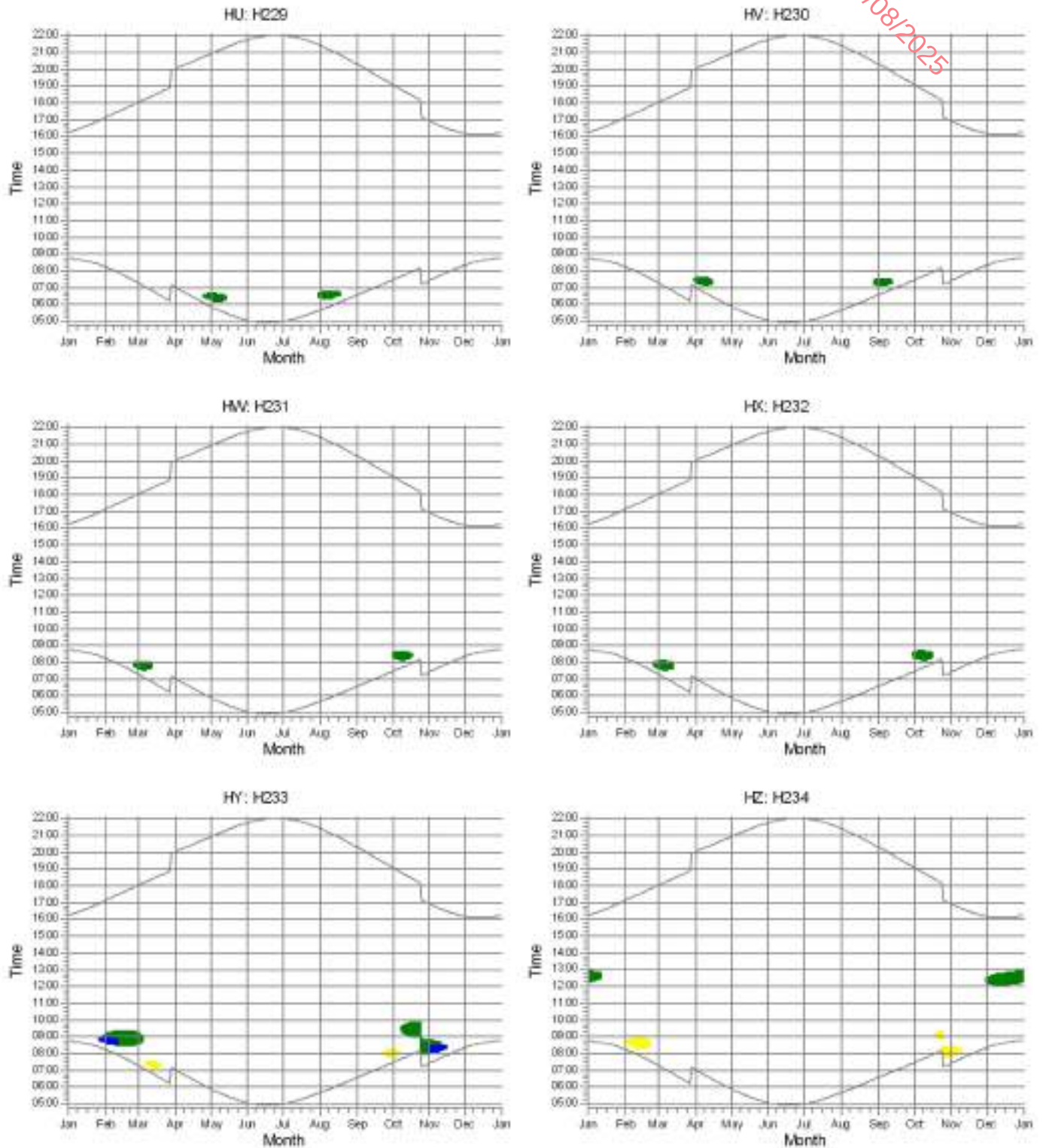


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

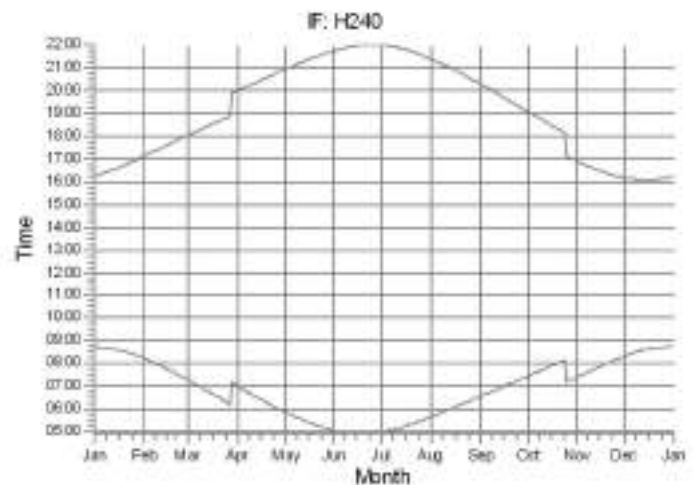
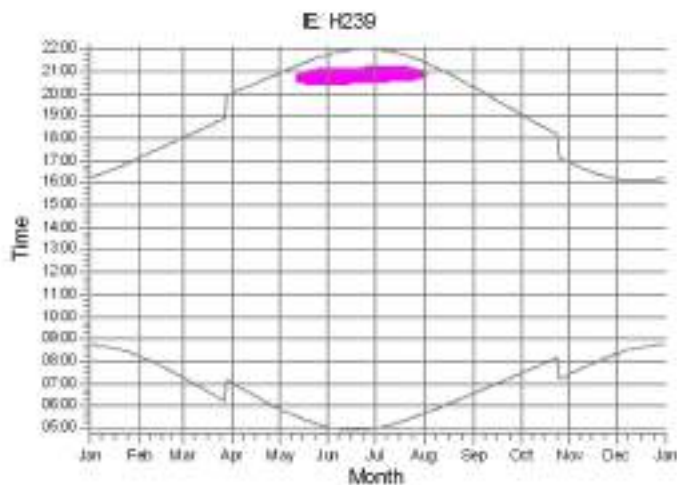
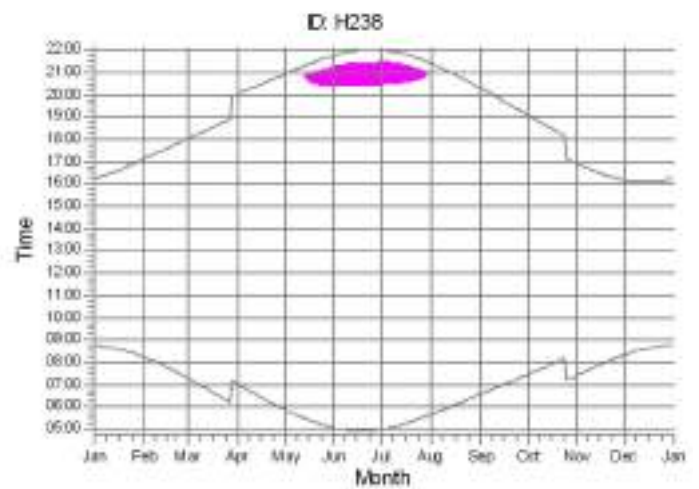
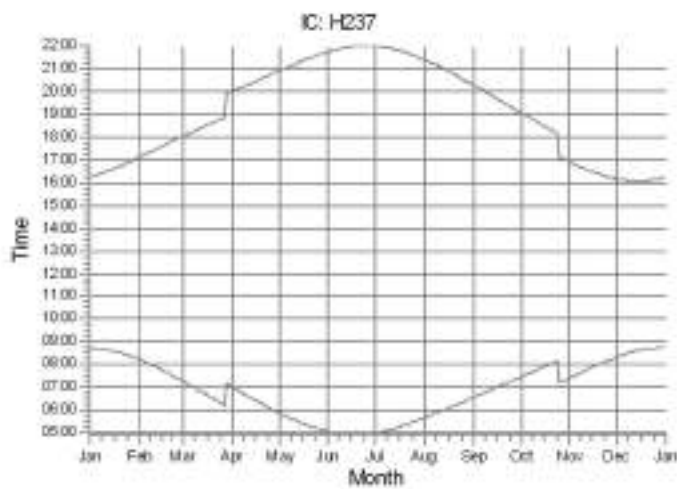
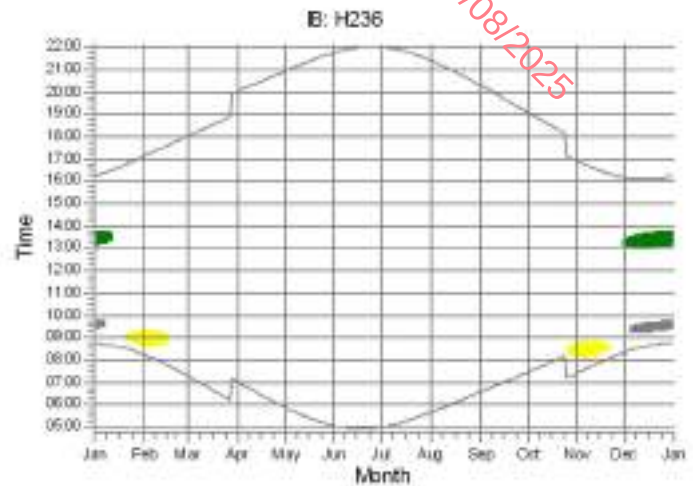
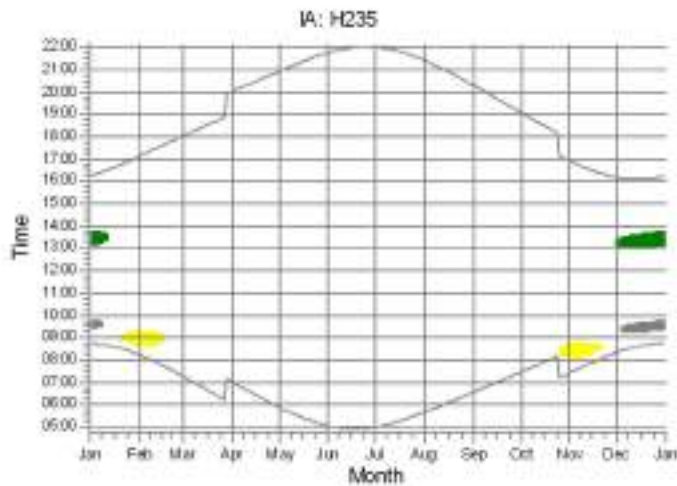


WTGs

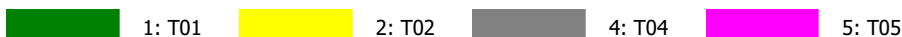
1: T01 2: T02 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

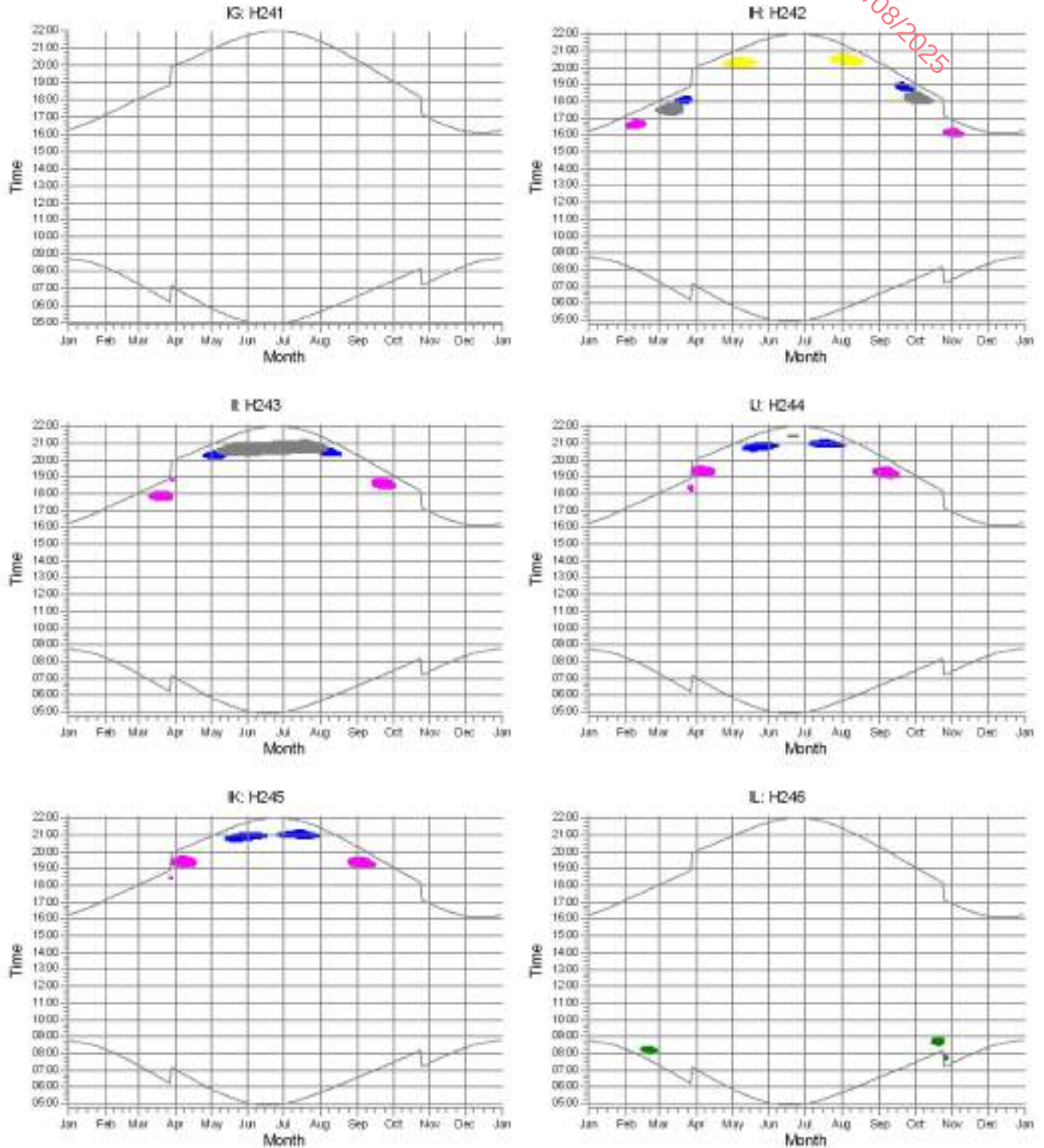


WTGs



SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

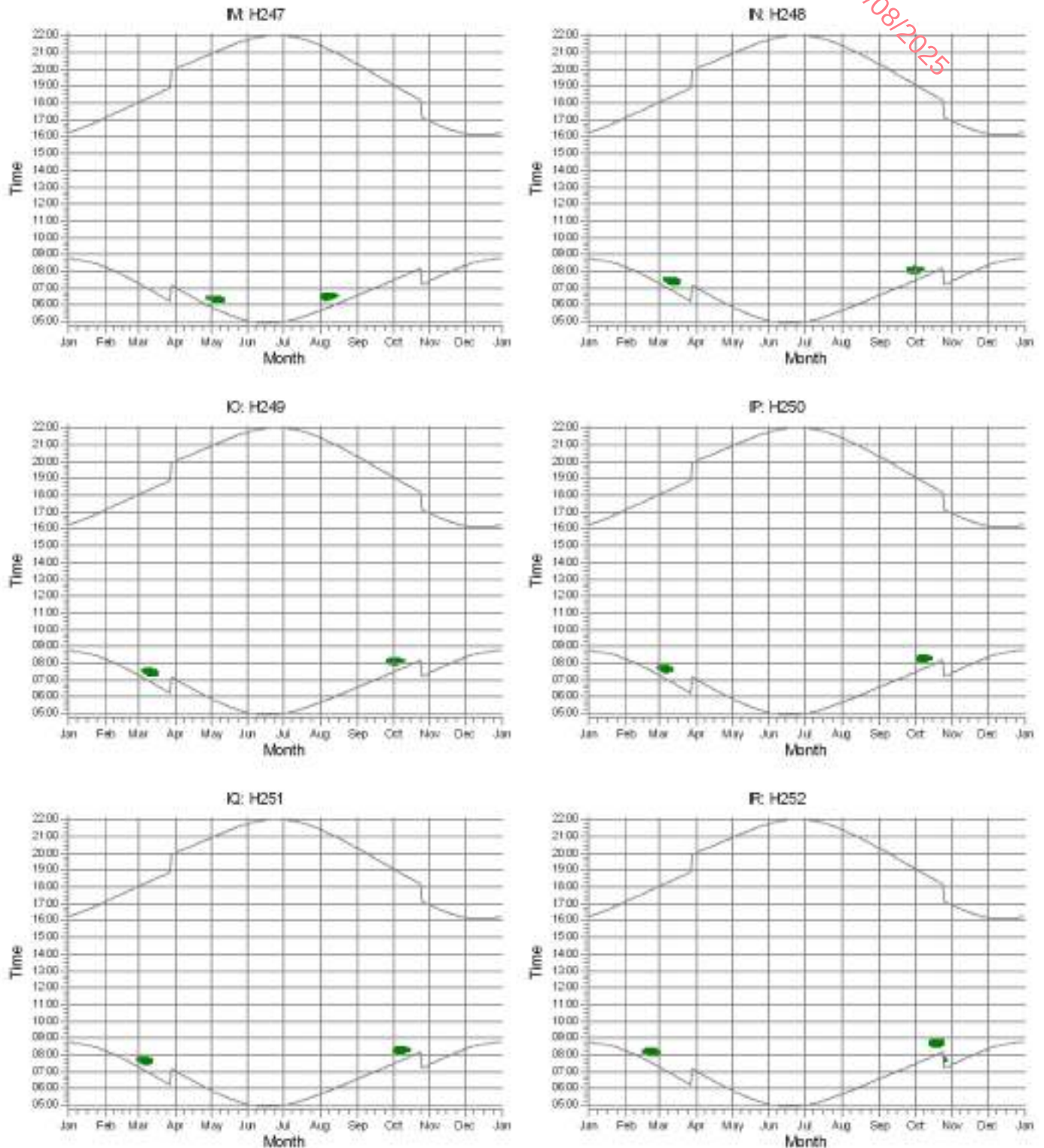


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

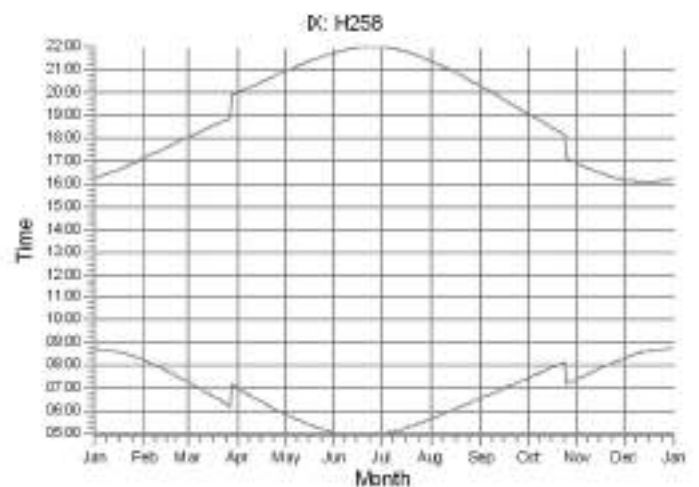
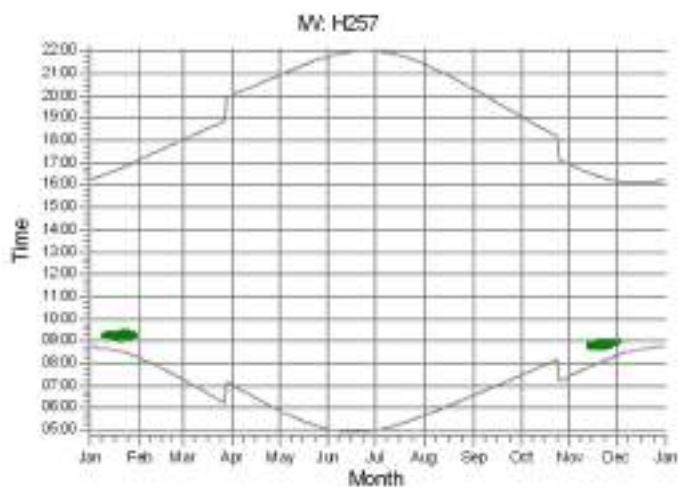
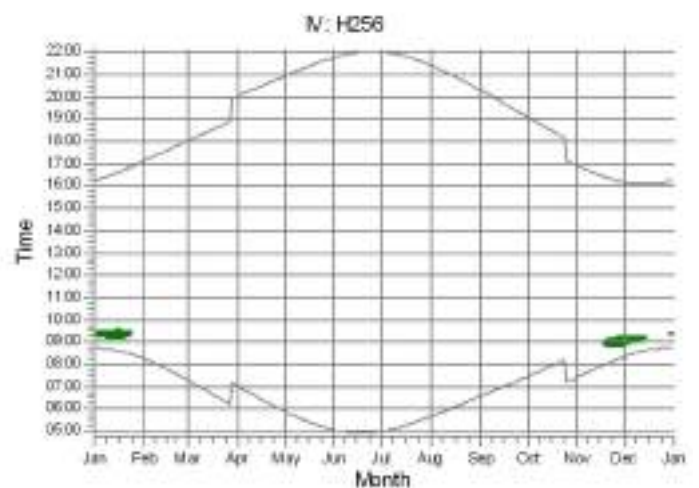
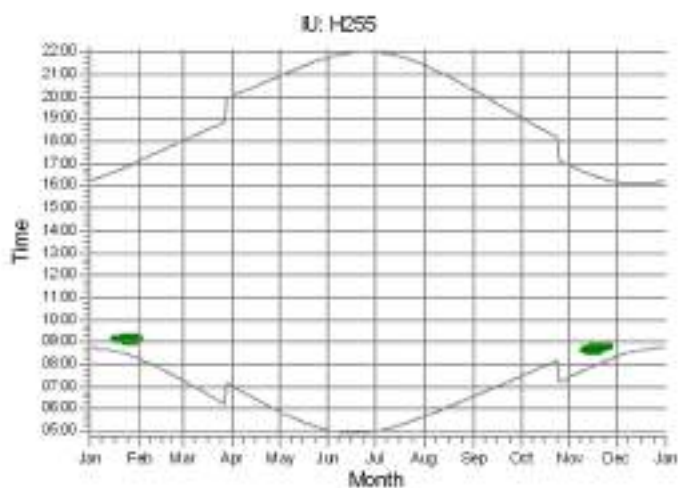
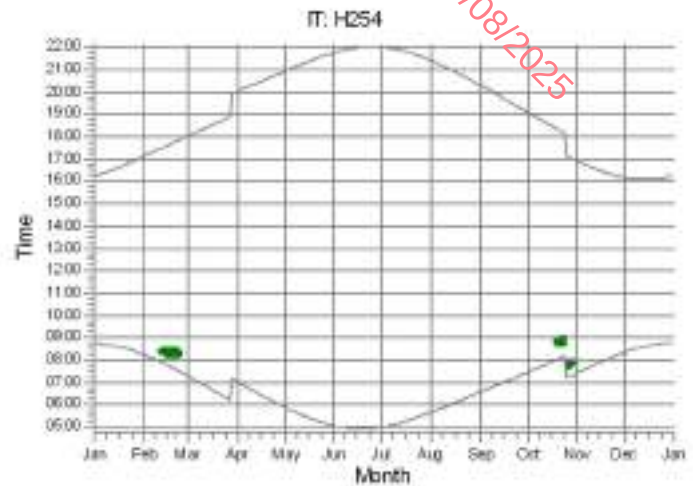
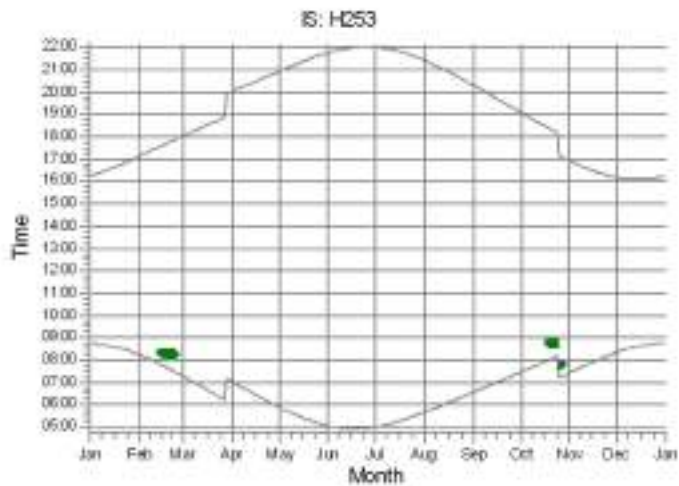


WTGs

1: T01

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

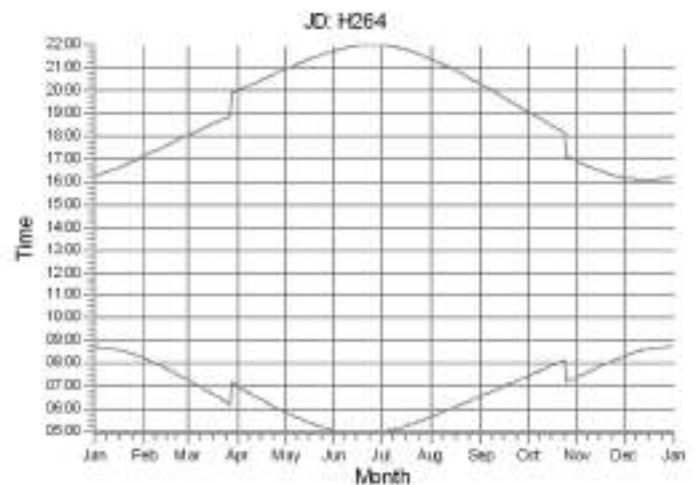
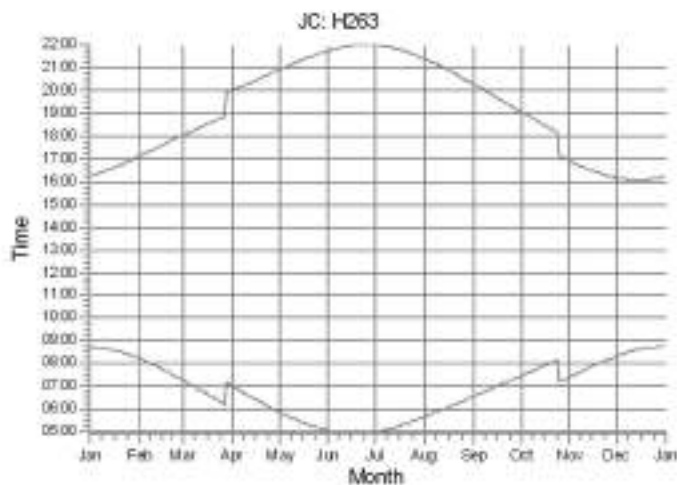
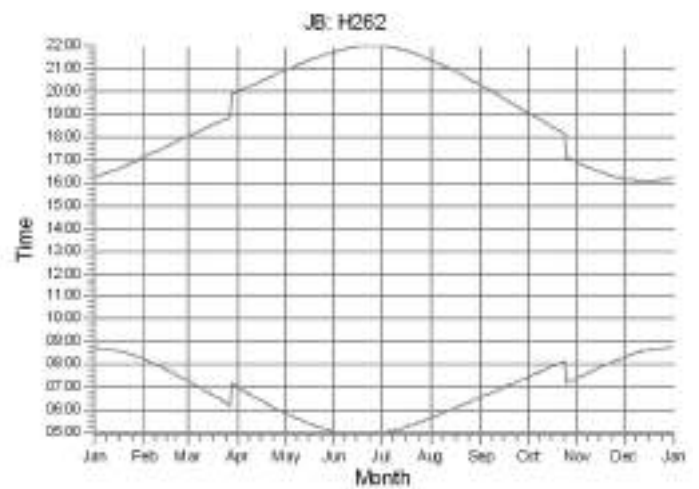
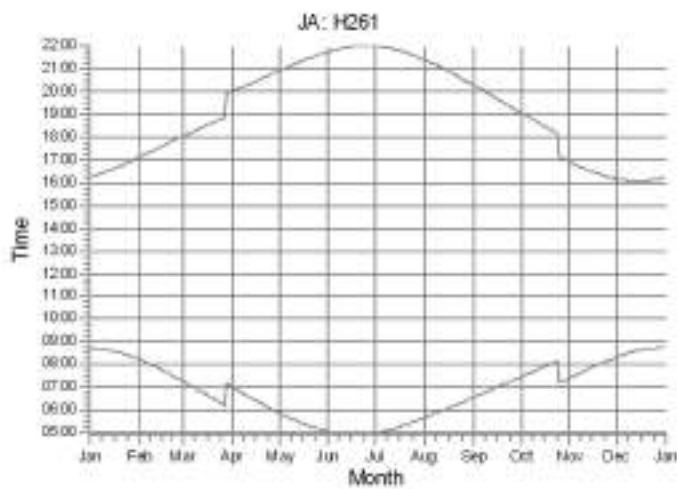
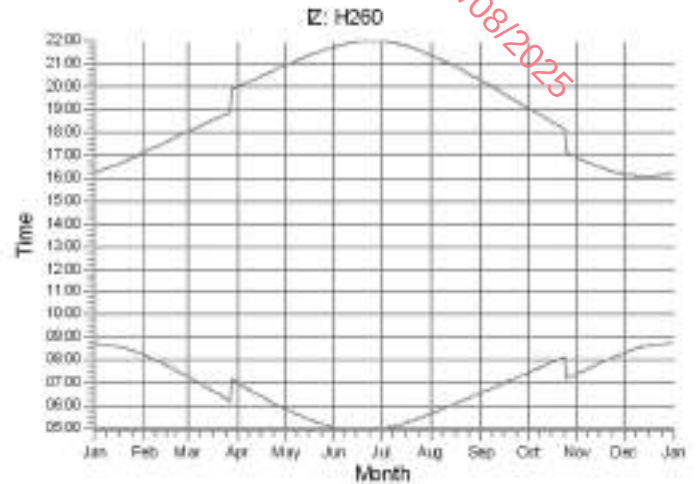
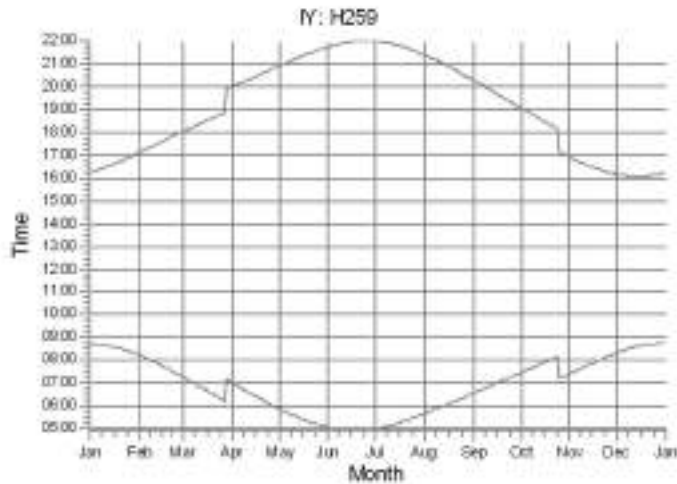


WTGs

1: T01

SHADOW - Calendar, graphical

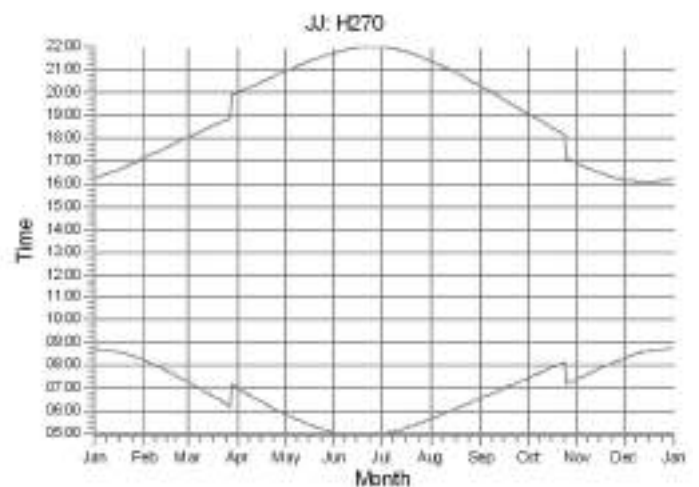
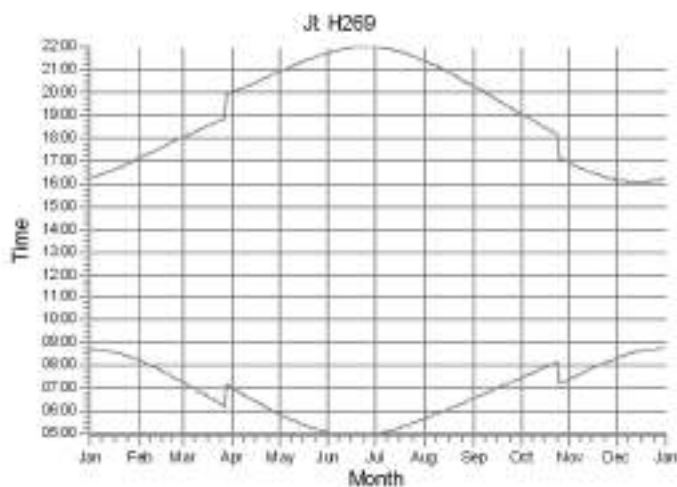
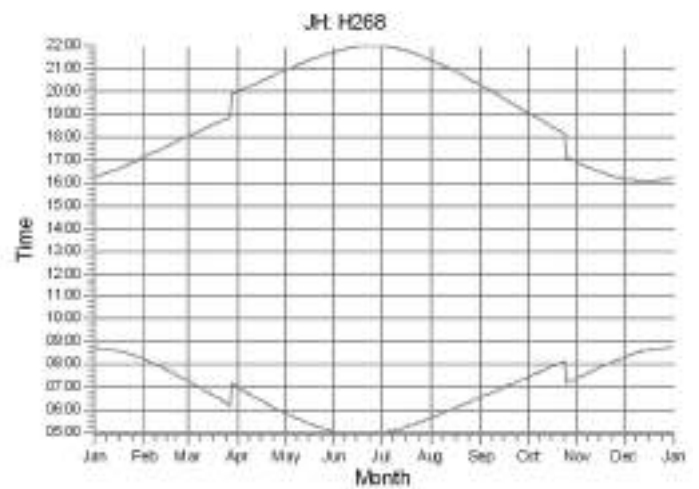
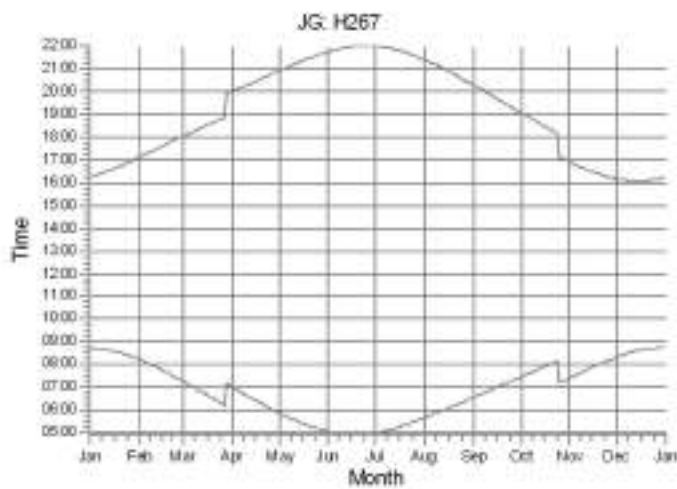
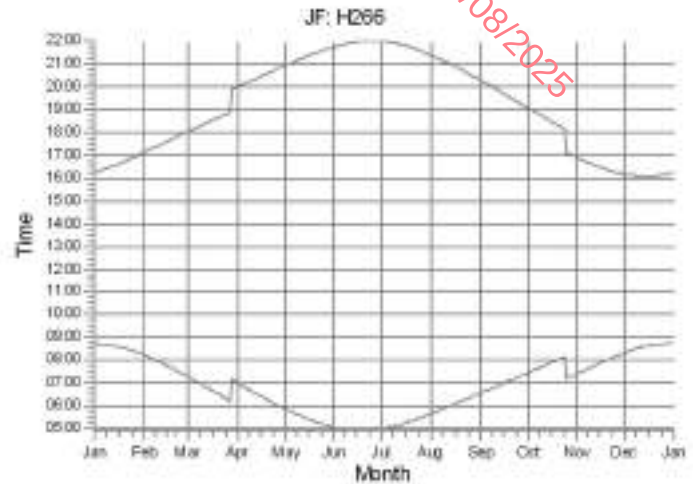
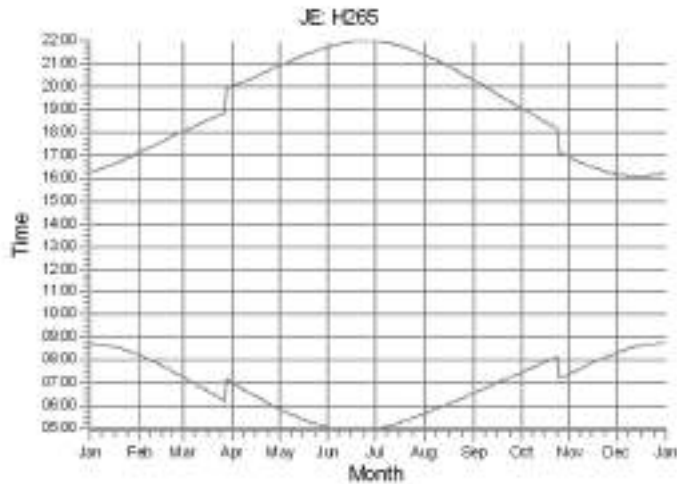
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

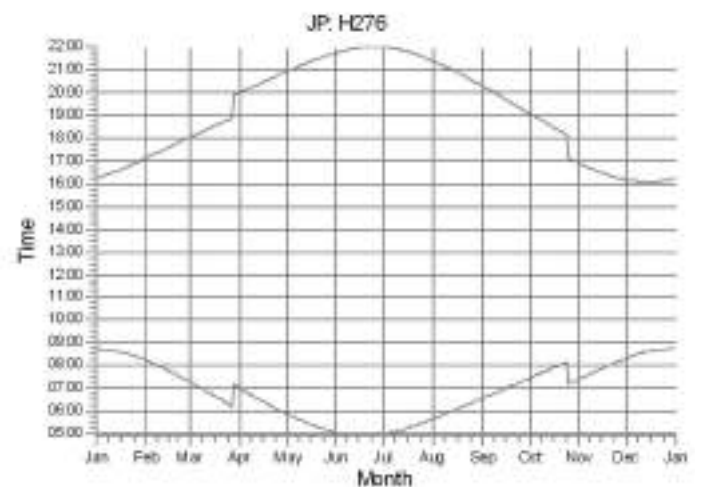
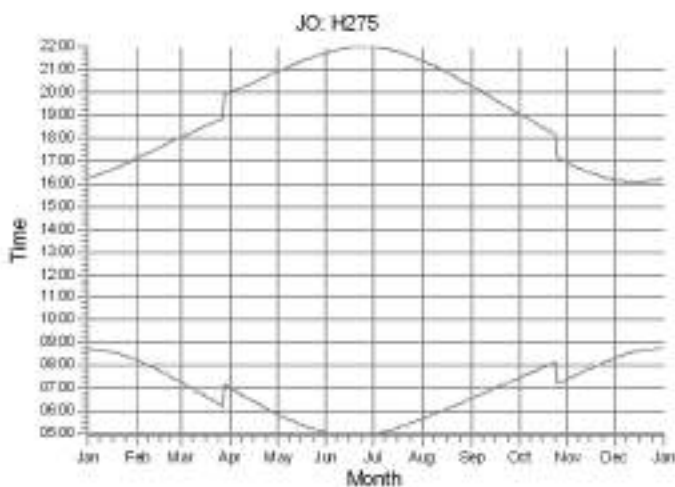
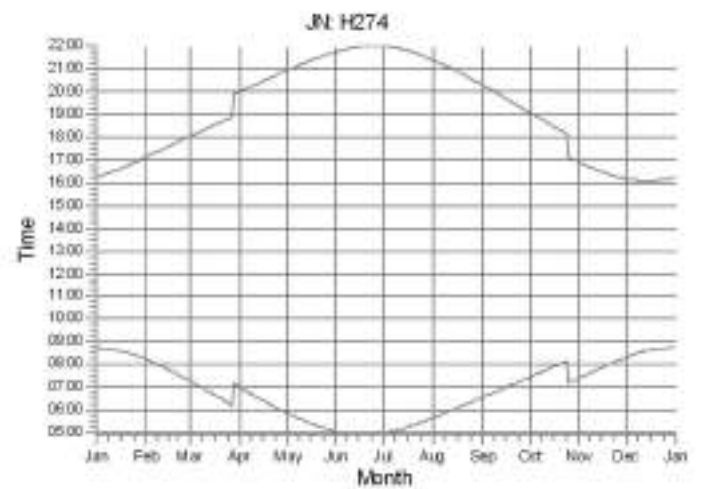
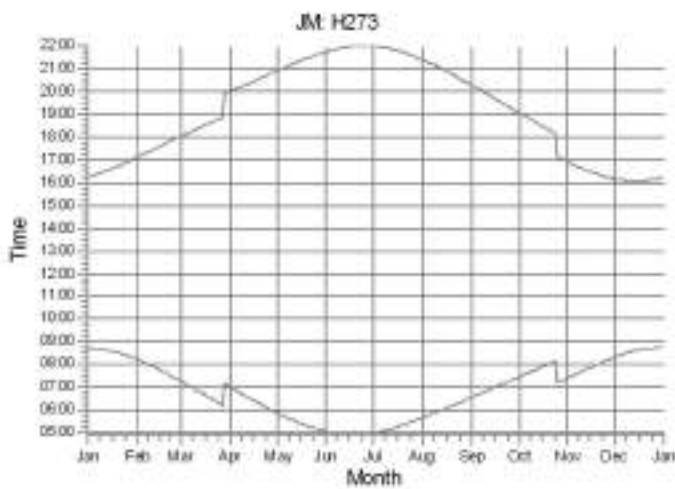
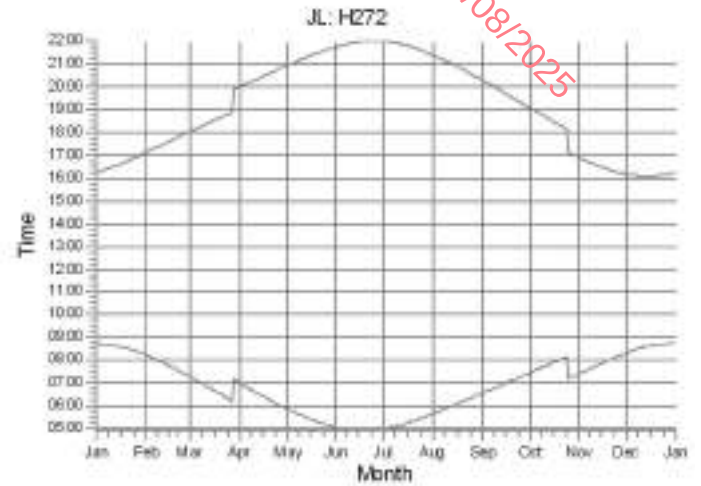
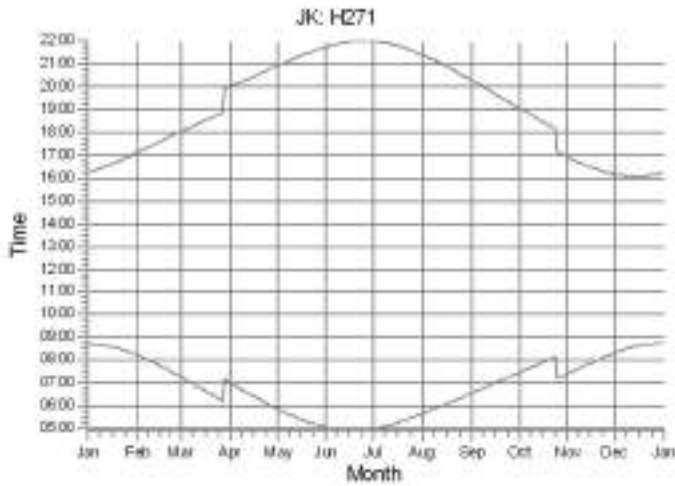
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

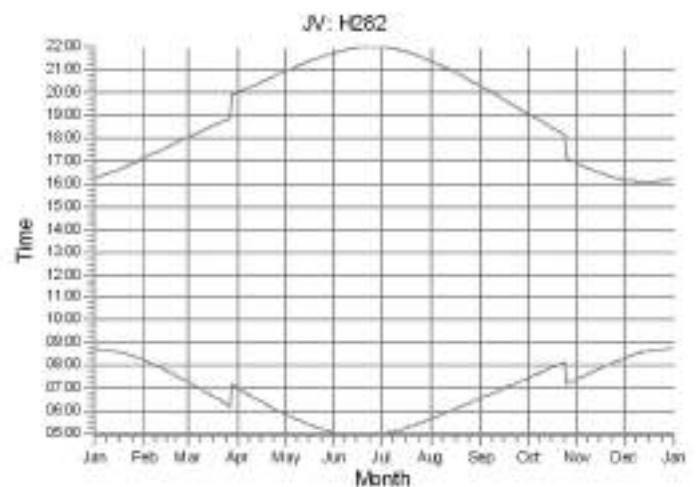
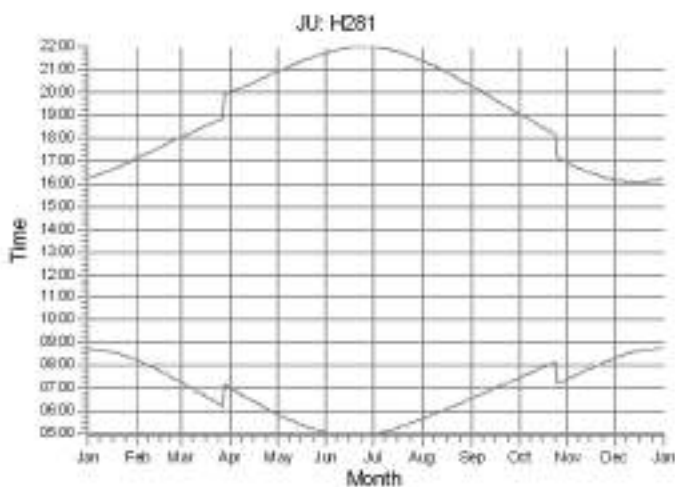
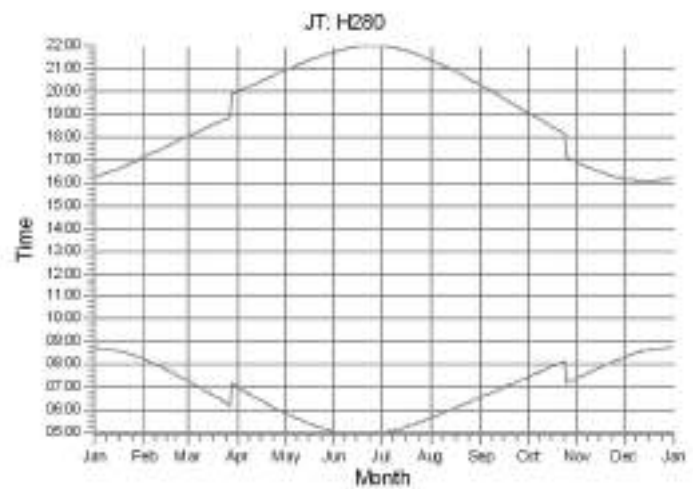
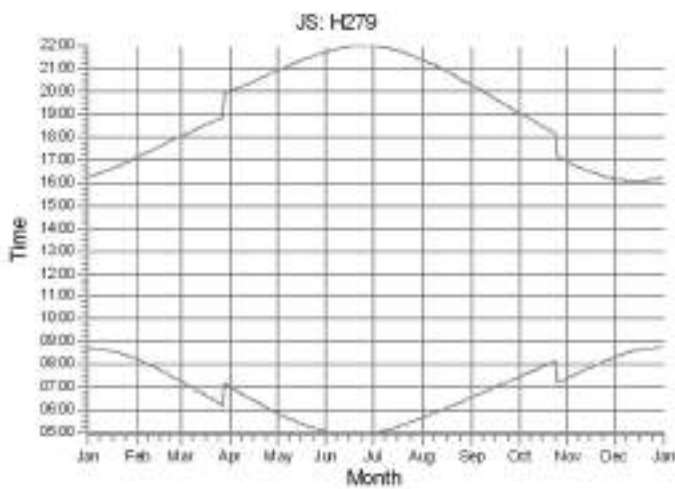
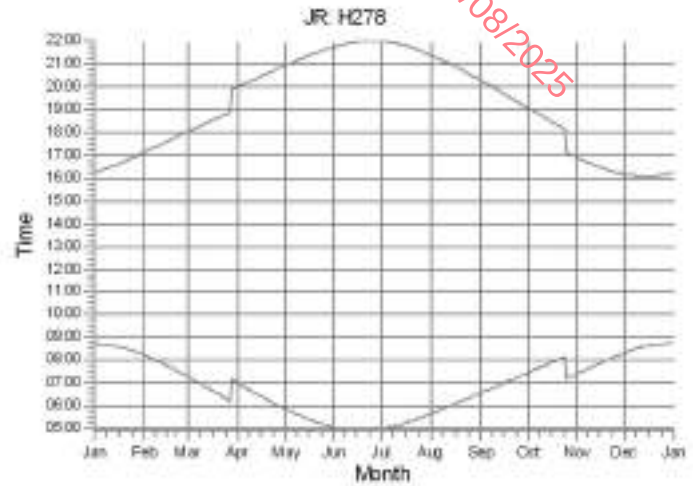
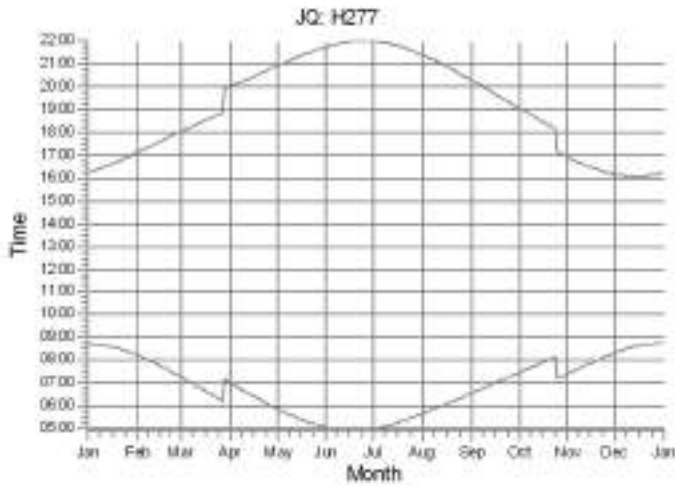
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

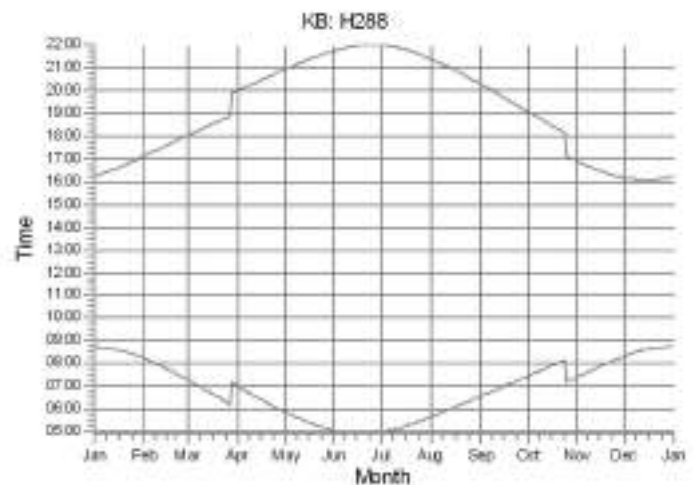
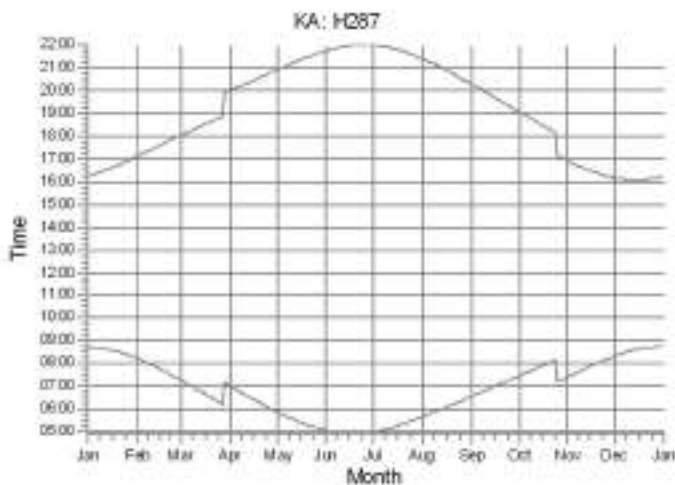
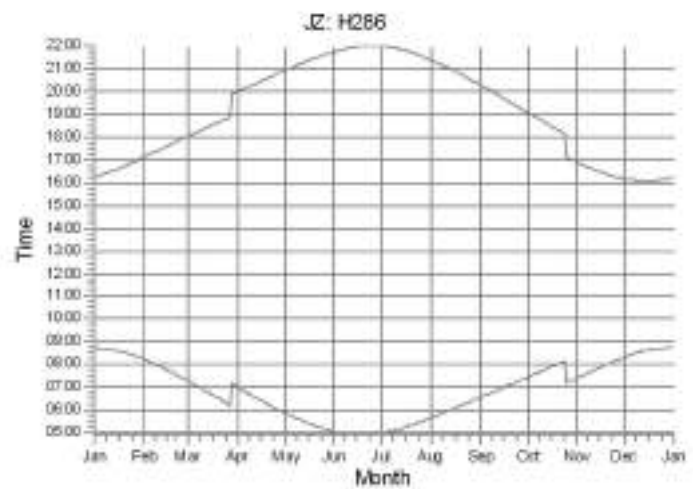
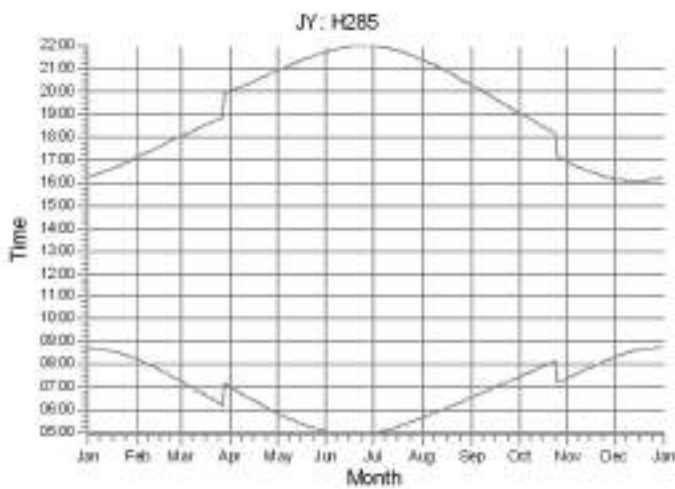
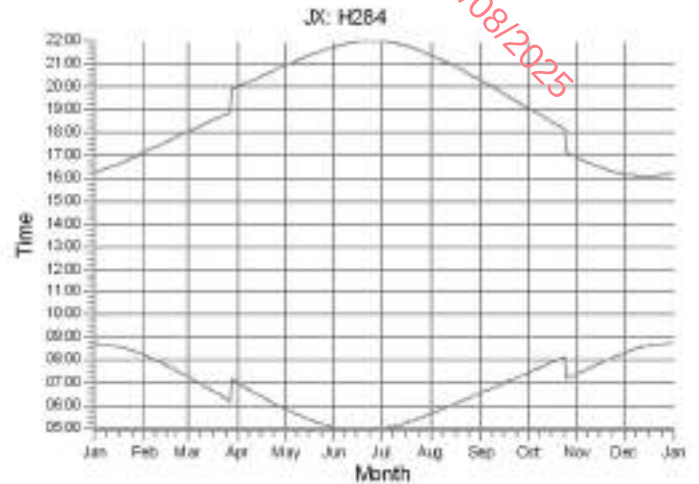
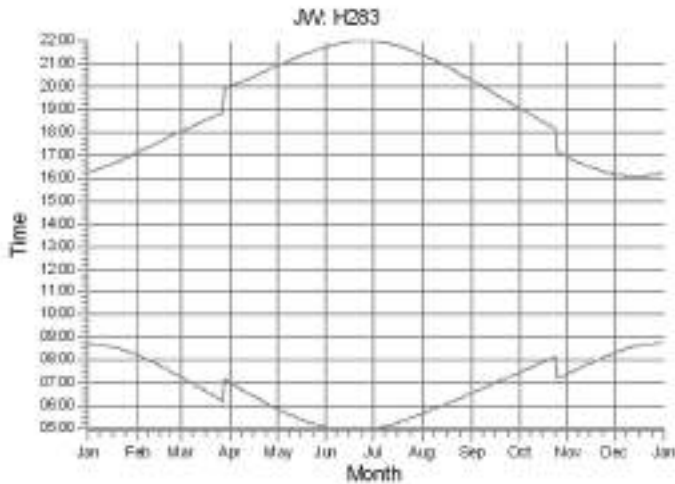
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

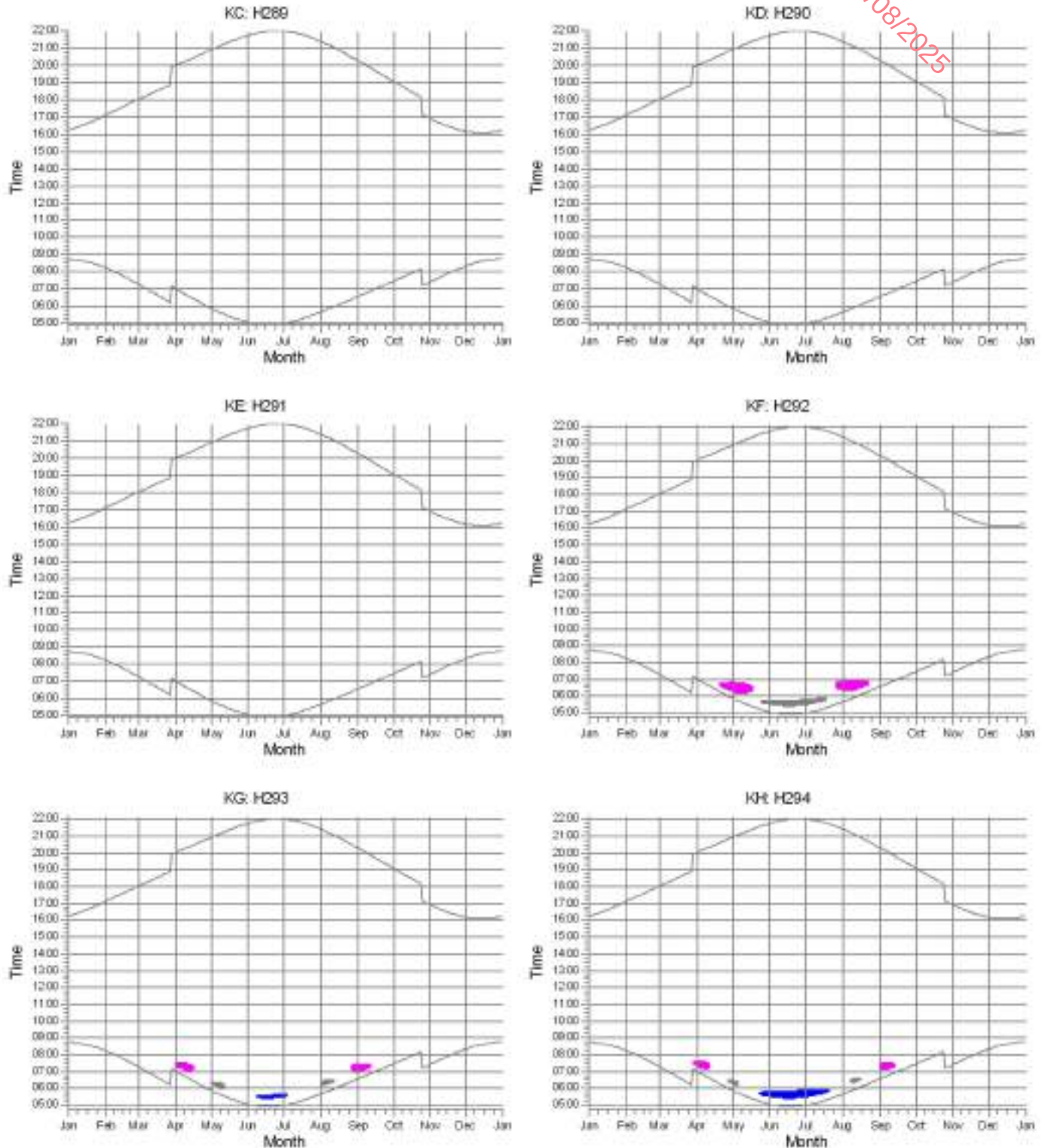
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

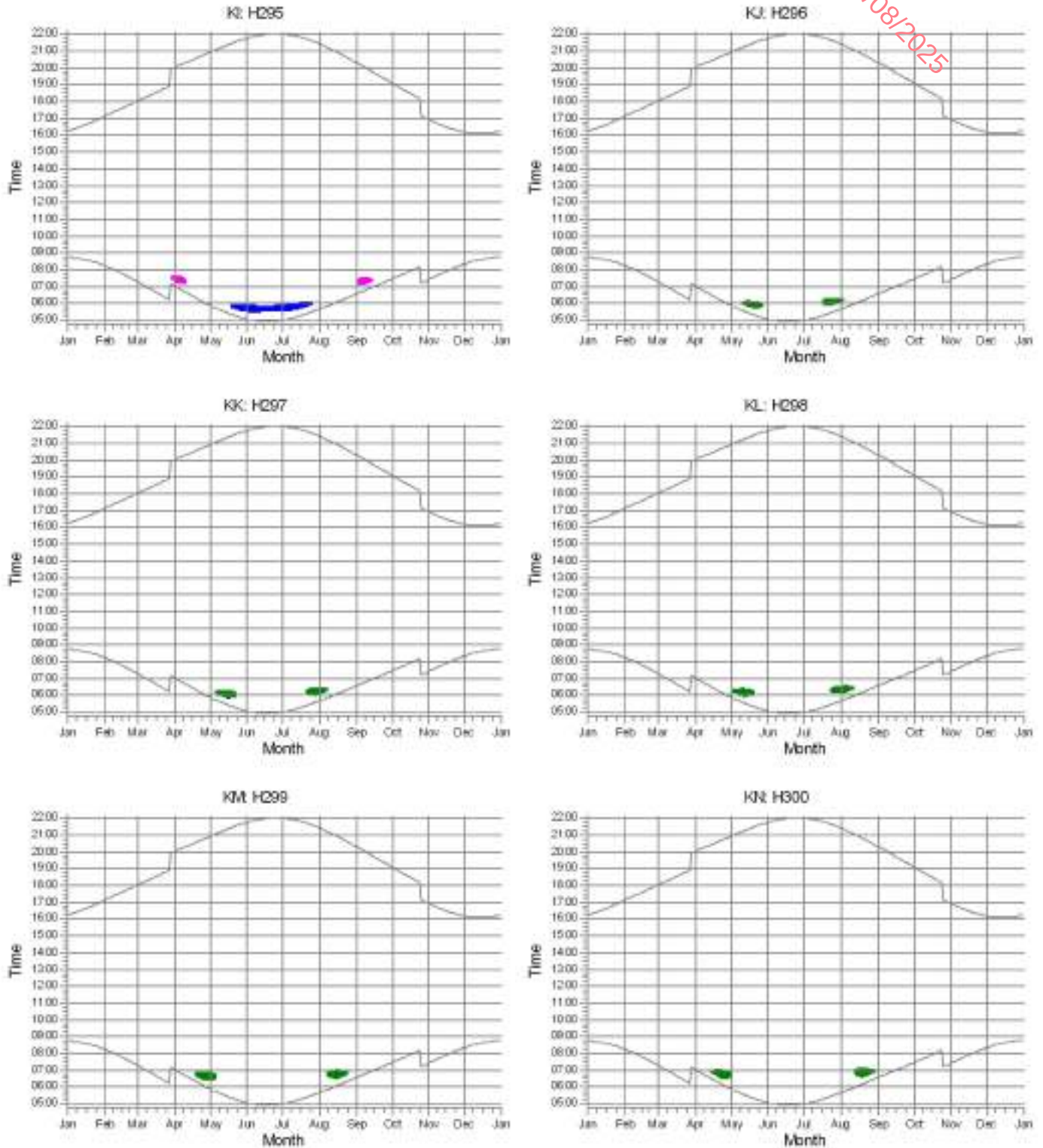


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

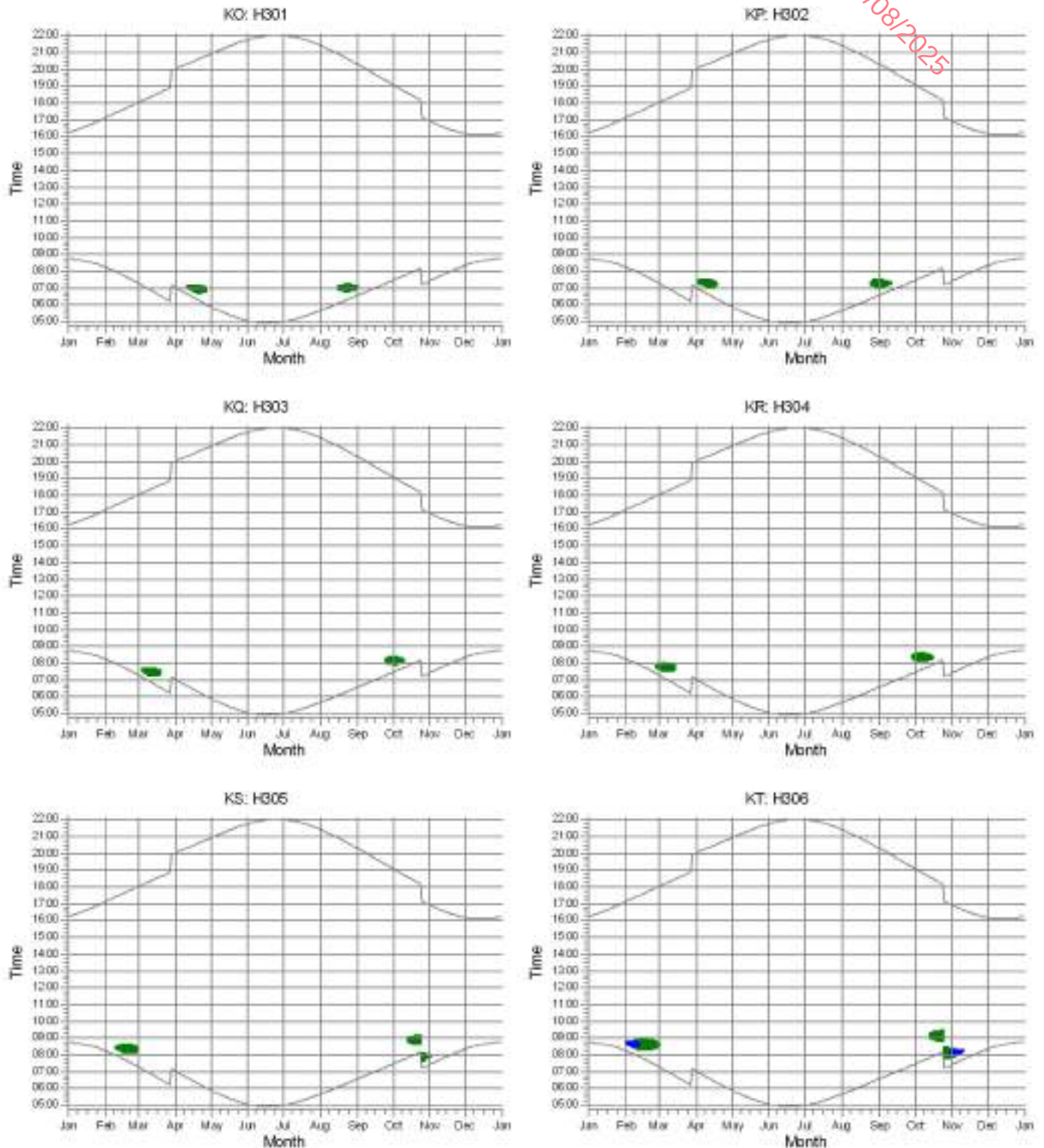


WTGs

1: T01 3: T03 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

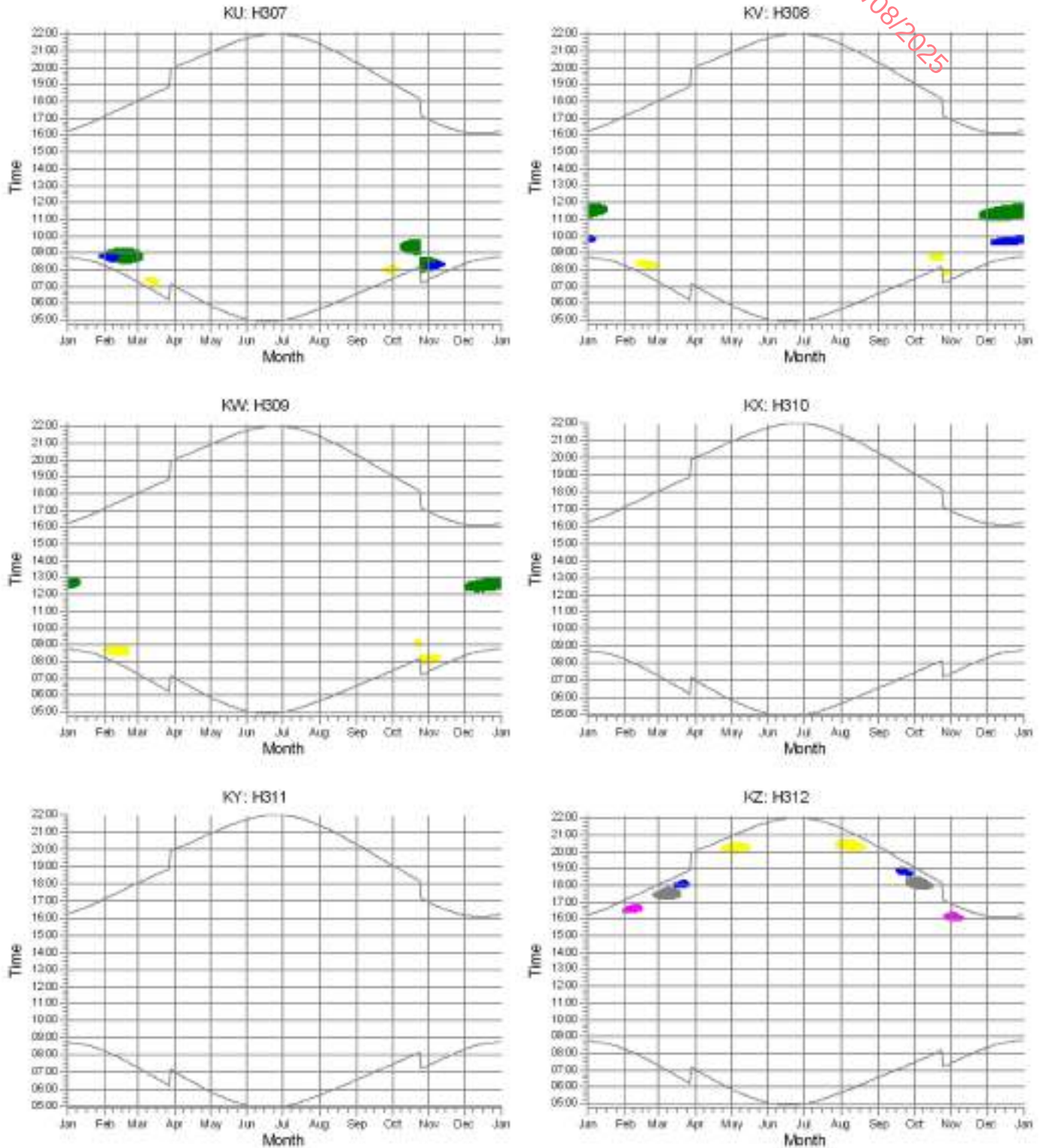


WTGs

1: T01 3: T03

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

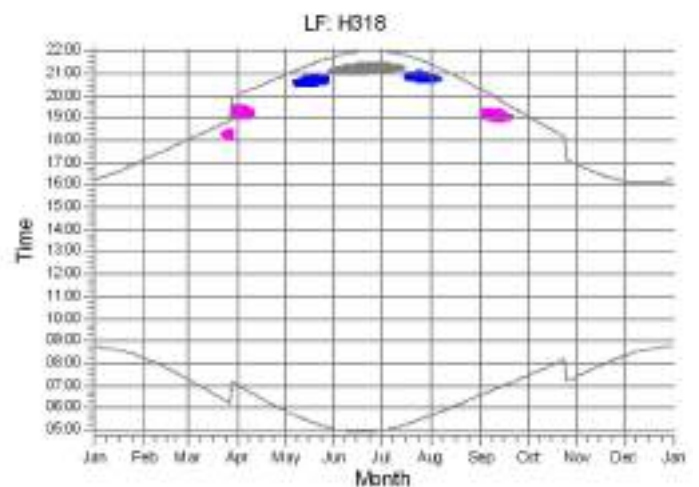
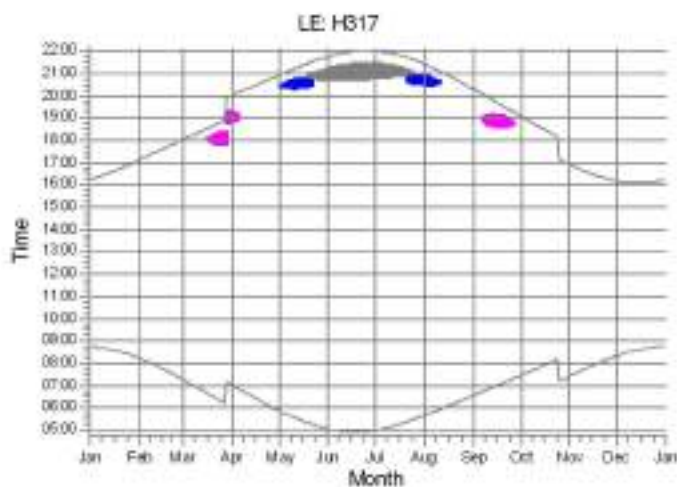
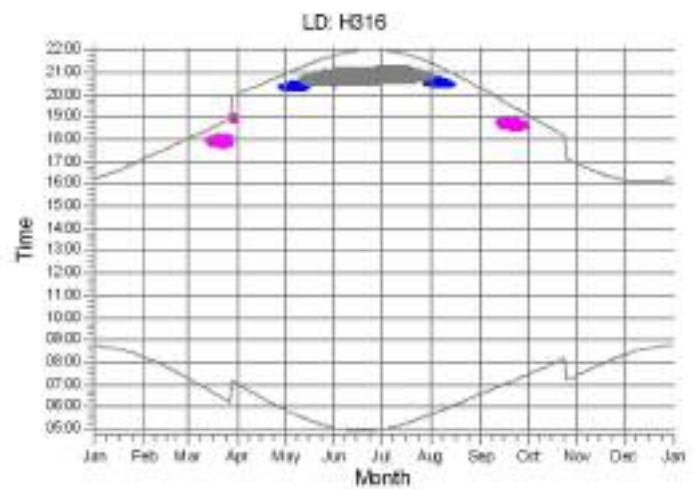
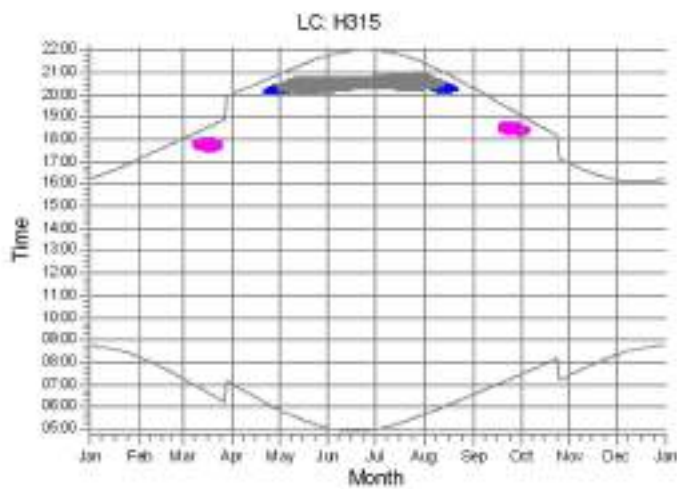
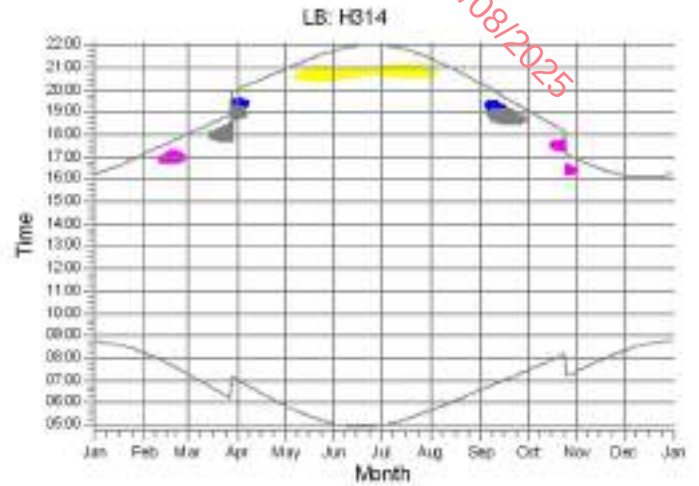
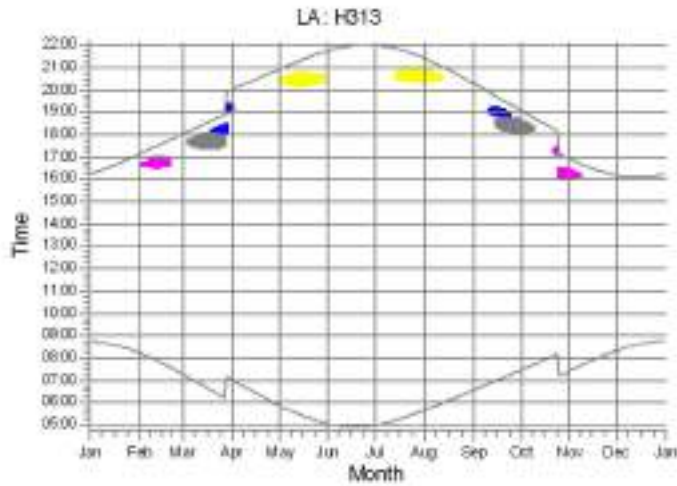


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

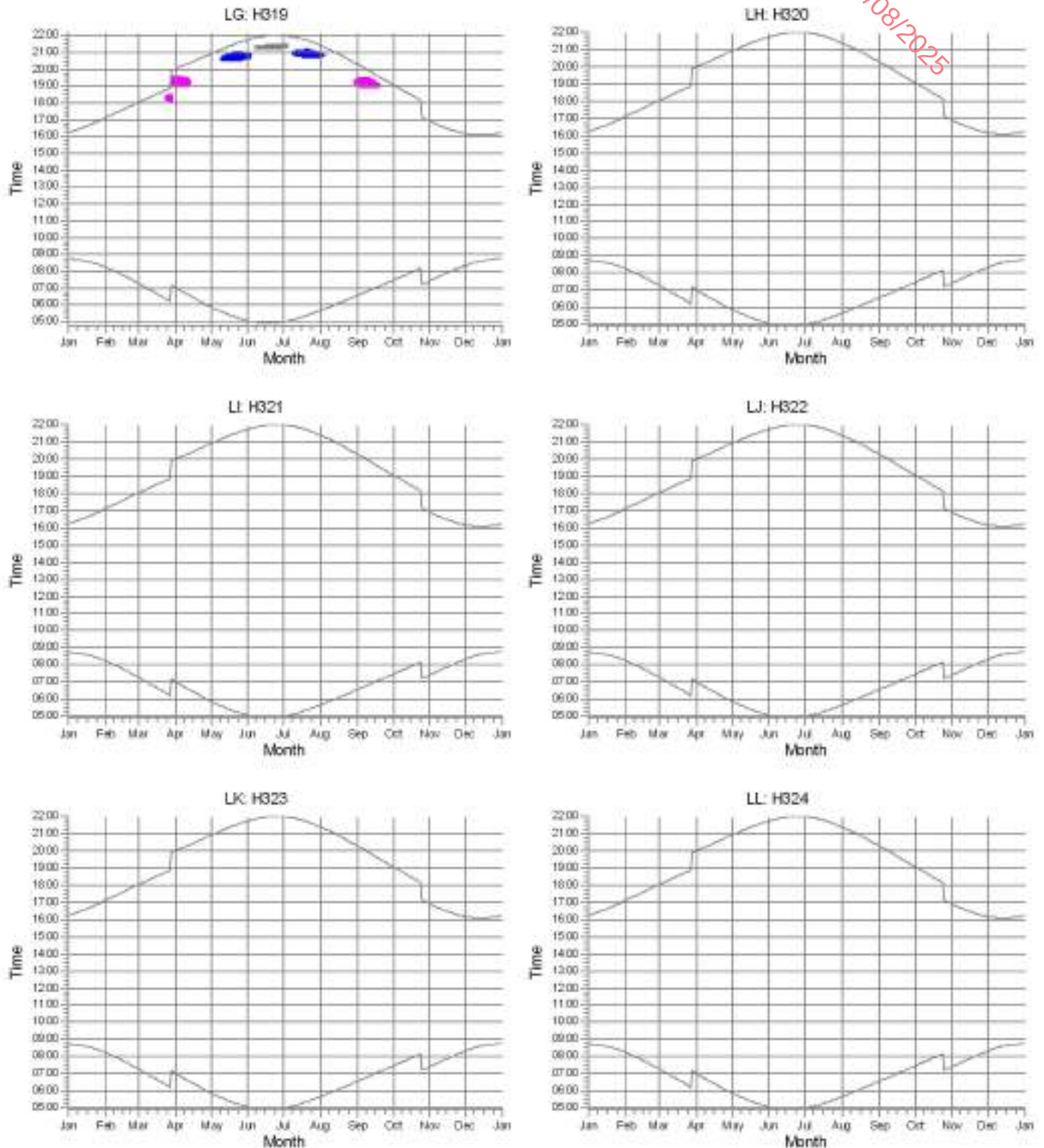


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

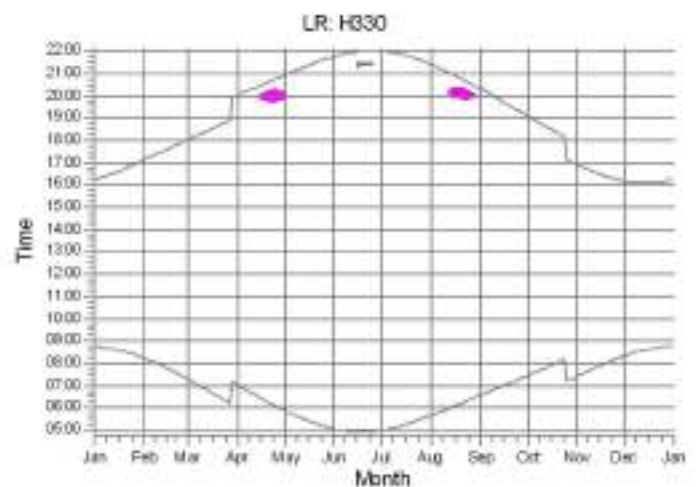
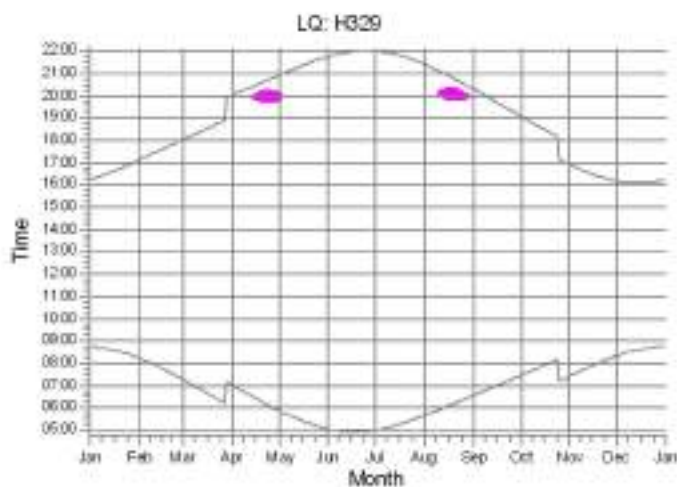
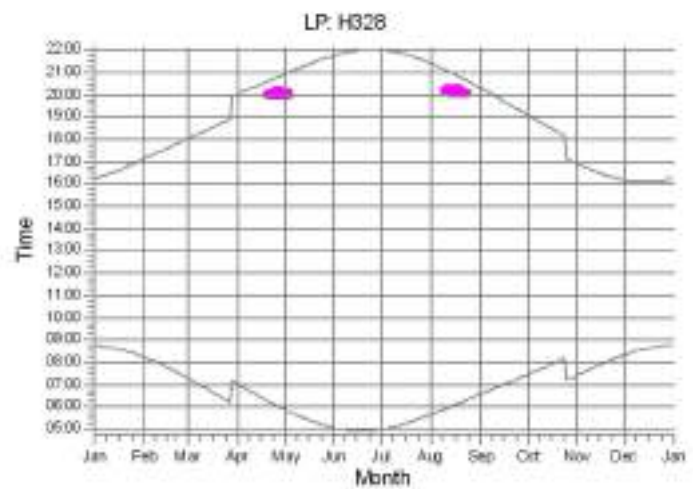
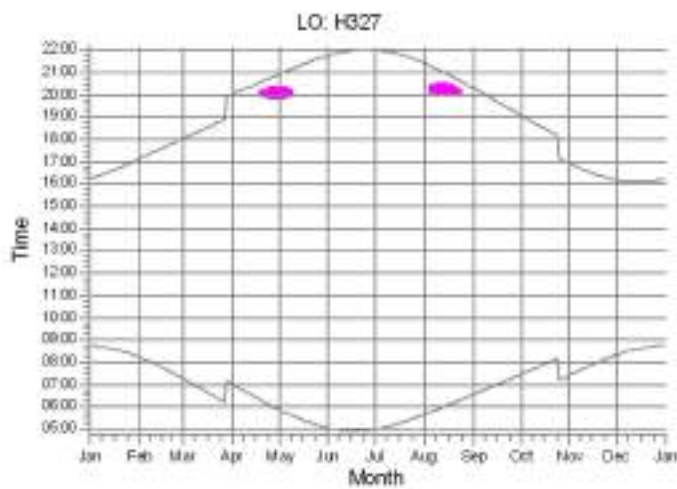
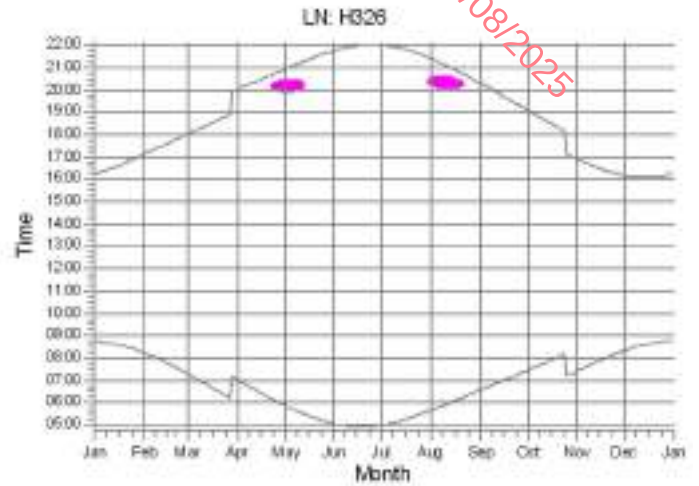
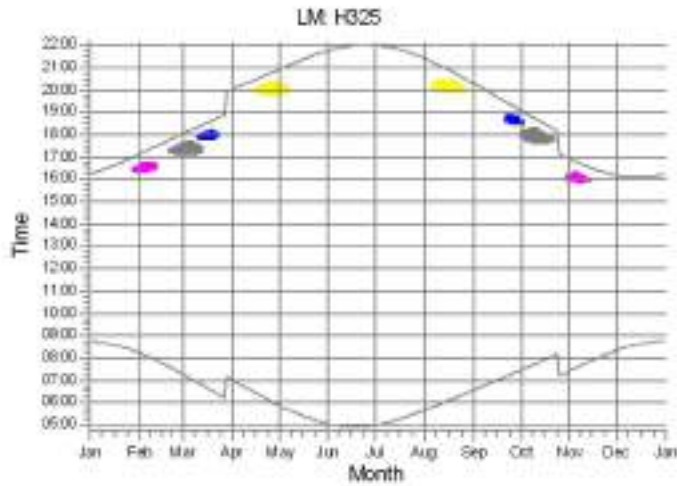


WTGs

3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

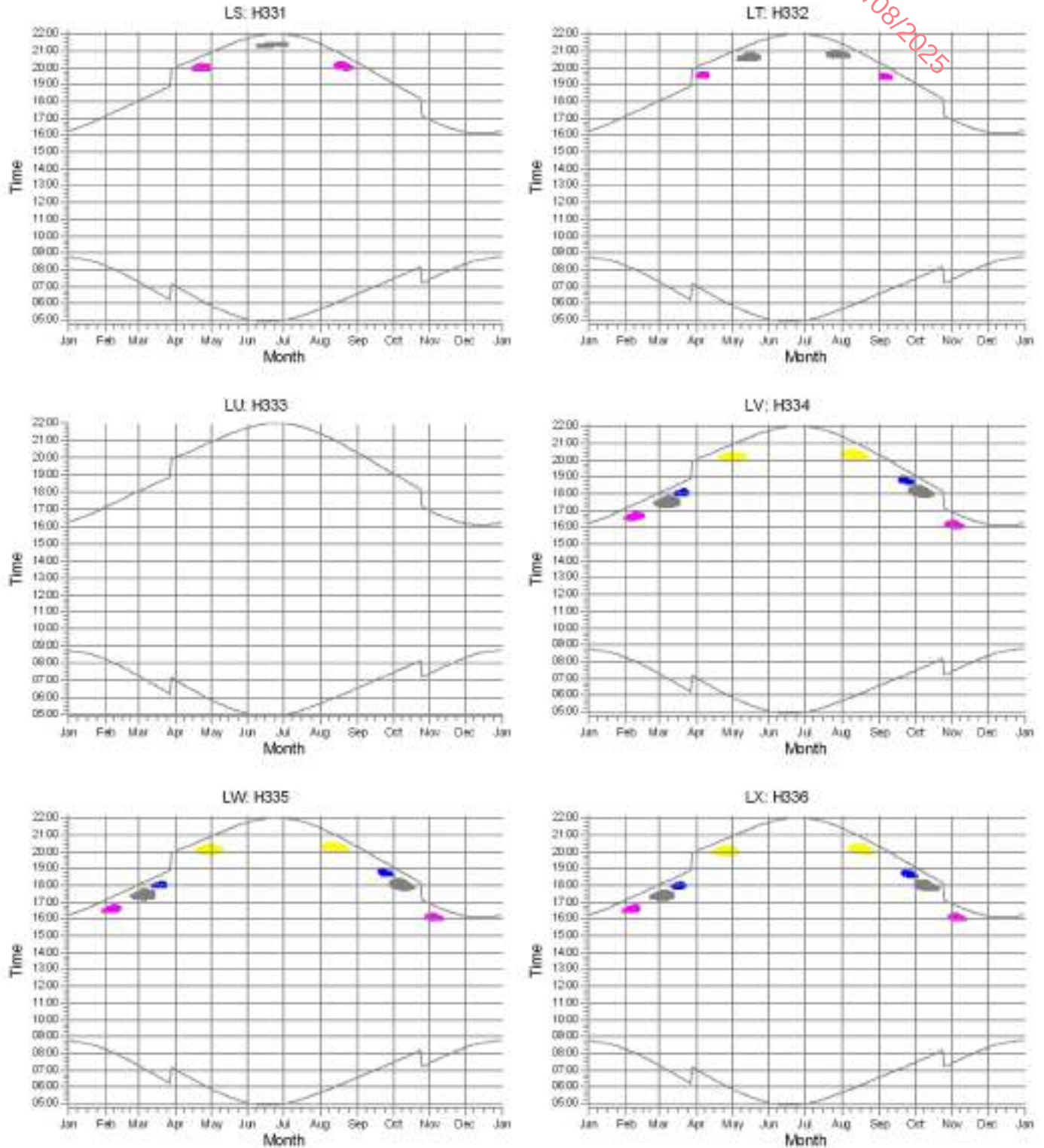


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

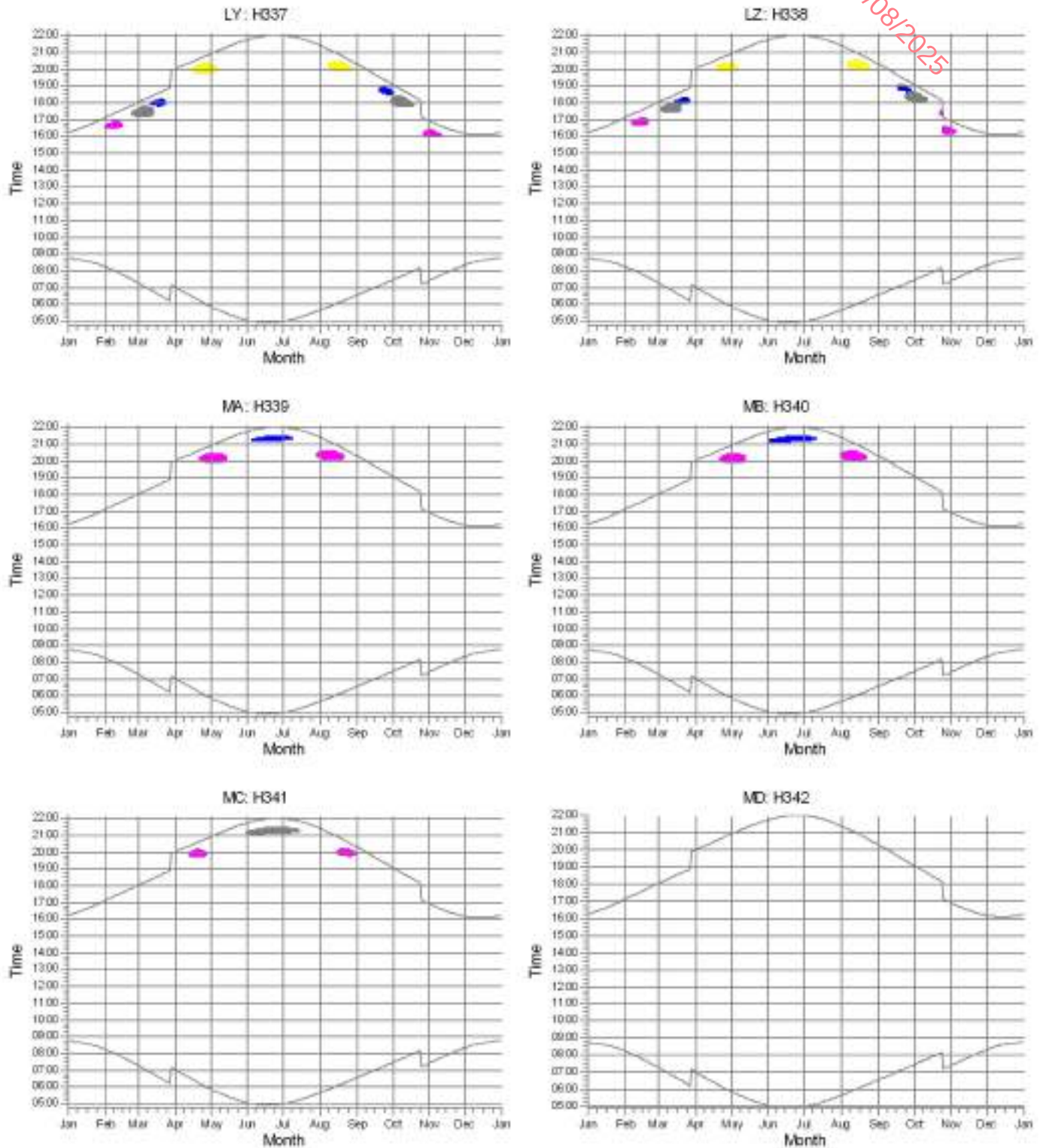


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

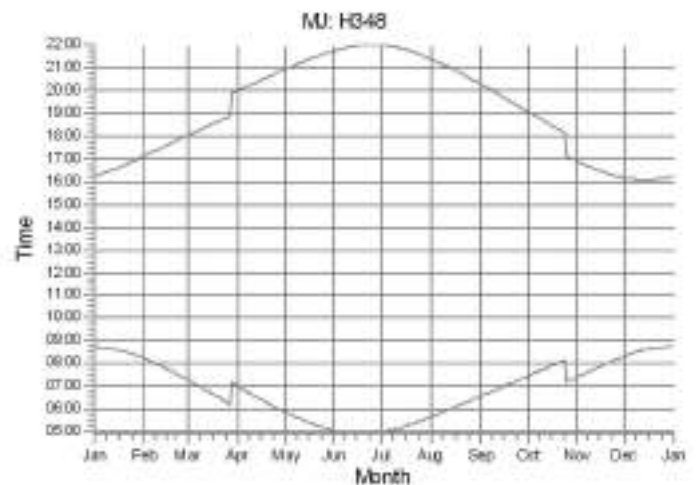
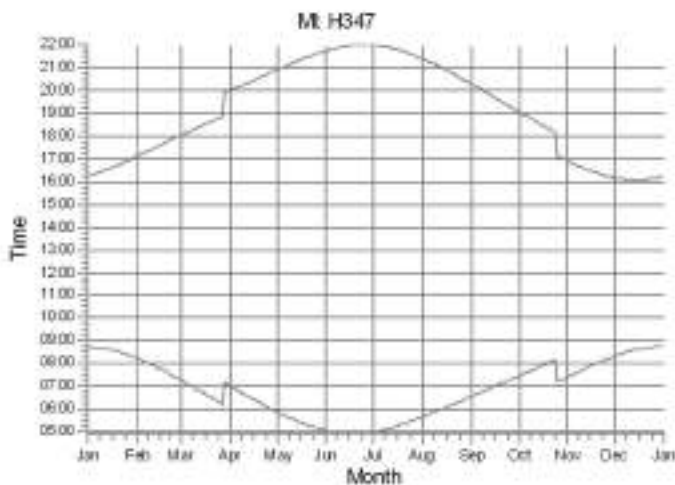
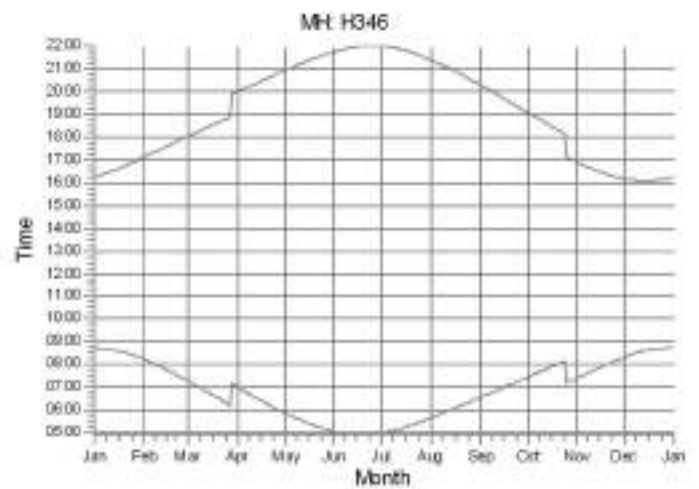
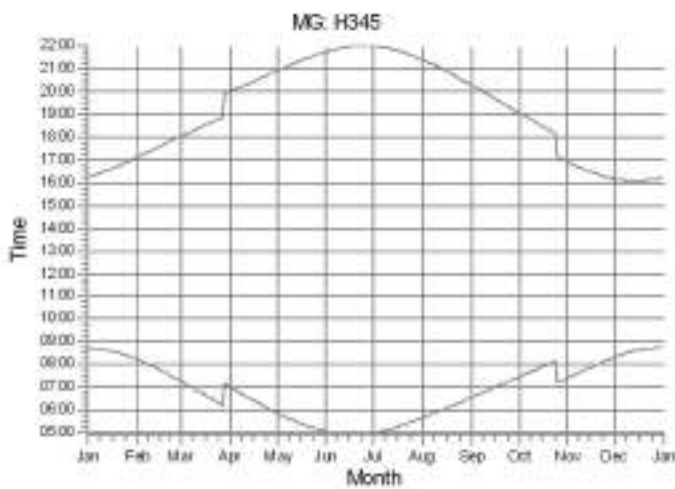
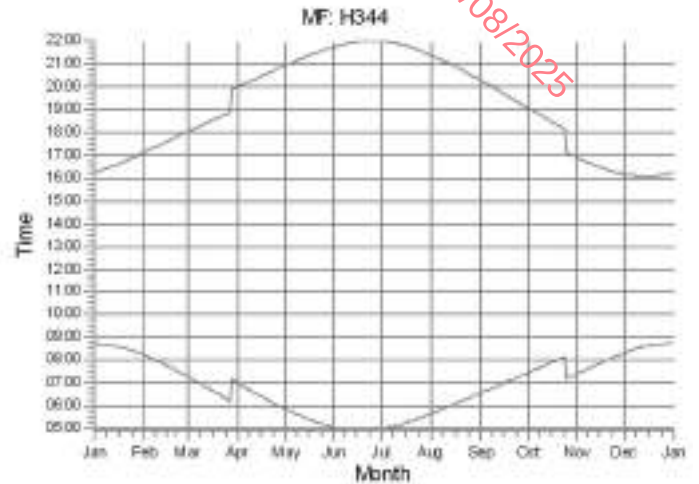
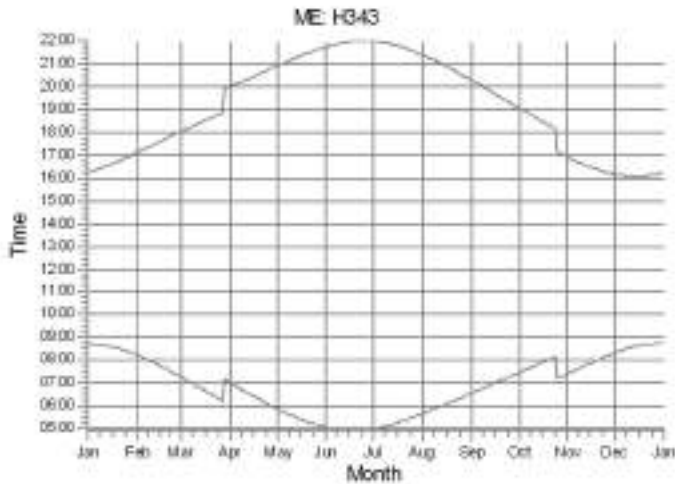
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

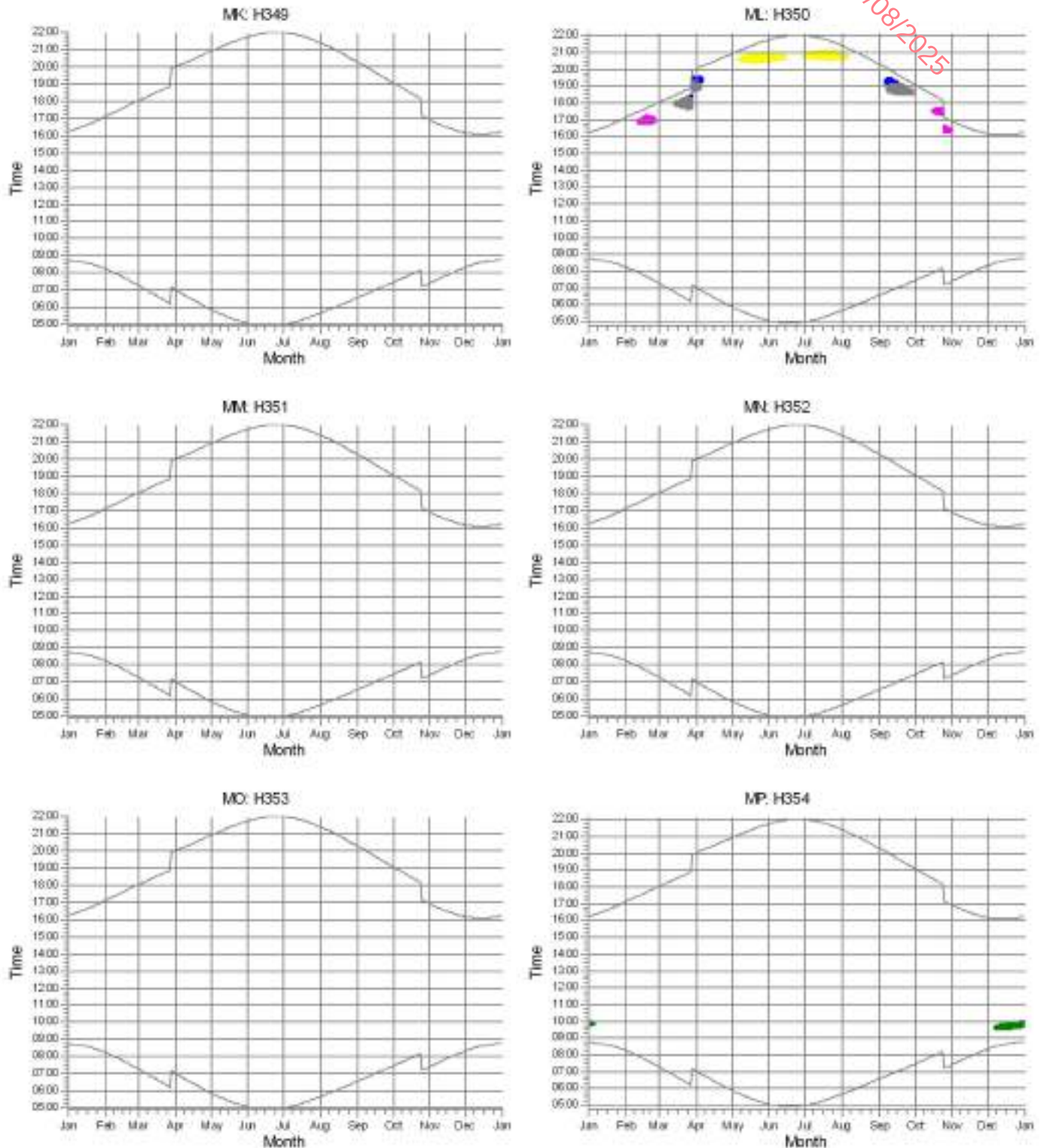
Calculation: Kellystown SG155 Worst Case



WTGs

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

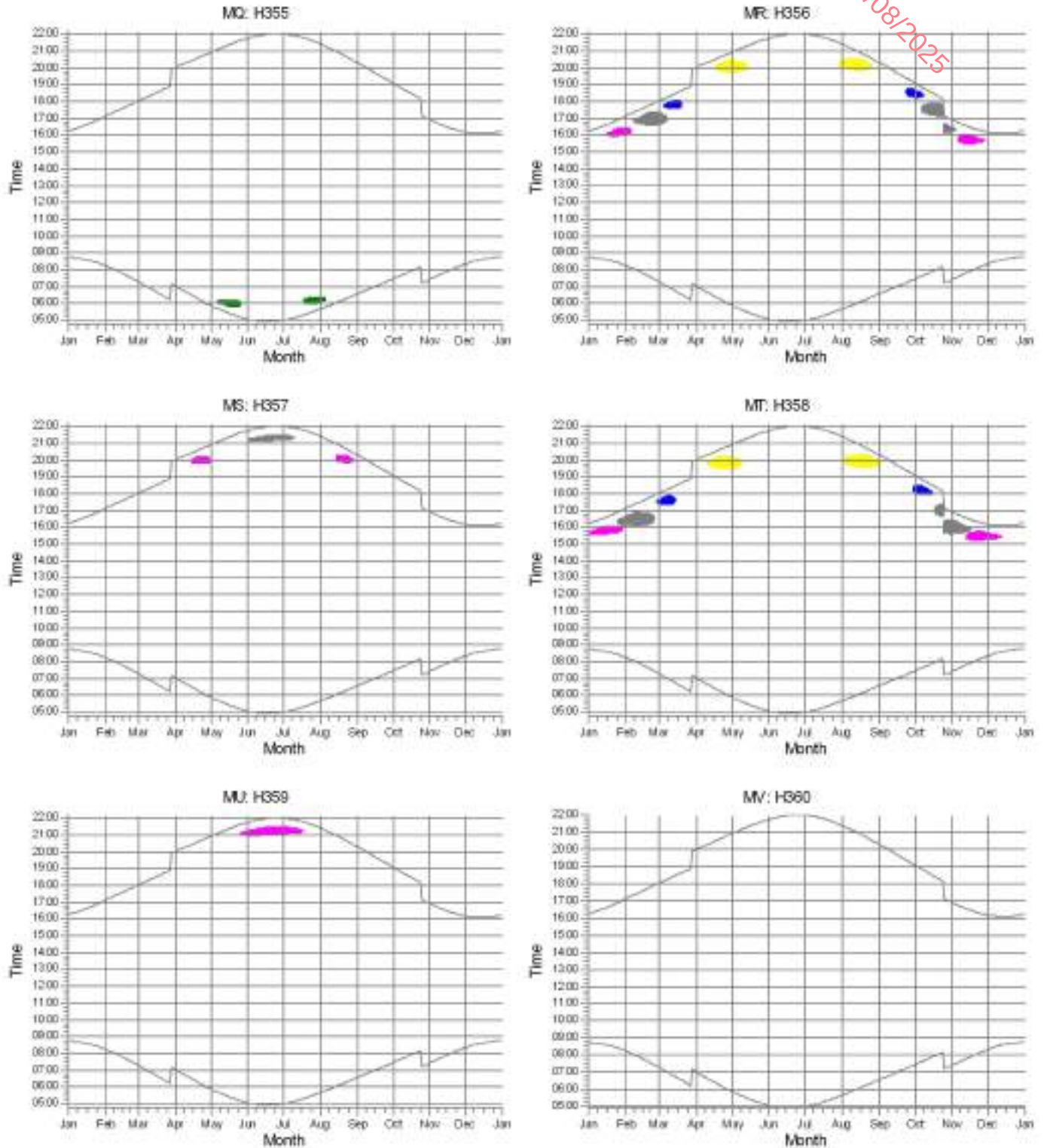


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

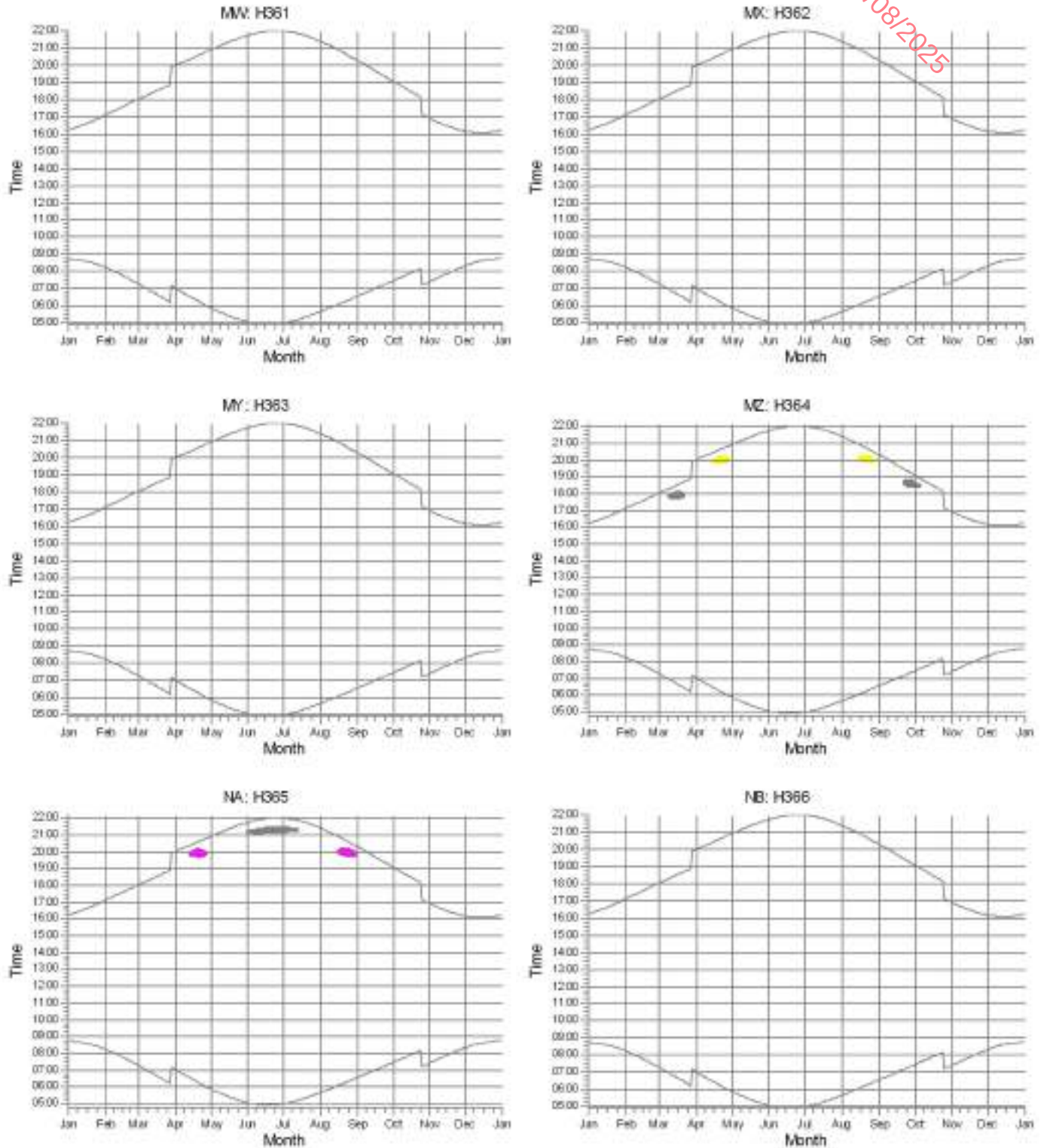


WTGs

1: T01 2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

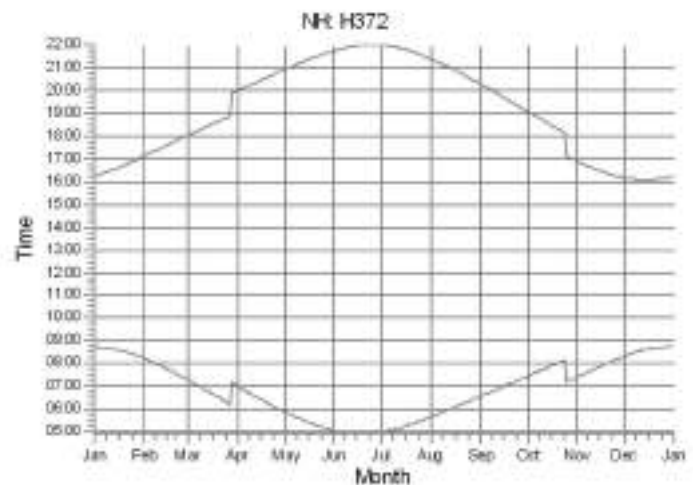
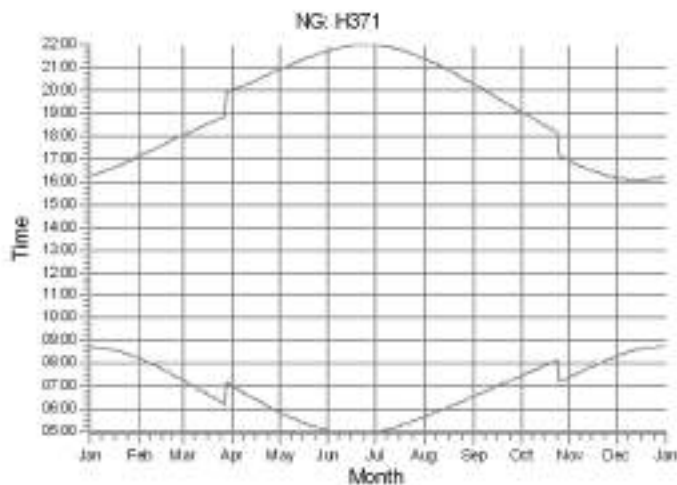
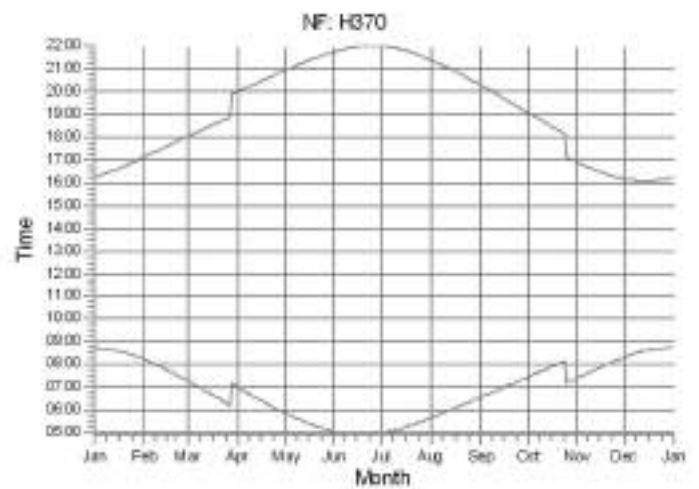
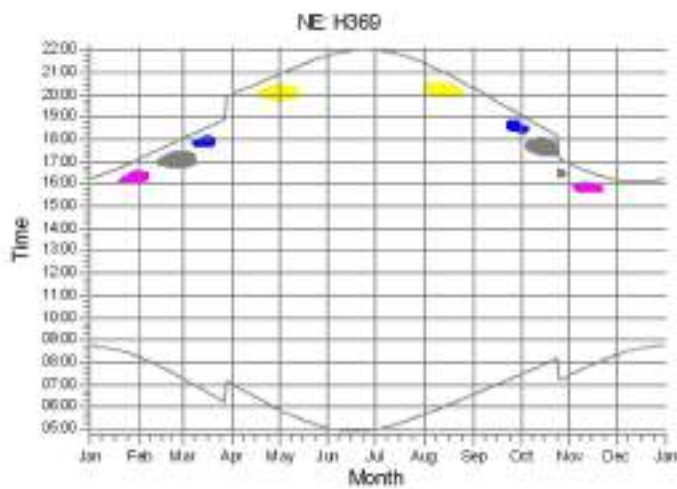
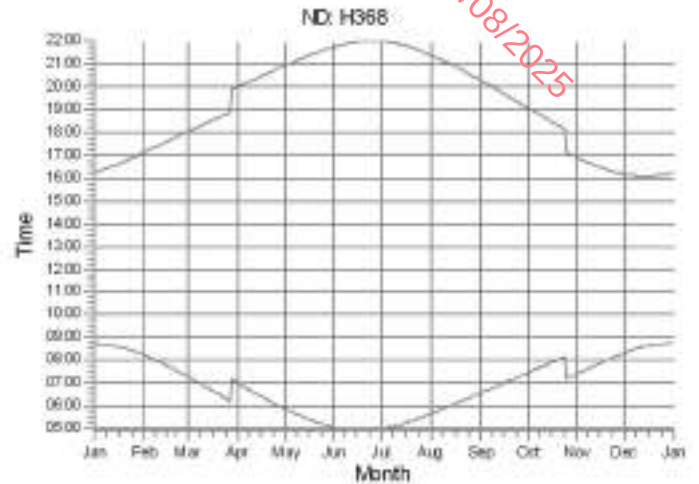
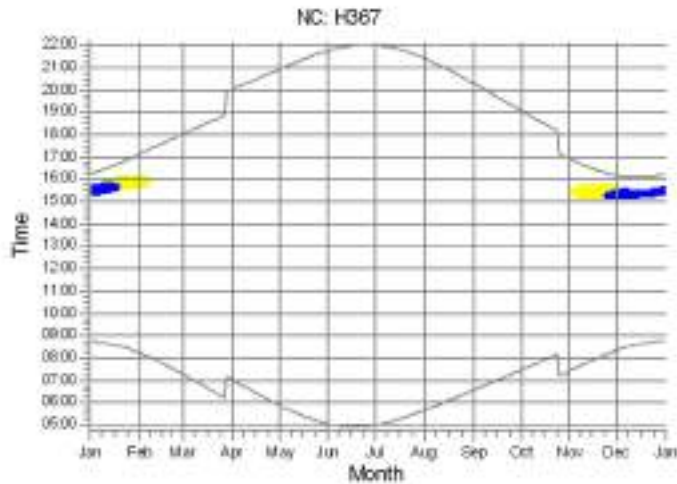


WTGs

2: T02 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case

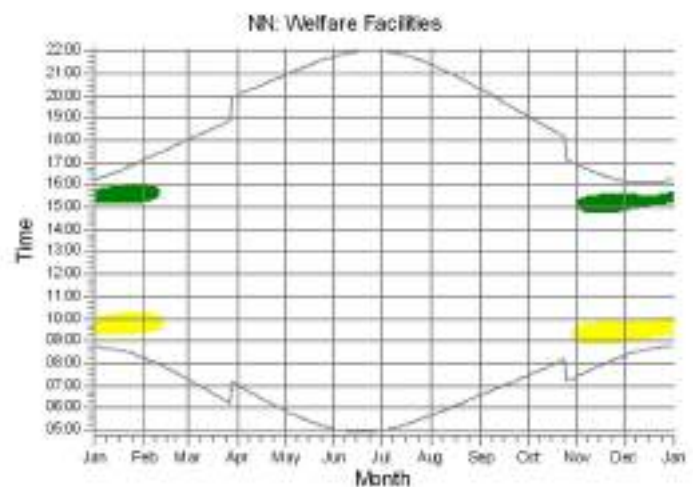
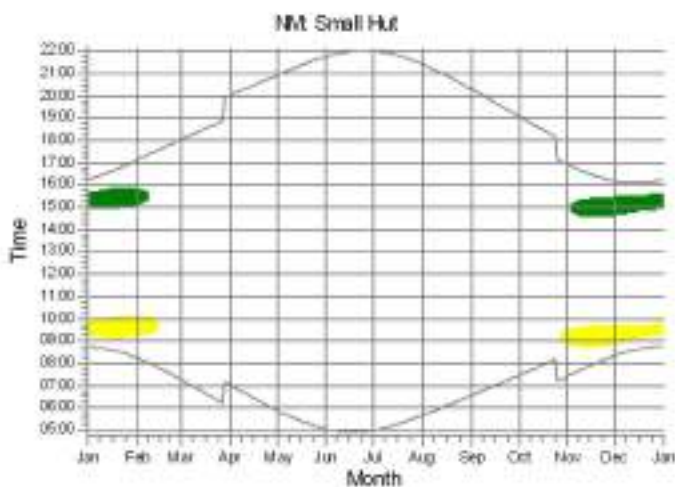
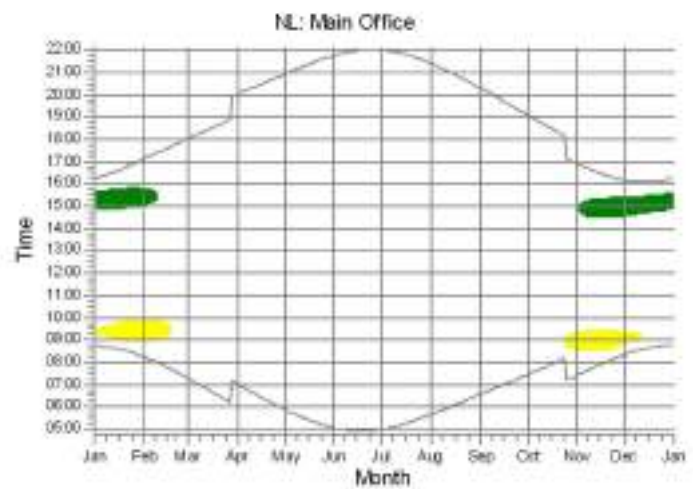
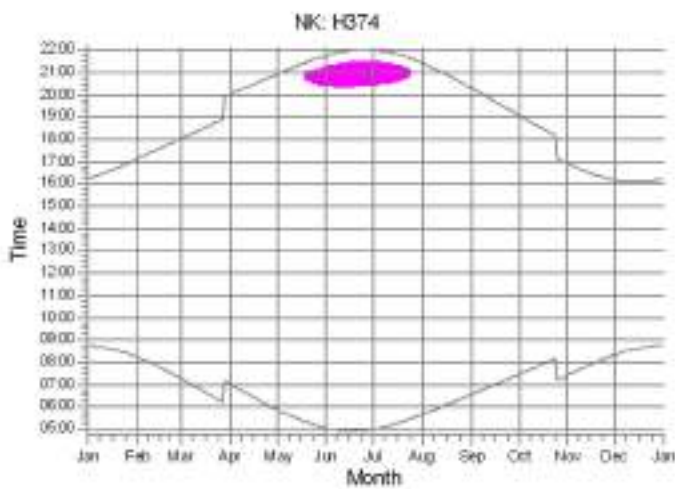
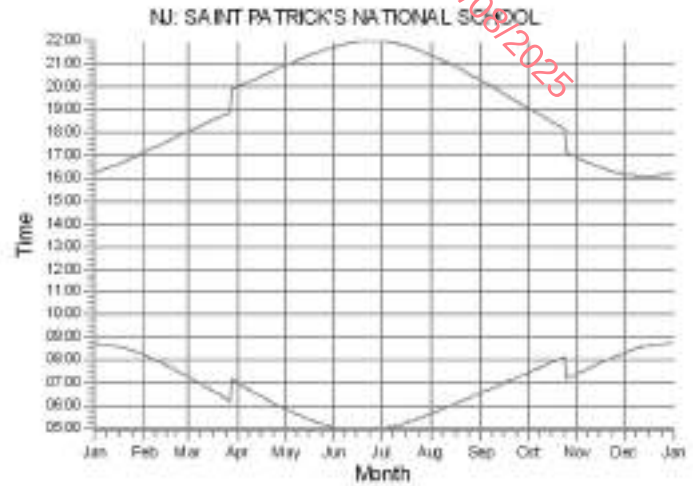
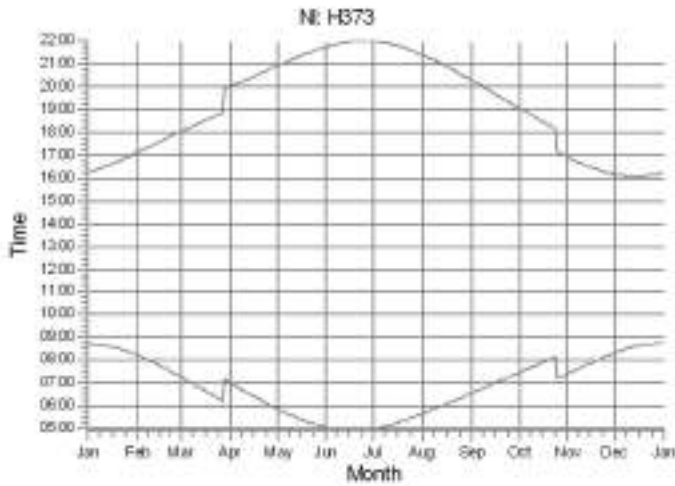


WTGs

2: T02 3: T03 4: T04 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



WTGs

1: T01 2: T02 5: T05

SHADOW - Calendar, graphical

Calculation: Kellystown SG155 Worst Case



WTGs

1: T01

2: T02

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 1 - T01 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 14:05-15:37/92 10:32-12:54/144 16:15 09:18-09:55/37 13:10-13:44/34	08:14 15:06-16:20/74 16:24-16:34/10 17:06 08:42-09:13/31	07:16 08:32-09:08/36 17:10-17:23/13 18:02 07:41-08:01/20 08:11-08:17/6	07:01 07:25-07:35/10 20:00 19:16-19:33/17	05:52 06:18-06:45/27 20:55 07:16-07:39/36	05:03 05:34-05:49/15 21:45 05:50-05:57/7
2	08:44 14:06-15:39/93 10:31-12:54/143 16:16 09:18-09:55/37 13:11-13:44/33	08:12 15:07-16:18/71 16:23-16:37/14 17:08 08:40-09:10/30	07:14 08:35-09:06/31 17:11-17:20/9 18:04 07:39-08:02/23	06:59 07:23-07:47/41 20:02 19:16-19:34/19	06:56 07:16-07:38/17 20:57 07:16-07:37/33	05:02 05:35-05:49/16 21:47 05:51-05:58/8
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6	08:43 14:09-15:44/95 09:16-09:51/35 16:21 10:33-12:53/140 13:16-13:43/27	08:05 15:13-16:08/55 16:20-16:45/25 17:16 08:32-09:12/40	07:05 07:29-08-02/33 18:11	06:49 07:13-07:43/30 20:09 19:28-19:42/13	05:42 06:09-06:34/25 20:59 19:11-07:30/13	04:59 05:30-05:48/18 21:51 05:54-05:59/8
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28	08:20 15:00-16:21/81 16:58 08:58-09:21/23	07:19 08:31-09:10/39 08:04-08:21/17 18:00 07:43-08:01/18 17:08-17:24/16	06:11 18:08-18:26/18 18:53	05:98 06:24-06:51/27 20:50	05:07 05:37-06:00/23 21:40	04:57 05:30-05:51/21 22:01 05:59-05:59/8
29	08:19 15:03-16:21/78 08:47-08:51/4 17:00 08:58-09:18/20	07:09 19:10-19:28/18 19:56	06:09 19:10-19:28/18 20:52	05:56 06:22-06:50/28 20:52	05:06 05:36-05:59/23 21:41	04:58 05:31-05:52/21 22:00 05:59-05:59/8
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31	08:15 15:04-16:19/75 16:25-16:31/6 17:04 08:44-09:14/30	07:04 07:27-07:29/2 19:58 19:15-19:31/16	06:07 07:27-07:29/2 19:58	05:54 06:20-06:47/27 19:58	05:04 05:34-05:57/23 21:44	04:58 05:31-05:52/21 22:00 05:59-05:59/8
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flowers	6091	3035	969	1709	979	605

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 1 - T01 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT] Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec 1.96 2.27 3.21 4.94 6.07 5.43 5.34 5.06 4.08 3.10 2.29 1.56

Operational time

N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum 160 97 158 383 373 261 461 767 532 825 1,031 1,215 766 673 581 477 8,760

July		August		September		October		November		December	
1	04:59 05:32-05:52/20	05:39 06:09-06:39/30	06:33 07:00-07:46/46	07:26 07:53-08:34/41	07:24 07:54-08:45/51	08:19 13:55-15:34/99	08:54-09:26/32	08:19 13:55-15:34/99	08:54-09:26/32	08:19 13:55-15:34/99	08:54-09:26/32
2	05:00 05:33-05:53/20	05:40 06:11-06:40/29	06:35 07:02-07:46/44	07:28 07:54-08:35/41	07:26 15:00-15:15/15	15:49-16:21/32	08:21 13:55-15:33/98	08:56-09:28/32	08:21 13:55-15:33/98	08:56-09:28/32	08:21 13:55-15:33/98
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22	05:23 05:55-06:17/22	06:15 06:44-07:02/18	07:10 18:43-18:58/15	08:05 08:33-09:48/75	16:21 08:36-09:05/29	16:21 08:36-09:05/29	08:04 14:24-15:44/80	10:26-10:46/20	08:04 14:24-15:44/80	10:26-10:46/20	08:04 14:24-15:44/80
23	05:24 05:56-06:19/23	06:17 06:45-07:02/17	07:12 18:42-18:56/14	08:07 08:35-09:48/73	16:19 08:38-09:08/30	16:19 08:38-09:08/30	08:06 14:23-15:43/80	10:24-10:54/30	08:06 14:23-15:43/80	10:24-10:54/30	08:06 14:23-15:43/80
24	05:26 05:57-06:19/22	06:19 06:47-07:02/16	07:14 18:42-18:54/12	08:09 08:37-09:48/71	16:18 08:39-09:08/29	16:18 08:39-09:08/29	08:08 14:23-15:42/79	10:23-10:57/34	08:08 14:23-15:42/79	10:23-10:57/34	08:08 14:23-15:42/79
25	05:27 05:59-06:28/29	06:21 06:49-07:01/15	07:15 18:41-18:52/11	08:11 08:39-09:48/69	16:17 08:41-09:09/28	16:17 08:41-09:09/28	08:10 14:22-15:41/78	10:22-11:00/38	08:10 14:22-15:41/78	10:22-11:00/38	08:10 14:22-15:41/78
26	05:29 06:00-06:29/29	06:22 06:50-07:01/14	07:17 18:40-18:51/9	08:13 08:41-08:47/66	16:16 08:43-09:11/28	16:16 08:43-09:11/28	08:11 14:23-15:39/76	10:21-11:02/40	08:11 14:23-15:39/76	10:21-11:02/40	08:11 14:23-15:39/76
27	05:31 06:02-06:31/29	06:24 06:52-07:01/13	07:19 18:40-18:48/6	08:15 17:18-17:45/27	16:15 11:09-11:18/9	16:15 11:09-11:18/9	08:13 14:24-15:38/74	10:21-11:04/43	08:13 14:24-15:38/74	10:21-11:04/43	08:13 14:24-15:38/74
28	05:32 06:03-06:31/28	06:26 06:54-07:01/12	07:21 18:40-18:31	08:17 07:45-08:47/62	16:14 11:06-11:37/31	16:14 11:06-11:37/31	08:14 14:24-15:37/73	10:21-11:04/43	08:14 14:24-15:37/73	10:21-11:04/43	08:14 14:24-15:37/73
29	05:34 06:05-06:33/28	06:28 06:55-07:01/11	07:23 18:40-18:26/37	08:19 07:47-08:46/59	16:13 10:21-11:40/79	16:13 10:21-11:40/79	08:16 14:23-15:36/73	12:04-12:08/4	08:16 14:23-15:36/73	12:04-12:08/4	08:16 14:23-15:36/73
30	05:35 06:06-06:33/27	06:29 06:57-07:01/10	07:24 18:40-18:10/39	08:21 07:50-08:47/57	16:12 10:20-11:41/81	16:12 10:20-11:41/81	08:18 14:24-15:35/71	12:04-12:08/4	08:18 14:24-15:35/71	12:04-12:08/4	08:18 14:24-15:35/71
31	05:37 06:08-06:37/29	06:31 06:59-07:01/9	19:07	08:22 07:52-08:46/54	16:11 10:19-11:59/100	16:11 10:19-11:59/100	08:22 07:52-08:46/54		08:22 07:52-08:46/54		08:22 07:52-08:46/54
Potential sun hours	512	460	382	254	395	395	233	9391			
Sum of minutes with flicker	699	1763	909	2544	3955	3955	233	9391			

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project:

6918 Kellystown

Description:

5 no. turbine Wind Farm, Co. Louth

Licensed user:

Jennings O'Donovan

Finisklin Business Park

F91 RHH9 Sligo

+353719161416

Kathryn Feeney / kfeeney@jodireland.com

Calculated:

28/03/2025 10:34/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case **WTG:** 2 - T02**Assumptions for shadow calculations**

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	[January	[February	[March	[April	[May	[June					
1	08:44 09:18-10:43/85 10:49-12:06/77 16:15 14:56-15:37/41 12:23-14:35/132	08:14 08:42-10:12/90 13:54-14:38/44 17:06 15:16-16:34/78	07:16 16:33-17:34/61 18:02	07:01 18:32-19:33/61 20:00 07:25-07:26/1	05:52 19:18-20:26/68 20:55	05:03 20:29-21:10/41 21:45 20:06-20:16/10					
2	08:44 09:18-10:43/85 10:50-12:06/76 16:16 14:57-15:39/42 12:24-14:36/132	08:12 08:40-10:11/91 13:55-14:37/42 17:08 15:18-16:37/79	07:14 16:36-17:36/60 18:04	06:59 18:31-19:35/64 20:02 07:23-07:27/4	05:50 19:18-20:27/69 20:57	05:02 20:31-21:12/41 21:47 20:11-20:14/3					
3	08:44 09:17-10:43/86 10:51-12:05/74 16:17 14:57-15:39/42 12:24-14:36/132	08:10 08:38-10:11/93 13:57-14:35/38 17:10 15:20-16:39/79	07:12 16:45-17:38/53 18:06	06:56 18:32-19:37/65 20:04 07:20-07:27/7	05:48 19:19-20:29/70 20:59	05:01 20:32-21:13/41 21:48					
4	08:43 09:17-10:44/87 10:52-12:06/74 16:18 14:59-15:41/42 12:25-14:37/132	08:08 08:36-10:10/94 13:59-14:33/34 17:12 15:21-16:41/80	07:09 16:48-17:41/53 18:08	06:54 18:33-19:39/66 20:06 07:18-07:27/9	05:46 19:21-20:30/69 21:01	05:00 20:33-21:14/41 21:49					
5	08:43 09:16-10:44/88 10:53-12:05/72 16:20 14:59-15:42/43 12:25-14:37/132	08:07 08:34-10:09/95 14:02-14:31/29 17:14 15:23-16:43/80	07:07 16:48-17:42/54 18:09	06:51 18:33-19:40/67 20:07 07:15-07:26/11	05:44 19:22-20:32/70 21:03	04:59 20:33-21:14/41 21:50					
6	08:43 09:16-10:44/88 10:54-12:05/71 16:21 15:01-15:44/43 12:27-14:38/131	08:05 08:32-10:08/96 14:05-14:29/24 17:16 15:25-16:45/80	07:05 16:49-17:45/56 18:11	06:49 18:34-19:42/68 20:09 07:13-07:26/13	05:42 19:24-20:33/69 21:04	04:59 20:35-21:16/41 21:51					
7	08:42 09:15-10:44/89 10:55-12:04/69 16:22 15:02-15:45/43 12:27-14:38/131	08:03 08:30-10:07/97 14:09-14:25/16 17:18 15:27-16:47/80	07:02 16:49-17:45/56 18:13	06:47 18:34-19:43/69 20:11 07:11-07:26/15	05:40 19:27-20:36/69 21:06	04:58 20:35-21:16/41 21:52					
8	08:42 09:14-10:44/90 11:44-12:03/19 12:28-14:38/130 16:24 15:03-15:46/43 10:56-11:41/45	08:01 08:28-10:05/97 17:20 15:31-16:50/79	07:00 07:24-07:28/4 18:15 16:50-17:46/56	06:44 18:35-19:46/71 20:13 07:08-07:24/16	05:38 19:43-20:37/54 21:08 19:30-19:40/10	04:57 20:36-21:17/41 21:53					
9	08:41 09:14-10:45/91 11:47-12:02/15 12:29-14:39/130 16:25 15:04-15:49/45 10:59-11:42/43	07:59 08:26-10:04/98 17:22 15:37-16:52/75	06:57 07:22-07:29/7 18:17 16:51-17:45/54	06:42 18:37-19:48/71 20:15 07:08-07:23/15	05:36 19:47-20:39/52 21:10	04:57 20:36-21:17/41 21:54					
10	08:40 09:13-10:45/92 11:49-12:00/11 12:30-14:40/130 16:27 15:04-15:50/46 11:00-11:42/42	07:57 08:24-10:02/98 17:24 15:37-16:54/77	06:55 07:19-07:29/10 18:19 16:53-17:45/52	06:39 18:38-19:49/71 20:17 07:09-07:21/12	05:34 19:47-20:40/53 21:12	04:56 20:37-21:18/41 21:55					
11	08:40 09:12-10:45/93 11:03-11:41/38 16:28 15:04-15:52/48 12:31-14:40/129	07:55 08:22-09:59/97 17:26 15:38-16:56/78	06:53 07:17-07:29/12 18:21 16:55-17:45/50	06:37 18:40-19:51/71 20:19 07:11-07:18/7	05:33 19:49-20:42/53 21:13	04:56 20:38-21:18/40 21:55					
12	08:39 09:11-10:45/94 11:06-11:41/35 16:30 15:04-15:54/50 12:32-14:40/128	07:53 08:20-09:55/95 17:28 15:39-16:59/80	06:50 07:14-07:29/15 18:23 16:56-17:43/47	06:35 18:44-19:53/69 20:20	05:31 19:48-20:43/55 21:15	04:55 20:38-21:18/40 21:56					
13	08:38 09:10-10:45/95 11:11-11:40/29 16:31 15:05-15:55/50 12:33-14:41/128	07:51 09:10-09:47/37 15:40-17:00/80 17:30 08:18-09:07/49	06:48 07:12-07:29/17 18:25 16:58-17:43/45	06:32 18:53-19:54/61 20:22	05:29 19:48-20:44/56 21:17	04:55 20:39-21:18/39 21:57					
14	08:37 09:09-10:44/95 11:13-11:39/26 16:33 15:05-15:57/52 12:34-14:41/127	07:49 09:12-09:40/28 15:41-17:02/81 17:32 08:15-09:05/50	06:45 07:09-07:27/18 18:27 16:59-17:41/42	06:30 18:55-19:56/61 20:24	05:27 19:49-20:47/58 21:18	04:55 20:40-21:18/38 21:58					
15	08:36 09:08-10:12/64 11:15-11:38/23 12:35-14:41/126 16:34 15:05-15:59/54 10:13-10:44/31	07:47 09:14-09:38/24 15:43-17:05/82 17:34 08:13-09:02/49	06:43 07:09-07:27/18 17:01-17:40/39 18:28 17:53-18:02/9	06:28 18:56-19:58/62 20:26	05:26 19:49-20:48/59 21:20	04:55 20:41-21:19/38 21:58					
16	08:35 09:07-10:12/65 11:17-11:37/20 12:37-14:41/124 16:36 15:05-16:00/55 10:14-10:44/30	07:45 09:17-09:36/19 15:45-17:07/82 17:36 08:11-08:51/40	06:40 07:09-07:25/16 17:04-17:38/34 18:30 17:48-18:04/16	06:25 18:58-20:00/62 20:28	05:24 19:50-20:50/60 21:22	04:54 20:41-21:19/38 21:59					
17	08:34 09:05-10:12/67 11:19-11:34/15 12:38-14:41/123 16:38 15:05-16:02/57 10:14-10:43/29	07:43 09:22-09:31/9 16:10-17:09/59 17:38 08:09-08:50/41 15:48-16:05/17	06:38 07:11-07:23/12 17:11-17:36/25 18:32 17:46-18:06/20	06:23 18:59-20:01/62 20:30	05:22 19:50-20:51/61 21:23	04:54 20:42-21:19/37 21:59					
18	08:33 09:04-10:12/68 11:23-11:31/8 12:40-14:42/122 16:40 15:06-16:05/59 10:16-10:42/26	07:41 08:07-08:48/41 15:52-16:00/8 17:40 16:11-17:11/60	06:36 07:14-07:19/5 17:15-17:32/17 18:34 17:43-18:07/24	06:21 19:02-20:03/61 20:32	05:21 19:51-20:53/62 21:25	04:54 20:42-21:19/37 22:00					
19	08:32 09:03-10:13/70 10:18-10:42/24 16:41 15:06-16:07/61 12:42-14:42/120	07:39 08:04-08:46/42 17:42 16:12-17:13/61	06:33 17:41-18:10/29 18:36	06:18 19:06-20:05/59 20:33	05:19 19:52-20:54/62 21:27	04:54 20:43-21:20/37 22:00					
20	08:31 09:01-10:12/71 10:19-10:40/21 16:43 15:06-16:08/62 12:43-14:41/118	07:37 08:02-08:43/41 17:44 16:14-17:16/62	06:31 17:39-18:11/32 18:38	06:16 19:12-20:07/55 20:35	05:18 19:52-20:55/63 21:28	04:54 20:43-21:20/37 22:00					
21	08:30 09:00-10:13/73 10:21-10:38/17 12:47-13:07/20 16:45 15:07-16:11/64 13:43-14:42/59 13:10-13:42/32	07:34 08:00-08:41/41 17:46 16:17-17:18/61	06:28 17:38-18:13/35 18:40	06:14 19:13-20:08/55 20:37	05:16 19:53-20:57/64 21:30	04:54 20:43-21:20/37 22:01					
22	08:29 08:58-10:12/74 10:24-10:35/11 12:50-13:03/13 16:47 15:07-16:12/65 13:43-14:41/58 13:12-13:41/29	07:32 07:57-08:36/39 17:48 16:19-17:19/60	06:26 17:36-18:15/39 18:42	06:12 19:13-20:10/57 20:39	05:15 19:54-20:59/65 21:31	04:55 20:44-21:21/37 22:01					
23	08:27 08:57-10:13/76 13:45-14:42/57 16:49 15:08-16:15/67 13:15-13:39/24	07:30 07:55-08:33/38 17:50 16:21-17:22/61	06:23 17:36-18:17/41 18:43	06:09 19:14-20:12/58 20:41	05:13 19:54-20:59/65 21:33	04:55 20:44-21:21/37 22:01					
24	08:26 08:55-10:12/77 13:45-14:41/56 16:51 15:08-16:16/68 13:17-13:37/20	07:28 07:54-08:29/35 17:52 16:23-17:24/61	06:21 17:34-18:18/44 18:45	06:07 19:14-20:14/60 20:43	05:12 19:55-21:01/66 21:34	04:55 20:44-21:20/36 22:01					
25	08:25 08:54-10:13/79 13:46-14:42/56 16:52 15:09-16:19/70 13:22-13:34/12	07:25 07:54-08:24/30 17:54 16:25-17:26/61	06:18 17:34-18:21/47 18:47	06:05 19:14-20:15/61 20:44	05:11 19:56-21:02/66 21:36	04:56 20:44-21:21/37 22:01					
26	08:23 08:52-10:12/80 13:47-14:41/54 16:54 15:09-16:21/72	07:23 07:56-08:21/25 17:56 16:28-17:28/60	06:16 17:34-18:23/49 18:49	06:03 19:15-20:17/62 20:46	05:09 19:57-21:04/67 21:37	04:56 20:44-21:21/37 22:01					
27	08:22 08:51-10:13/82 13:47-14:40/53 16:56 15:10-16:23/73	07:21 16:29-17:31/62 17:58 07:57-08:14/17	06:13 17:33-18:24/51 18:51	06:01 19:15-20:19/64 20:48	05:08 19:59-21:05/66 21:39	04:56 20:43-21:21/38 22:01					
28	08:20 08:49-10:12/83 13:49-14:41/52 16:58 15:11-16:26/75	07:19 16:30-17:32/62 18:00 07:59-08:10/11	06:11 17:33-18:26/53 18:53	05:58 19:15-20:21/66 20:50	05:07 20:00-21:06/66 21:40	04:57 20:43-21:22/39 22:01					
29	08:19 08:47-10:12/85 13:50-14:40/50 17:00 15:12-16:27/75		07:09 18:32-19:28/56 19:55	05:56 19:16-20:22/66 20:52	05:06 20:24-21:07/43 21:41	04:57 20:44-21:22/38 22:01					
30	08:17 08:45-10:12/87 13:51-14:39/48 17:02 15:13-16:29/76		07:06 18:32-19:30/58 19:56	05:54 19:17-20:24/67 20:54	05:05 20:26-21:08/42 21:43	04:58 20:43-21:22/39 22:00					
31	08:15 08:44-10:11/87 13:52-14:38/46 17:04 15:14-16:31/77		07:04 18:31-19:31/60 19:58		05:04 20:28-21:09/41 21:44						
Potential sun hours	250		367		420		494		510		
Sum of minutes with flicker	8673	4099	1651	2022	1944	1213					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan Finisklin Business Park F91 RHH9 Sligo +353719161416 Kathryn Feeney / kfeeney@jodireland.com Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 2 - T02 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

July		August		September		October		November		December	
1	04:59 20:43-21:22/39	05:39 19:59-20:53/54	06:33 18:39-19:50/71	07:26 07:52-08:07/15	07:24 07:54-09:32/98	07:26 07:52-08:07/15	07:24 07:54-09:32/98	07:24 07:54-09:32/98	07:24 07:54-09:32/98	08:19 08:54-10:27/93	10:45-11:23/38
2	05:00 20:43-21:23/40	05:40 19:59-20:52/53	06:35 18:37-19:48/71	07:28 07:54-08:07/13	07:26 07:56-09:34/98	07:28 07:54-08:07/13	07:26 07:56-09:34/98	07:26 07:56-09:34/98	07:26 07:56-09:34/98	08:21 08:56-10:28/92	11:33-11:43/10
3	05:00 20:42-21:22/40	05:42 19:58-20:50/52	06:36 18:35-19:46/71	07:30 07:56-08:07/11	07:28 07:58-09:35/97	07:30 07:56-08:07/11	07:28 07:58-09:35/97	07:28 07:58-09:35/97	07:28 07:58-09:35/97	08:22 08:57-10:28/91	11:30-11:45/15
4	05:01 20:42-21:23/41	05:44 19:56-20:48/52	06:38 18:32-19:43/71	07:32 07:58-08:06/8	07:30 08:00-09:37/97	07:32 07:58-08:06/8	07:30 08:00-09:37/97	07:30 08:00-09:37/97	07:30 08:00-09:37/97	08:24 08:59-10:29/90	11:29-11:48/19
5	05:02 20:42-21:23/41	05:45 19:58-20:46/68	06:40 18:31-19:41/70	07:33 08:00-08:05/5	07:32 08:02-09:38/96	07:33 08:00-08:05/5	07:32 08:02-09:38/96	07:32 08:02-09:38/96	07:32 08:02-09:38/96	08:25 09:00-10:29/89	11:28-11:49/21
6	05:03 20:41-21:22/41	05:47 19:35-20:45/70	06:42 18:30-19:38/69	07:35 08:02-08:04/2	07:34 08:04-09:39/95	07:35 08:02-08:04/2	07:34 08:04-09:39/95	07:34 08:04-09:39/95	07:34 08:04-09:39/95	08:26 09:02-10:31/88	10:41-11:51/70
7	05:04 20:41-21:22/41	05:49 19:34-20:43/69	06:43 18:28-19:35/67	07:37 17:24-18:21/57	07:36 08:06-09:40/94	07:37 17:24-18:21/57	07:36 08:06-09:40/94	07:36 08:06-09:40/94	07:36 08:06-09:40/94	08:28 09:03-10:31/88	10:40-11:52/72
8	05:05 20:41-21:22/40	05:51 19:31-20:41/70	06:45 18:27-19:33/66	07:39 17:24-18:18/54	07:38 08:09-09:40/91	07:39 17:24-18:18/54	07:38 08:09-09:40/91	07:38 08:09-09:40/91	07:38 08:09-09:40/91	08:29 09:05-10:32/87	10:40-11:52/74
9	05:06 20:40-21:21/41	05:52 19:30-20:39/69	06:47 18:26-19:31/65	07:41 17:23-18:16/53	07:40 08:11-09:42/91	07:41 17:23-18:16/53	07:40 08:11-09:42/91	07:40 08:11-09:42/91	07:40 08:11-09:42/91	08:30 09:06-10:32/86	10:40-11:54/74
10	05:07 20:39-21:20/41	05:54 19:28-20:37/69	06:49 18:25-19:28/63	07:42 17:22-18:14/52	07:42 08:13-09:43/90	07:42 17:22-18:14/52	07:42 08:13-09:43/90	07:42 08:13-09:43/90	07:42 08:13-09:43/90	08:32 09:07-10:32/85	10:40-11:55/75
11	05:08 20:38-21:19/41	05:56 19:27-20:35/68	06:51 18:24-19:26/62	07:44 17:15-17:16/1	07:44 08:15-09:43/88	07:44 17:15-17:16/1	07:44 08:15-09:43/88	07:44 08:15-09:43/88	07:44 08:15-09:43/88	08:34 09:09-10:33/84	10:39-11:57/78
12	05:09 20:37-21:18/41	05:58 19:26-20:34/68	06:52 18:24-19:24/60	07:46 17:08-18:09/61	07:46 17:08-18:09/61	07:46 17:08-18:09/61	07:46 17:08-18:09/61	07:46 17:08-18:09/61	07:46 17:08-18:09/61	08:36 09:11-10:35/84	10:40-11:58/78
13	05:11 20:37-21:17/40	05:59 19:24-20:31/67	06:54 18:23-19:22/59	07:48 17:05-18:07/62	07:47 08:19-09:44/85	07:48 17:05-18:07/62	07:47 08:19-09:44/85	07:47 08:19-09:44/85	07:47 08:19-09:44/85	08:38 09:13-10:35/82	10:40-12:00/80
14	05:12 20:34-21:16/42	06:01 19:23-20:29/66	06:56 18:22-19:18/56	07:50 17:03-18:04/61	07:49 08:21-09:44/83	07:50 17:03-18:04/61	07:49 08:21-09:44/83	07:49 08:21-09:44/83	07:49 08:21-09:44/83	08:39 09:14-10:36/82	10:41-12:01/80
15	05:13 20:32-21:15/43	06:03 19:23-20:28/65	06:58 18:22-19:16/54	07:52 08:29-08:50/21	07:51 08:23-09:45/82	07:52 08:29-08:50/21	07:51 08:23-09:45/82	07:51 08:23-09:45/82	07:51 08:23-09:45/82	08:40 09:16-10:37/81	10:42-12:02/80
16	05:14 20:30-20:30/21	06:05 19:21-20:25/64	06:59 18:22-19:14/52	07:54 08:27-08:55/28	07:53 08:25-09:45/80	07:54 08:27-08:55/28	07:53 08:25-09:45/80	07:53 08:25-09:45/80	07:53 08:25-09:45/80	08:42 09:18-10:39/81	10:44-12:04/80
17	05:16 20:08-21:14/66	06:06 19:21-20:23/62	07:01 18:21-19:11/50	07:56 08:26-08:57/31	07:55 08:27-09:46/79	07:56 08:26-08:57/31	07:55 08:27-09:46/79	07:55 08:27-09:46/79	07:55 08:27-09:46/79	08:44 09:19-10:41/82	10:46-12:06/80
18	05:17 20:06-21:12/66	06:08 19:21-20:22/61	07:03 18:21-19:08/47	07:57 08:25-09:02/37	07:57 08:29-09:46/77	07:57 08:25-09:02/37	07:57 08:29-09:46/77	07:57 08:29-09:46/77	07:57 08:29-09:46/77	08:46 09:21-10:42/82	10:48-12:08/80
19	05:18 20:05-21:11/66	06:10 19:20-20:19/59	07:05 18:22-19:06/44	07:59 08:27-09:06/39	07:59 08:31-09:47/76	07:59 08:27-09:06/39	07:59 08:31-09:47/76	07:59 08:31-09:47/76	07:59 08:31-09:47/76	08:48 09:23-10:43/82	10:50-12:10/80
20	05:20 20:05-21:10/65	06:12 19:19-20:17/58	07:06 18:22-19:04/42	08:01 08:29-09:09/40	08:00 08:33-09:47/74	08:01 08:29-09:09/40	08:00 08:33-09:47/74	08:00 08:33-09:47/74	08:00 08:33-09:47/74	08:50 09:25-10:45/82	10:52-12:12/80
21	05:21 20:04-21:09/65	06:13 19:19-20:15/56	07:08 18:22-19:01/39	08:03 08:31-09:12/41	08:02 08:35-09:48/73	08:03 08:31-09:12/41	08:02 08:35-09:48/73	08:02 08:35-09:48/73	08:02 08:35-09:48/73	08:52 09:27-10:47/82	10:54-12:14/80
22	05:23 20:03-21:07/64	06:15 19:17-20:12/55	07:10 18:23-18:58/35	08:05 08:33-09:15/42	08:04 08:37-09:48/71	08:05 08:33-09:15/42	08:04 08:37-09:48/71	08:04 08:37-09:48/71	08:04 08:37-09:48/71	08:54 09:29-10:49/82	10:56-12:16/80
23	05:24 20:03-21:07/64	06:17 19:15-20:10/55	07:12 18:24-18:56/32	08:07 08:35-09:17/42	08:06 08:39-09:49/70	08:07 08:35-09:17/42	08:06 08:39-09:49/70	08:06 08:39-09:49/70	08:06 08:39-09:49/70	08:56 09:31-10:51/82	10:58-12:18/80
24	05:26 20:02-21:05/63	06:19 19:09-20:09/60	07:14 18:25-18:54/29	08:09 08:37-09:18/41	08:08 08:41-09:49/68	08:09 08:37-09:18/41	08:08 08:41-09:49/68	08:08 08:41-09:49/68	08:08 08:41-09:49/68	08:58 09:33-10:53/82	10:60-12:20/80
25	05:27 20:02-21:04/62	06:20 19:04-20:06/62	07:15 18:25-18:51/26	08:11 08:41-09:20/40	08:09 08:43-09:50/67	08:11 08:41-09:20/40	08:09 08:43-09:50/67	08:09 08:43-09:50/67	08:09 08:43-09:50/67	08:59 09:34-10:54/82	10:62-12:22/80
26	05:29 20:01-21:02/61	06:22 19:02-20:04/62	07:17 07:54-08:04/10	08:13 08:41-09:20/40	08:11 08:45-09:50/65	07:17 07:54-08:04/10	08:13 08:41-09:20/40	08:11 08:45-09:50/65	08:11 08:45-09:50/65	09:00 09:35-10:55/82	10:64-12:24/80
27	05:30 20:01-21:00/59	06:24 18:59-20:02/63	07:19 07:52-08:06/14	08:15 08:43-09:20/40	08:13 08:47-09:51/64	07:19 07:52-08:06/14	08:15 08:43-09:20/40	08:13 08:47-09:51/64	08:13 08:47-09:51/64	09:02 09:37-10:57/82	10:66-12:26/80
28	05:32 20:00-20:59/59	06:26 18:57-19:59/62	07:21 07:50-08:07/17	08:17 08:45-09:21/40	08:15 08:49-09:52/64	07:21 07:50-08:07/17	08:17 08:45-09:21/40	08:15 08:49-09:52/64	08:15 08:49-09:52/64	09:04 09:39-10:59/82	10:68-12:28/80
29	05:34 19:59-20:57/58	06:28 18:55-19:57/62	07:22 07:49-08:08/19	08:19 08:47-09:22/40	08:17 08:51-09:53/64	07:22 07:49-08:08/19	08:19 08:47-09:22/40	08:17 08:51-09:53/64	08:17 08:51-09:53/64	09:06 09:41-10:61/82	10:70-12:30/80
30	05:35 19:59-20:56/57	06:29 18:54-19:55/61	07:24 07:51-08:08/17	08:21 08:49-09:23/40	08:19 08:53-09:54/64	06:29 18:54-19:55/61	07:24 07:51-08:08/17	08:21 08:49-09:23/40	08:19 08:53-09:54/64	09:08 09:43-10:63/82	10:72-12:32/80
31	05:37 19:59-20:55/56	06:31 18:42-19:52/70	07:26 07:53-08:10/17	08:23 08:51-09:24/40	08:21 08:55-09:56/64	05:37 19:59-20:55/56	06:31 18:42-19:52/70	07:26 07:53-08:10/17	08:23 08:51-09:24/40	09:10 09:45-10:65/82	10:74-12:34/80
Potential sun hours	512	460	382	2925	7015	512	460	382	2925	7015	10315
Sum of minutes with flicker	1686	1935	1802	2925	7015	1686	1935	1802	2925	7015	10315

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 3 - T03
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 15:04-15:37/33 16:15 09:21-10:00/39 2 08:44 15:05-15:39/34 16:16 09:22-10:00/38 3 08:44 15:05-15:39/34 16:17 09:22-09:58/36 4 08:43 15:06-15:41/35 16:18 09:23-09:58/35 5 08:43 15:06-15:42/36 16:20 09:23-09:56/33 6 08:43 15:08-15:44/36 16:21 09:25-09:54/29 7 08:42 15:08-15:45/37 16:22 09:25-09:52/27 8 08:42 15:09-15:46/37 16:24 09:26-09:48/22 9 08:41 15:11-15:49/38 16:25 09:27-09:48/21 10 08:40 15:13-15:50/37 16:27 09:28-09:48/20 11 08:40 15:14-15:52/38 16:28 09:29-09:46/17 12 08:39 15:15-15:54/39 16:30 09:31-09:44/13 13 08:38 15:17-15:55/38 16:31 09:32-09:43/11 14 08:37 15:19-15:57/38 16:33 09:35-09:41/6 15 08:36 15:23-15:59/36 16:35 16 08:35 15:24-16:00/36 16:36 17 08:34 15:26-16:02/36 16:38 18 08:33 15:27-16:05/38 16:40 19 08:32 15:29-16:07/38 16:41 20 08:31 15:30-16:08/38 16:43 21 08:30 15:42-16:11/29 16:45 22 08:29 15:43-16:12/29 16:47 23 08:27 15:45-16:15/30 16:49 24 08:26 15:46-16:17/31 16:51 25 08:25 15:50-16:19/29 16:52 26 08:23 15:51-16:21/30 16:54 27 08:22 15:52-16:23/31 16:56 28 08:20 08:49-08:52/3 16:58 29 08:19 08:47-08:52/5 17:00 30 08:17 08:45-08:53/8 17:02 31 08:15 08:44-08:54/10 17:04	08:14 08:42-08:55/13 17:06 16:04-16:34/30 08:12 08:40-08:55/15 17:08 16:10-16:37/27 08:10 08:38-08:55/17 17:10 16:12-16:39/27 08:08 08:36-08:55/19 17:12 16:14-16:41/27 08:07 08:34-08:55/21 17:14 16:15-16:43/28 08:05 08:32-08:54/22 17:16 16:16-16:45/29 08:03 08:30-08:54/24 17:18 16:18-16:47/29 08:01 08:28-08:53/25 17:20 16:20-16:50/30 07:59 08:28-08:52/24 17:22 16:21-16:52/31 07:57 08:29-08:51/22 17:24 16:24-16:54/30 07:55 08:31-08:49/18 17:26 16:28-16:56/28 07:53 08:41-08:44/3 17:28 08:34-08:39/5 07:51 16:33-17:00/27 17:30 07:49 16:37-17:02/25 17:32 07:47 16:38-17:05/27 17:34 07:45 16:38-17:07/29 17:36 07:43 16:39-17:09/30 17:38 07:41 16:39-17:11/32 17:40 07:39 16:40-17:13/33 17:42 07:37 16:42-17:16/34 17:44 07:34 16:44-17:18/34 17:46 07:32 16:46-17:19/33 17:48 07:30 16:55-17:22/27 17:50 07:28 16:56-17:24/28 17:52 07:25 16:56-17:26/30 17:54 07:23 16:57-17:28/31 17:56 07:21 16:59-17:31/32 17:58 07:19 17:01-17:32/31 18:00 07:43-07:48/5	07:16 17:04-17:34/30 18:02 07:41-07:49/8 07:14 17:04-17:36/32 18:06 07:39-07:50/11 07:12 17:06-17:38/32 18:06 07:36-07:50/14 07:09 17:07-17:41/34 18:08 07:34-07:50/16 07:07 17:08-17:42/34 18:09 07:31-07:49/18 07:05 17:10-17:45/35 18:11 07:29-07:49/20 07:02 17:14-17:46/32 18:13 07:26-07:48/22 07:00 17:24-17:48/24 18:15 07:24-07:47/23 06:57 17:24-17:50/26 18:17 07:22-07:47/25 06:55 17:25-17:52/27 18:19 07:19-07:44/25 06:53 17:26-17:55/29 18:21 07:19-07:42/23 06:50 17:26-17:56/30 18:23 07:19-07:37/18 06:48 17:27-17:58/31 18:25 07:21-07:33/12 06:45 17:27-18:00/33 18:27 07:23-07:29/6 06:43 17:29-18:02/33 18:29 06:40 17:30-18:04/34 18:30 06:38 17:35-18:06/31 18:32 06:36 17:40-18:07/27 18:34 06:33 17:43-18:10/27 18:36 06:31 17:47-18:11/24 18:38 06:28 17:48-18:13/25 18:40 06:26 17:48-18:15/27 18:42 06:23 17:49-18:17/28 18:43 06:21 17:50-18:18/28 18:45 06:18 17:53-18:21/28 18:47 06:16 17:57-18:22/25 18:49 06:13 18:00-18:24/24 18:51 06:11 18:03-18:26/23 18:53 07:09 19:03-19:28/25 19:55 07:06 19:04-19:30/26 19:56 07:04 19:05-19:31/26 19:58	07:01 19:08-19:33/25 20:00 06:59 19:10-19:35/25 20:02 06:56 19:12-19:37/25 20:04 06:54 19:14-19:39/25 20:06 06:52 19:15-19:40/25 20:08 06:49 19:17-19:42/25 20:09 06:47 19:18-19:43/25 20:11 06:44 19:20-19:46/26 20:13 06:42 19:22-19:48/26 20:15 06:39 19:23-19:46/23 20:17 06:37 19:25-19:46/21 20:19 06:35 19:26-19:53/27 20:20 06:32 19:27-19:43/16 20:22 06:30 19:28-19:41/13 20:24 06:28 19:32-19:56/13 20:26 06:25 19:42-20:00/18 20:28 06:23 19:41-20:01/20 20:30 06:21 19:41-20:03/22 20:32 06:18 19:42-20:04/22 20:33 06:16 19:42-20:04/22 20:35 06:14 19:42-20:02/20 20:37 06:12 20:08-20:10/2 20:39 06:09 20:06-20:12/6 20:41 06:07 20:05-20:14/9 20:43 06:05 20:04-20:15/11 20:44 06:03 20:03-20:17/14 20:46 06:01 20:03-20:19/16 20:48 05:58 20:02-20:21/19 20:50 05:56 20:02-20:22/20 20:52 05:54 20:02-20:24/22 20:54 05:04 20:32-21:07/35 21:44	05:52 20:02-20:26/24 20:55 05:50 20:02-20:27/25 20:57 05:48 20:02-20:29/27 20:59 05:46 20:03-20:30/27 21:01 05:44 20:03-20:32/29 21:03 05:42 20:04-20:33/29 21:04 05:40 20:06-20:36/30 21:06 05:38 20:07-20:37/30 21:08 05:36 20:10-20:39/29 21:10 05:34 20:11-20:40/29 21:12 05:33 20:13-20:42/29 21:13 05:31 20:14-20:43/29 21:15 05:29 20:14-20:44/30 21:17 05:27 20:15-20:47/32 21:18 05:26 20:15-20:48/33 21:20 05:24 20:16-20:50/34 21:22 05:22 20:16-20:51/35 21:23 05:21 20:17-20:53/36 21:25 05:19 20:18-20:54/36 21:27 05:18 20:19-20:57/38 21:28 05:16 20:19-20:57/38 21:30 05:15 20:21-20:59/38 21:31 05:14 20:21-20:59/38 21:33 05:13 20:21-20:59/38 21:34 05:12 20:23-21:01/38 21:36 05:11 20:26-21:02/36 21:38 05:10 20:29-21:04/35 21:39 05:08 20:29-21:05/36 21:40 05:07 20:30-21:06/36 21:41 05:06 20:31-21:07/36 21:42 05:05 20:32-21:07/36 21:43 05:04 20:34-05:51/17	05:03 20:33-21:07/34 21:45 05:33-05:51/18 05:02 20:34-21:08/34 21:47 05:33-05:50/17 05:01 21:11-21:13/2 05:32-05:50/18 21:48 20:35-21:08/33 05:00 21:11-21:14/3 20:36-21:07/31 21:49 05:31-05:49/18 04:59 21:11-21:15/4 20:38-21:08/30 21:50 05:31-05:49/18 04:59 21:11-21:16/5 20:39-21:07/28 21:51 05:30-05:49/19 04:58 21:10-21:16/6 20:41-21:07/26 21:52 05:30-05:49/19 04:57 21:11-21:17/6 20:43-21:07/24 21:53 05:29-05:48/19 04:57 21:11-21:19/8 20:44-21:08/24 21:54 05:29-05:48/19 04:56 21:11-21:21/9 20:44-21:07/23 21:55 05:28-05:48/20 04:56 21:11-21:20/9 20:45-21:07/22 21:55 05:28-05:48/20 04:55 21:12-21:21/9 20:46-21:08/22 21:56 05:28-05:48/20 04:55 21:12-21:21/10 20:45-21:07/22 21:57 05:27-05:47/20 04:55 21:12-21:22/10 20:46-21:07/21 21:58 05:27-05:47/20 04:55 21:12-21:22/10 20:46-21:07/21 21:58 05:27-05:47/20 04:54 21:12-21:23/11 20:47-21:07/20 21:59 05:27-05:47/20 04:54 21:12-21:24/12 20:47-21:08/21 22:00 05:27-05:47/20 04:54 21:13-21:24/11 20:48-21:08/20 22:00 05:27-05:47/20 04:54 21:13-21:24/11 20:48-21:08/20 22:01 05:27-05:47/20 04:55 21:14-21:25/11 20:49-21:09/20 22:00 05:27-05:47/20 04:55 21:14-21:25/11 20:49-21:09/20 22:01 05:28-05:48/20 04:56 21:14-21:25/11 20:49-21:09/20 22:01 05:29-05:49/20 04:56 21:14-21:24/10 20:48-21:09/21 22:01 05:30-05:50/20 04:57 21:15-21:25/10 20:49-21:10/21 22:01 05:30-05:50/20 04:58 21:15-21:25/10 20:49-21:11/22 22:01 05:31-05:51/20 04:58 21:15-21:24/9 20:49-21:11/22 22:00 05:31-05:51/20
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	1443	1061	1131	671	1198	1540

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown
Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user:
Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated:
28/03/2025 10:34/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 3 - T03
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 21:16-21:24/8 20:49-21:11/22	05:39 20:23-20:53/30	06:33 19:24-19:45/21	07:26 18:05-18:36/31	07:24 07:58-08:21/23	08:19 14:56-15:34/38
2	22:00 05:32-05:52/20	21:25	20:18 19:46-19:50/4	19:05 07:58-08:13/15	16:54 15:53-16:23/30	16:10 09:11-09:28/17
3	05:00 21:16-21:24/8 20:49-21:12/23	05:40 20:22-20:52/30	06:35 19:22-19:45/23	07:28 18:04-18:33/29	07:26 07:57-08:22/25	08:21 14:55-15:32/37
4	22:00 05:33-05:53/20	21:23	20:16	19:02 07:57-08:19/22	16:52 15:51-16:21/30	16:09 09:11-09:31/20
5	05:00 21:16-21:23/7 20:49-21:12/23	05:42 20:21-20:50/29	06:36 19:19-19:45/26	07:30 18:03-18:31/28	07:28 07:58-08:23/25	08:22 14:55-15:32/37
6	21:59 05:33-05:53/20	21:21	20:13	19:00 07:56-08:22/26	16:50 15:49-16:19/30	16:08 09:10-09:32/22
7	05:01 21:16-21:23/7 20:49-21:12/23	05:44 20:19-20:48/29	06:38 19:17-19:43/26	07:32 18:02-18:29/27	07:30 08:00-08:24/24	08:24 14:54-15:32/38
8	21:59 05:34-05:53/19	21:19	20:11	18:57 07:58-08:23/25	16:48 15:47-16:17/30	16:08 09:11-09:32/22
9	05:02 21:17-21:23/6 20:49-21:13/24	05:45 20:16-20:46/30	06:40 19:15-19:41/26	07:33 18:01-18:26/25	07:32 08:02-08:24/22	08:25 14:54-15:30/36
10	21:58 05:35-05:54/19	21:17	20:09	18:55 08:00-08:24/24	16:46 15:46-16:15/29	16:07 09:10-09:37/27
11	05:03 21:17-21:22/5 20:46-21:14/28	05:47 20:15-20:45/30	06:42 19:13-19:39/26	07:35 17:54-18:24/30	07:34 08:04-08:25/21	08:26 14:54-15:30/36
12	21:58 05:36-05:55/19	21:16	20:06	18:52 08:02-08:25/23	16:44 15:45-16:12/27	16:07 09:10-09:40/29
13	05:04 21:18-21:22/4 20:45-21:14/29	05:49 20:14-20:43/29	06:44 19:10-19:35/25	07:37 17:47-18:21/34	07:36 08:06-08:25/19	08:28 14:53-15:29/36
14	21:57 05:37-05:55/18	21:14	20:04	18:50 08:04-08:25/21	16:43 15:44-16:10/26	16:06 09:10-09:42/32
15	05:05 21:18-21:21/3 20:44-21:14/30	05:51 20:12-20:41/29	06:45 19:09-19:33/24	07:39 17:44-18:18/34	07:38 08:09-08:26/17	08:29 14:53-15:28/35
16	21:56 05:38-05:56/18	21:12	20:01	18:48 08:05-08:24/19	16:41 15:41-16:08/27	16:06 09:11-09:46/35
17	05:06 21:19-21:21/2 05:39-05:57/18	05:52 20:12-20:39/27	06:47 19:06-19:31/25	07:41 17:42-18:16/34	07:40 08:11-08:26/15	08:30 14:54-15:28/34
18	21:55 20:43-21:15/32	21:10	19:59	18:45 08:07-08:24/17	16:39 15:39-16:07/28	16:05 09:11-09:47/36
19	05:07 21:19-21:20/1 05:40-05:57/17	05:54 20:10-20:37/27	06:49 19:04-19:28/24	07:43 17:40-18:14/34	07:42 08:13-08:25/12	08:32 14:54-15:28/34
20	21:55 20:42-21:15/33	21:08	19:56	18:43 08:09-08:24/15	16:37 15:35-16:05/30	16:05 09:11-09:49/38
21	05:08 20:41-21:15/34	05:56 20:10-20:35/25	06:51 19:01-19:26/25	07:44 17:39-18:11/32	07:44 08:15-08:25/10	08:33 14:54-15:27/33
22	21:54 05:41-05:58/17	21:06	19:54	18:41 08:11-08:24/13	16:36 15:33-16:03/30	16:05 09:11-09:50/39
23	05:09 20:41-21:16/35	05:58 20:10-20:34/24	06:52 18:58-19:24/26	07:46 17:38-18:09/31	07:46 08:17-08:25/8	08:34 14:54-15:27/33 14:25-14:30/5
24	21:53 05:42-05:59/17	21:03	19:52	18:38 08:13-08:23/10	16:34 15:32-16:01/29	16:05 09:12-09:51/39
25	05:11 20:40-21:16/36	05:59 20:09-20:31/22	06:54 18:56-19:22/26	07:48 17:36-18:07/31	07:47 08:19-08:24/5	08:35 14:55-15:26/32 14:24-14:31/7
26	21:52 05:43-06:00/17	21:01	19:49	18:36 08:15-08:22/7	16:32 15:29-15:59/30	16:05 09:12-09:52/40
27	05:12 20:39-21:16/37	06:01 20:09-20:29/20	06:56 18:53-19:18/25	07:49 17:33-18:04/31	07:49 08:21-08:24/3	08:36 14:55-15:26/31 14:25-14:34/9
28	21:51 05:44-06:00/16	20:59	19:47	18:33 08:17-08:21/4	16:31 15:28-15:57/29	16:05 09:13-09:53/40
29	05:13 20:39-21:15/36	06:03 20:10-20:28/18	06:58 18:52-19:16/24	07:52 17:30-18:02/32	07:51 15:25-15:56/31	08:37 14:55-15:26/31 14:23-14:34/11
30	21:50 05:45-06:01/16	20:57	19:44	18:31	16:29	16:05 09:13-09:54/41
31	05:14 20:39-21:15/36	06:05 20:09-20:25/16	06:59 18:50-19:14/24	07:54 17:29-17:59/30	07:53 15:23-15:54/31	08:38 14:55-15:26/31 14:23-14:35/12
32	21:49 05:47-06:03/16	20:55	19:42	18:29	16:28	16:05 09:13-09:57/44
33	05:16 20:38-21:14/36	06:06 20:10-20:23/13	07:01 18:46-19:11/25	07:56 17:27-17:57/30	07:55 15:22-15:52/30	08:38 14:56-15:27/31 14:23-14:36/13
34	21:47 05:48-06:03/15	20:53	19:39	18:27	16:26	16:05 09:14-09:59/45
35	05:17 20:38-21:12/34	06:08 20:11-20:22/11	07:03 18:42-19:08/26	07:57 17:27-17:55/28	07:57 15:20-15:50/30	08:39 14:56-15:27/31 14:24-14:37/13
36	21:46 05:49-06:03/14	20:51	19:54-20:02/8	18:24	16:25	16:05 09:15-10:00/45
37	05:18 20:34-21:11/37	06:10 20:11-20:19/8	07:05 18:38-19:06/28	07:59 17:26-17:52/26	07:59 15:19-15:49/30	08:40 14:57-15:28/31 14:24-14:38/14
38	21:45 05:50-06:05/15	20:48	19:51-20:04/13	18:22	16:23	16:05 09:16-10:01/45
39	05:20 20:33-21:10/37	06:12 20:12-20:17/5	07:06 18:36-19:04/28	08:01 17:16-17:50/34	08:00 15:18-15:47/29	08:41 14:57-15:27/30 14:24-14:38/14
40	21:44 05:52-06:05/13	20:46	19:49-20:06/17	18:20	16:22	16:06 09:16-10:01/45
41	05:21 20:31-21:09/38	06:13 20:14-20:15/1	07:08 18:34-19:01/27	08:03 17:13-17:48/35	08:02 15:17-15:46/29	08:41 14:58-15:28/30 14:25-14:39/14
42	21:42 05:53-06:05/12	20:44	19:48-20:07/19	18:17	16:20	16:06 09:17-10:02/45
43	05:23 20:30-21:07/37	06:15 19:46-20:07/21	07:10 18:33-18:58/25	08:05 17:12-17:45/33	08:04 15:06-15:44/38	08:42 14:58-15:28/30 14:25-14:39/14
44	21:41 05:55-06:06/11	20:42	19:27	18:15	16:19	16:07 09:17-10:02/45
45	05:24 20:29-21:07/38	06:17 19:46-20:07/21	07:12 18:32-18:56/24	08:07 17:10-17:43/33	08:06 15:05-15:43/38	08:42 14:59-15:29/30 14:26-14:40/14
46	21:39 05:56-06:05/9	20:39	19:24	18:13	16:18	16:07 09:18-10:03/45
47	05:26 20:28-21:05/37	06:19 19:45-20:08/23	07:14 18:28-18:54/26	08:09 17:09-17:41/32	08:08 15:04-15:42/38	08:43 14:59-15:29/30 14:26-14:40/14
48	21:38 05:57-06:05/8	20:37	19:22	18:11	16:17	16:08 09:18-10:03/45
49	05:27 20:28-21:04/36	06:20 19:44-20:06/22	07:15 18:23-18:51/28	07:11 16:08-16:38/30	08:09 15:04-15:41/37	08:43 14:59-15:30/31 14:27-14:40/13
50	21:36 05:59-06:06/7	20:35	19:19	17:09	16:16	16:08 09:18-10:03/45
51	05:29 20:27-21:02/35	06:22 19:44-20:04/20	07:17 18:20-18:48/28	07:13 16:07-16:36/29	08:11 15:03-15:39/36	08:43 14:59-15:30/31 14:27-14:40/13
52	21:35 06:00-06:05/5	20:32	19:17	17:07	16:15	16:09 09:19-10:04/45
53	05:31 20:27-21:01/34	06:24 19:44-20:02/18	07:19 18:13-18:46/33	07:15 16:07-16:34/27	08:13 15:02-15:38/36	08:44 15:01-15:32/31 14:29-14:41/12
54	21:33 06:02-06:06/4	20:30	19:14	17:04	16:14	16:10 09:19-10:03/44
55	05:32 20:26-20:59/33	06:26 19:32-19:39/7	07:21 18:10-18:44/34	07:17 16:07-16:31/24	08:14 15:00-15:37/37	08:44 15:01-15:33/32 14:30-14:41/11
56	21:32 06:03-06:05/2	20:28 19:43-19:59/16	19:12	17:02	16:13	16:11 09:19-10:02/43
57	05:34 20:26-20:58/32	06:28 19:29-19:42/13	07:22 18:08-18:41/33	07:18 16:02-16:29/27	08:16 14:57-15:36/39	08:44 15:02-15:34/32 14:31-14:41/10
58	21:30	20:25 19:44-19:57/13	19:10	17:00	16:12	16:12 09:12-09:23/11
59	05:35 20:25-20:56/31	06:29 19:27-19:55/28	07:24 18:06-18:38/32	07:20 08:02-08:15/13	08:18 14:57-15:35/38	08:44 15:03-15:35/32 14:32-14:41/9
60	21:28	20:23	19:07 08:02-08:12/10	16:58 15:59-16:27/28	16:12 09:12-09:25/13	16:12 09:20-10:00/40
61	05:37 20:25-20:55/30	06:31 19:25-19:52/27		07:22 08:00-08:19/19		08:44 15:02-15:35/33 14:33-14:39/6
62	21:27	20:21		16:56 15:57-16:25/28		16:13 09:20-09:59/39
Potential sun hours	512	460	382	328	259	233
Sum of minutes with flicker	1459	739	807	1210	1220	2423

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 4 - T04
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

January		February		March		April		May		June	
1	08:44 09:18-09:42/24	08:14 15:25-16:35/70	07:16 16:35-17:34/59	07:01 18:44-19:33/49	05:52 20:18-20:26/8	19:29-20:04/35	05:03 20:08-21:10/62				
2	08:44 09:18-09:42/24	08:12 15:26-16:37/71	07:14 16:36-17:36/60	06:59 18:44-19:35/51	05:50 20:15-20:27/12	19:30-20:03/33	05:02 20:09-21:12/63				
3	08:44 09:17-09:41/24	08:10 15:27-16:39/72	07:12 16:39-17:38/59	06:56 18:46-19:37/51	05:48 20:13-20:29/16	19:31-20:02/31	05:01 20:10-21:13/63				
4	08:43 09:17-09:42/25	08:08 15:28-16:41/73	07:09 16:45-17:41/56	06:54 18:48-19:39/51	05:46 20:11-20:30/19	19:32-20:00/28	05:00 20:10-21:14/64				
5	08:43 09:16-09:41/25	08:07 15:29-16:43/74	07:07 16:47-17:42/55	06:51 18:49-19:39/50	05:44 20:10-20:32/22	19:33-19:59/26	04:59 20:11-21:15/64				
6	08:43 09:16-09:41/25	08:05 15:30-16:45/75	07:04 16:51-17:45/54	06:49 18:51-19:39/48	05:42 20:09-20:33/24	19:34-19:57/23	04:59 20:11-21:16/65				
7	08:42 09:15-09:39/24	08:03 15:32-16:47/75	07:02 16:53-17:46/53	06:47 18:52-19:39/47	05:40 20:09-20:36/27	19:36-19:56/20	04:58 20:11-21:16/65				
8	08:42 09:14-09:37/24	08:01 15:34-16:50/76	07:00 16:54-17:48/54	06:44 18:54-19:39/45	05:38 20:08-20:37/29	19:38-19:54/16	04:57 20:12-21:18/66				
9	08:41 14:46-15:49/63	07:59 15:37-16:52/75	06:57 16:54-17:50/56	06:42 18:56-19:38/42	05:36 20:07-20:39/32	19:42-19:50/8	04:57 20:12-21:19/67				
10	08:40 14:46-15:50/64	07:57 15:40-16:54/74	06:55 16:55-17:52/57	06:39 18:56-19:37/41	05:34 20:06-20:40/34		04:56 20:13-21:19/66				
11	08:40 14:47-15:52/65	07:55 15:53-16:56/63	06:53 16:57-17:55/58	06:37 18:58-19:37/39	05:33 20:06-20:42/36		04:56 20:14-21:20/66				
12	08:39 14:48-15:54/66	07:53 15:55-16:58/63	06:50 16:58-17:56/58	06:35 19:00-19:36/36	05:31 20:05-20:43/38		04:55 20:15-21:21/66				
13	08:38 14:49-15:55/66	07:51 15:55-17:00/65	06:48 17:00-17:58/58	06:32 19:01-19:35/34	05:29 20:04-20:44/40		04:55 20:15-21:21/66				
14	08:37 14:50-15:57/67	07:49 15:56-17:02/66	06:45 17:02-18:00/58	06:30 19:02-19:34/32	05:27 20:05-20:47/42		04:55 20:15-21:22/67				
15	08:36 14:51-15:59/68	07:47 15:57-17:05/68	06:43 17:06-18:02/56	06:28 19:03-19:33/30	05:26 20:04-20:48/44		04:55 20:16-21:22/66				
16	08:35 14:51-16:00/69	07:45 15:57-17:07/70	06:40 17:09-18:04/55	06:25 19:04-19:32/28	05:20 05:57-06:06/9		04:54 20:17-21:23/66				
17	08:34 14:52-16:02/70	07:43 15:58-17:09/71	06:38 17:14-18:06/52	06:23 19:05-19:29/24	05:22 20:04-20:51/47		04:54 20:17-21:23/66				
18	08:33 14:54-16:05/71	07:41 15:59-17:11/72	06:36 17:17-18:07/50	06:21 19:06-19:27/21	05:21 20:04-20:53/49		04:54 20:17-21:24/67				
19	08:32 14:56-16:07/71	07:39 16:00-17:13/73	06:33 17:21-18:10/49	06:18 19:09-19:25/16	05:19 20:05-20:54/49		04:54 20:18-21:24/66				
20	08:31 14:57-16:08/71	07:36 16:01-17:16/75	06:31 17:23-18:11/48	06:16 19:13-19:21/8	05:18 20:04-20:55/51		04:54 20:18-21:24/66				
21	08:30 14:59-16:11/72	07:34 16:03-17:18/75	06:28 17:25-18:13/48	06:14 19:28-20:07/39	05:16 20:05-20:57/52		04:54 20:18-21:24/66				
22	08:29 15:01-15:16/15	07:32 16:04-17:19/75	06:26 17:25-18:15/50	06:12 19:28-20:07/39	05:10 05:45-05:47/2		04:55 20:19-21:25/66				
23	08:27 15:05-15:14/9	07:30 16:06-17:22/76	06:23 17:26-18:17/51	06:09 19:28-20:07/39	05:13 20:04-20:59/55		04:55 20:19-21:25/66				
24	08:26 15:20-16:17/57	07:28 16:09-17:24/75	06:21 17:26-18:18/52	06:07 19:27-20:07/40	05:12 20:05-21:01/56		04:55 20:18-21:25/67				
25	08:24 15:21-16:19/58	07:25 16:11-17:26/75	06:18 17:28-18:21/53	06:05 19:27-20:07/40	05:11 20:05-21:02/57		04:56 20:19-21:25/66				
26	08:23 15:21-16:21/60	07:23 16:18-17:28/70	06:16 17:30-18:22/52	06:03 19:27-20:07/40	05:09 20:06-21:04/58		04:56 20:19-21:25/66				
27	08:22 15:21-16:23/62	07:21 16:24-17:31/67	06:13 17:33-18:24/51	06:01 19:28-20:06/38	05:08 20:06-21:05/59		04:56 20:18-21:24/66				
28	08:20 15:23-16:26/63	07:19 16:31-17:32/61	06:11 17:39-18:26/47	05:58 19:28-20:06/38	05:07 20:07-21:06/59		04:57 20:19-21:25/66				
29	08:19 15:23-16:28/65		06:09 18:39-19:28/49	05:56 19:28-20:06/38	05:06 20:07-21:07/60		04:58 20:19-21:25/66				
30	08:17 15:23-16:30/67		07:05 18:40-19:30/50	05:54 20:22-20:24/2	05:05 20:07-21:08/61		04:58 20:18-21:24/66				
31	08:15 15:24-16:32/68		07:04 18:41-19:31/50	05:54 20:22-20:24/2	05:04 20:08-21:09/61		04:58 20:18-21:24/66				
Potential sun hours	250	273	367	420	494		510				
Sum of minutes with flicker	2472	1995	1658	1437	1808		2377				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 4 - T04
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	July	August	September	October	November	December
1	04:59 20:19-21:24/65	05:39 20:16-20:53/37	06:33 18:56-19:36/40	07:26 17:37-18:36/59	07:24 15:09-16:23/74	08:19 14:29-15:34/65
2	05:00 20:19-21:24/65	05:40 20:16-20:52/36	06:35 18:55-19:36/41	07:28 17:36-18:33/57	07:26 15:06-16:21/75	08:21 14:29-15:33/64
3	05:00 20:18-21:23/65	05:42 20:16-20:50/34	06:36 18:53-19:35/42	07:30 17:34-18:31/57	07:28 15:03-16:19/76	08:22 14:29-15:32/63
4	05:01 20:18-21:23/65	05:44 20:17-20:48/31	06:38 18:51-19:36/45	07:31 17:33-18:29/56	07:30 15:02-16:17/75	08:24 14:30-15:32/62
5	05:02 20:18-21:23/65	05:45 20:17-20:46/29	06:40 18:49-19:36/47	07:33 17:31-18:26/55	07:32 15:00-16:15/75	08:25 14:30-15:32/61
6	05:03 20:18-21:22/64	05:47 20:18-20:45/27	06:42 18:47-19:35/48	07:35 17:31-18:24/53	07:34 14:59-16:12/73	08:26 14:30-15:32/60
7	05:04 20:18-21:22/64	05:49 20:19-20:43/24	06:43 18:45-19:34/49	07:37 17:29-18:21/52	07:36 14:58-16:10/72	08:28 14:30-15:32/59
8	05:05 20:17-21:21/64	05:51 20:20-20:41/21	06:45 18:42-19:33/51	07:39 17:24-18:18/54	07:38 14:57-16:08/71	08:29 14:30-15:32/58
9	05:06 20:17-21:21/64	05:52 20:21-20:39/18	06:47 18:40-19:31/51	07:41 17:20-18:16/56	07:40 14:56-16:06/70	08:30 14:30-15:32/57
10	05:07 20:17-21:20/63	05:54 20:22-20:37/15	06:49 18:38-19:28/50	07:42 17:16-18:14/58	07:42 14:56-16:05/69	08:31 14:30-15:32/56
11	05:08 20:17-21:19/62	05:56 20:24-20:35/11	06:51 18:36-19:26/50	07:44 17:12-18:11/59	07:44 14:56-16:03/67	08:33 14:30-15:32/55
12	05:09 20:16-21:18/62	05:58 20:27-20:34/7	06:52 18:34-19:24/50	07:46 17:09-18:09/60	07:45 14:55-16:01/66	08:34 14:30-15:32/54
13	05:11 20:16-21:17/61	05:59 20:28-20:41/13	06:54 18:32-19:22/50	07:48 17:07-18:07/60	07:47 14:55-15:59/64	08:35 14:30-15:32/53
14	05:12 20:16-21:16/60	06:01 20:30-20:41/11	06:56 18:30-19:18/48	07:50 17:00-18:04/64	07:49 14:54-15:58/64	08:36 14:30-15:32/52
15	05:13 20:15-21:15/60	06:03 20:32-20:41/9	06:58 18:28-19:16/48	07:52 16:55-18:02/67	07:51 14:54-15:56/62	08:37 14:30-15:32/51
16	05:14 20:16-21:15/59	06:05 20:33-20:41/8	06:59 18:23-19:14/51	07:54 16:47-17:59/72	07:53 14:54-15:54/60	08:38 14:30-15:32/50
17	05:16 20:16-21:14/58	06:06 20:35-20:41/6	07:01 18:19-19:11/52	07:55 16:42-17:57/75	07:55 14:54-15:52/58	08:39 14:30-15:32/49
18	05:17 20:15-21:12/57	06:08 20:37-20:41/4	07:03 18:16-19:08/52	07:57 16:39-17:55/76	07:57 14:54-15:51/57	08:40 14:30-15:32/48
19	05:18 20:15-21:11/56	06:10 20:39-20:41/40	07:05 18:14-19:06/52	07:59 16:36-17:52/76	07:59 14:39-14:48/9	08:41 14:30-15:32/47
20	05:20 20:15-21:10/55	06:12 20:39-20:41/40	07:06 18:13-19:04/51	08:01 16:34-17:50/76	08:00 14:36-14:51/15	08:42 14:30-15:32/46
21	05:21 20:15-21:09/54	06:13 20:39-20:41/40	07:08 18:10-19:01/51	08:03 16:33-17:48/75	08:02 14:34-15:46/72	08:43 14:30-15:32/45
22	05:23 20:14-21:07/53	06:15 20:39-20:41/40	07:10 18:09-18:58/49	08:05 16:31-17:45/74	08:04 14:33-15:44/71	08:44 14:30-15:32/44
23	05:24 20:15-21:07/52	06:17 20:39-20:41/40	07:12 18:09-18:56/47	08:07 16:30-17:43/73	08:06 14:32-15:43/71	08:45 14:30-15:32/43
24	05:26 20:14-21:05/51	06:19 20:39-20:41/40	07:14 18:06-18:54/48	08:09 16:29-17:41/72	08:08 14:31-15:42/71	08:46 14:30-15:32/42
25	05:27 20:15-21:04/49	06:20 20:39-20:41/40	07:15 18:01-18:51/50	07:11 15:28-16:38/70	08:09 14:30-15:41/71	08:47 14:30-15:32/41
26	05:29 20:15-21:02/47	06:22 20:39-20:41/40	07:17 17:57-18:48/51	07:13 15:27-16:36/69	08:11 14:30-15:39/69	08:48 14:30-15:32/40
27	05:31 20:15-21:01/46	06:24 20:39-20:41/40	07:19 17:53-18:46/53	07:15 15:26-16:34/68	08:13 14:30-15:38/68	08:49 14:30-15:32/39
28	05:32 20:15-20:59/44	06:26 20:39-20:41/40	07:21 17:49-18:44/55	07:16 15:25-16:31/66	08:14 14:30-15:37/67	08:50 14:30-15:32/38
29	05:34 20:15-20:58/43	06:28 20:39-20:41/40	07:22 17:44-18:41/57	07:18 15:25-16:29/64	08:16 14:29-15:36/67	08:51 14:30-15:32/37
30	05:35 20:15-20:56/41	06:29 20:39-20:41/40	07:24 17:40-18:38/58	07:20 15:23-16:27/64	08:18 14:29-15:35/66	08:52 14:30-15:32/36
31	05:37 20:16-20:55/39	06:31 20:39-20:41/40	07:26 17:36-18:36/60	07:22 15:21-16:25/64	08:20 14:29-15:34/65	08:53 14:30-15:32/35
Potential sun hours	512	460	382	328	259	233
Sum of minutes with flicker	2024	1609	1501	2005	2286	2487

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 5 - T05
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

	January	February	March	April	May	June
1	08:44 15:06-15:37/31 16:15	08:14 16:00-16:35/35 17:06	07:16 16:59-17:34/35 18:02	07:01 18:36-19:33/57 18:02	05:52 19:53-20:26/33 20:55 06:18-06:51/33	05:03 20:28-21:10/42 21:45 05:33-05:52/19
2	08:44 15:07-15:39/32 16:16	08:12 16:04-16:37/33 17:08	07:14 17:00-17:36/36 18:04	06:59 18:37-19:35/58 20:02 07:23-08:05/42	05:50 19:54-20:27/33 20:57 06:16-06:50/34	05:02 20:28-21:12/44 21:46 05:33-05:53/20
3	08:44 15:07-15:39/32 16:17	08:10 16:06-16:39/33 17:10	07:12 17:01-17:38/37 18:06	06:56 18:39-19:37/58 20:04 07:20-08:00/40	05:48 19:54-20:29/35 20:59 06:14-06:49/35	05:01 20:28-21:13/45 21:48 05:32-05:53/21
4	08:43 15:08-15:41/33 16:18	08:08 16:09-16:41/32 17:12	07:09 17:04-17:41/37 18:08	06:54 18:41-19:39/58 20:06 07:18-07:58/40	05:46 19:54-20:30/36 21:01 06:12-06:48/36	05:00 20:27-21:14/47 21:49 05:31-05:53/22
5	08:43 15:08-15:42/34 16:20	08:07 16:11-16:43/32 17:14	07:07 17:07-17:11/4 18:09 17:13-17:40/27	06:52 18:44-19:40/56 07:47-07:52/5 20:07 07:15-07:42/27	05:44 19:54-20:32/38 21:03 06:10-06:47/37	04:59 20:27-21:15/48 21:50 05:31-05:54/23
6	08:43 15:09-15:44/35 16:21	08:05 16:12-16:45/33 17:16	07:05 17:14-17:40/26 18:11	06:49 18:50-19:42/52 20:09 07:13-07:41/28	05:42 19:54-20:33/39 21:04 06:10-06:46/36	04:59 20:27-21:16/49 21:51 05:30-05:54/24
7	08:42 15:10-15:45/35 16:22	08:03 16:13-16:47/34 17:18	07:02 17:13-17:46/33 18:13	06:47 18:49-19:43/54 20:11 07:11-07:40/29	05:40 19:55-20:36/41 21:06 06:11-06:44/33	04:58 20:26-21:16/50 21:52 05:30-05:55/25
8	08:42 15:10-15:46/36 16:24	08:01 16:15-16:50/35 17:20	07:00 17:14-17:48/34 18:15	06:44 18:50-19:46/56 20:13 07:08-07:37/29	05:38 19:56-20:37/41 21:08 06:11-06:42/31	04:57 20:26-21:17/51 21:53 05:29-05:55/26
9	08:41 15:12-15:49/37 16:25	07:59 16:17-16:52/35 17:22	06:57 17:14-17:50/36 18:17	06:42 18:51-19:48/57 20:15 07:06-07:33/27	05:36 19:56-20:38/42 21:10 06:11-06:41/30	04:57 20:27-21:19/52 21:54 05:29-05:56/27
10	08:40 15:12-15:50/38 16:27	07:57 16:21-16:54/33 17:24	06:55 17:15-17:52/37 18:19	06:39 18:51-19:49/58 20:17 07:03-07:27/24	05:34 19:57-20:39/42 21:11 06:12-06:41/29	04:56 20:26-21:19/53 21:55 05:28-05:55/27
11	08:40 15:13-15:52/39 16:28	07:55 16:23-16:56/33 17:26	06:53 17:16-17:55/39 18:21	06:37 18:53-19:51/58 20:19 07:01-07:27/26	05:33 19:58-20:40/42 21:13 06:13-06:40/27	04:56 20:26-21:20/54 21:55 05:28-05:56/28
12	08:39 15:14-15:54/40 16:30	07:53 16:25-16:58/33 17:28	06:50 17:17-17:56/39 18:23	06:35 18:55-19:53/58 20:20 06:59-07:26/27	05:31 19:59-20:39/40 20:40-20:43/3 21:15 06:13-06:38/25	04:55 20:27-21:21/54 21:56 05:28-05:57/29
13	08:38 15:16-15:55/39 16:31	07:51 16:28-17:00/32 17:30	06:48 17:20-17:58/38 18:25 07:12-07:13/1	06:32 18:56-19:54/58 20:22 06:58-07:25/27	05:29 20:00-20:44/44 21:17 06:15-06:38/23	04:55 20:26-21:21/55 21:57 05:27-05:56/29
14	08:37 15:17-15:57/40 16:33	07:49 16:31-17:02/31 17:32	06:45 17:26-18:00/34 18:27 07:09-07:14/5	06:30 19:36-19:56/20 18:59-19:35/36 20:24 06:58-07:24/26	05:27 20:06-06:36/20 21:18 20:01-20:47/46	04:55 20:26-21:22/56 21:58 05:27-05:57/30
15	08:36 15:19-15:59/40 16:35	07:47 16:34-17:05/31 17:34	06:43 17:25-18:02/37 18:28 07:07-07:16/9	06:28 19:36-19:58/22 19:12-19:33/21 20:26 06:59-07:23/24	05:26 20:07-06:34/17 21:20 20:02-20:48/46	04:55 20:26-21:22/56 21:58 05:27-05:57/30
16	08:35 15:21-16:00/39 16:36	07:45 16:36-17:07/31 17:36	06:40 17:24-18:04/40 18:30 07:04-07:16/12	06:25 19:36-20:00/24 07:01-07:21/20 20:28 19:13-19:32/19	05:24 20:19-06:32/13 21:22 20:05-20:50/45	04:54 20:26-21:23/57 21:59 05:27-05:57/30
17	08:34 15:28-16:03/35 16:38	07:43 16:37-17:09/32 17:38	06:38 17:24-18:06/42 18:32 07:02-07:17/15	06:23 19:38-20:01/23 06:47-06:48/1 20:30 19:15-19:28/13 07:01-07:18/17	05:22 20:23-06:30/7 05:51-05:52/1 21:23 20:07-20:51/44	04:54 20:26-21:23/57 21:59 05:27-05:58/31
18	08:33 15:29-16:05/36 16:40	07:41 16:38-17:11/33 17:40	06:36 17:23-18:07/44 18:34 06:59-07:17/18	06:21 19:41-20:03/22 06:45-06:50/5 20:31 19:21-19:22/1 07:04-07:16/12	05:21 20:10-20:52/42 21:25 05:49-05:51/2	04:54 20:27-21:24/57 22:00 05:27-05:58/31
19	08:32 15:31-16:07/36 16:41	07:39 16:40-17:13/33 17:42	06:33 17:24-18:10/46 18:36 06:57-07:18/21	06:18 19:45-20:05/20 20:33 06:43-06:51/8	05:19 20:11-20:54/43 21:27 05:48-05:51/3	04:54 20:27-21:24/57 22:00 05:27-05:58/31
20	08:31 15:31-16:08/37 16:43	07:36 16:44-17:16/32 17:44	06:31 17:23-18:11/48 18:38 06:54-07:18/24	06:16 19:45-20:07/22 20:35 06:41-06:52/11	05:18 20:11-20:55/44 21:28 05:46-05:50/4	04:54 20:27-21:24/57 22:00 05:27-05:58/31
21	08:30 15:33-16:11/38 16:45	07:34 16:47-17:18/31 17:46	06:28 17:24-18:13/49 18:40 06:52-07:18/26	06:14 19:44-20:08/24 20:37 06:39-06:53/14	05:16 20:12-20:57/45 21:30 05:45-05:50/5	04:55 20:27-21:24/57 22:01 05:27-05:58/31
22	08:29 15:33-16:12/39 16:47	07:32 16:47-17:19/32 17:48	06:26 17:23-18:15/52 18:42 06:49-07:17/28	06:12 19:45-20:10/25 20:39 06:36-06:52/16	05:15 20:13-20:59/46 21:31 05:44-05:49/5	04:55 20:28-21:25/57 22:01 05:28-05:59/31
23	08:27 15:35-16:15/40 16:49	07:30 16:49-17:22/33 17:50	06:23 17:24-18:17/53 18:43 06:47-07:17/30	06:09 19:46-20:12/26 20:41 06:34-06:53/19	05:13 20:14-20:59/45 21:33 05:43-05:49/6	04:55 20:28-21:25/57 22:01 05:28-05:59/31
24	08:26 15:36-16:17/41 16:51	07:28 16:51-17:24/33 17:52	06:21 17:24-18:18/54 18:45 06:45-07:17/32	06:07 19:47-20:13/26 20:43 06:32-06:53/21	05:12 20:15-21:01/46 21:34 05:41-05:47/6	04:55 20:28-21:25/57 22:01 05:28-05:59/31
25	08:24 15:39-16:19/40 16:52	07:25 16:53-17:23/30 17:54 17:24-17:26/2	06:18 17:26-18:21/55 18:47 06:42-07:16/34	06:05 19:47-20:15/28 20:44 06:30-06:53/23	05:11 20:17-21:02/45 21:36 05:40-05:47/7	04:56 20:29-21:25/56 22:01 05:29-06:00/31
26	08:23 15:43-16:21/38 16:54	07:23 16:55-17:28/33 17:56	06:16 17:27-18:23/56 18:49 06:40-07:16/36	06:03 19:48-20:17/29 20:46 06:28-06:53/25	05:09 20:19-21:03/44 21:37 05:39-05:48/9	04:56 20:28-21:25/57 22:01 05:29-05:59/30
27	08:22 15:46-16:23/37 16:56	07:21 16:57-17:31/34 17:58	06:13 17:28-18:24/56 18:51 06:37-07:15/38	06:01 19:48-20:19/31 20:48 06:26-06:53/27	05:08 20:28-21:05/37 20:22-20:25/3 21:39 05:38-05:49/11	04:56 20:29-21:25/56 22:01 05:30-06:00/30
28	08:20 15:49-16:26/37 16:58	07:19 16:57-17:32/35 18:00	06:11 17:31-18:26/55 18:53 06:35-07:14/39	05:58 19:49-20:21/32 20:50 06:24-06:52/28	05:07 20:28-21:06/38 21:40 05:37-05:50/13	04:57 20:29-21:25/56 22:01 05:30-06:00/30
29	08:19 15:54-16:28/34 17:00		07:09 18:34-19:28/54 19:55 07:32-08:12/40	05:56 19:50-20:22/32 20:52 06:22-06:52/30	05:06 20:28-21:07/39 21:41 05:36-05:50/14	04:58 20:30-21:25/55 22:01 05:31-06:00/29
30	08:17 15:56-16:30/34 17:02		07:06 18:35-19:30/55 19:56 07:30-08:11/41	05:54 19:51-20:24/33 20:54 06:20-06:51/31	05:05 20:28-21:08/40 21:43 05:35-05:51/16	04:58 20:30-21:24/54 22:00 05:31-06:00/29
31	08:15 15:57-16:32/35 17:04		07:04 18:35-19:31/56 19:58 07:27-08:09/42		05:04 20:28-21:09/41 21:44 05:34-05:51/17	
Potential sun hours	250	273	367	420	494	510
Sum of minutes with flicker	1137	919	1835	2038	1873	2440

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

Project: 6918 Kellystown Description: 5 no. turbine Wind Farm, Co. Louth

Licensed user: Jennings O'Donovan
Finisklin Business Park
F91 RHH9 Sligo
+353719161416
Kathryn Feeney / kfeeney@jodireland.com
Calculated: 28/03/2025 10:34/4.0.552

SHADOW - Calendar per WTG

Calculation: Kellystown SG155 Worst Case WTG: 5 - T05
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DUBLIN ARPT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.96	2.27	3.21	4.94	6.07	5.43	5.34	5.06	4.08	3.10	2.29	1.56

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
160	97	158	383	373	261	461	767	532	825	1,031	1,215	766	673	581	477	8,760

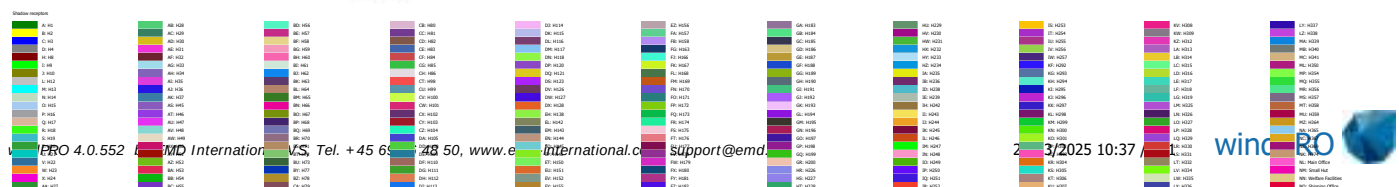
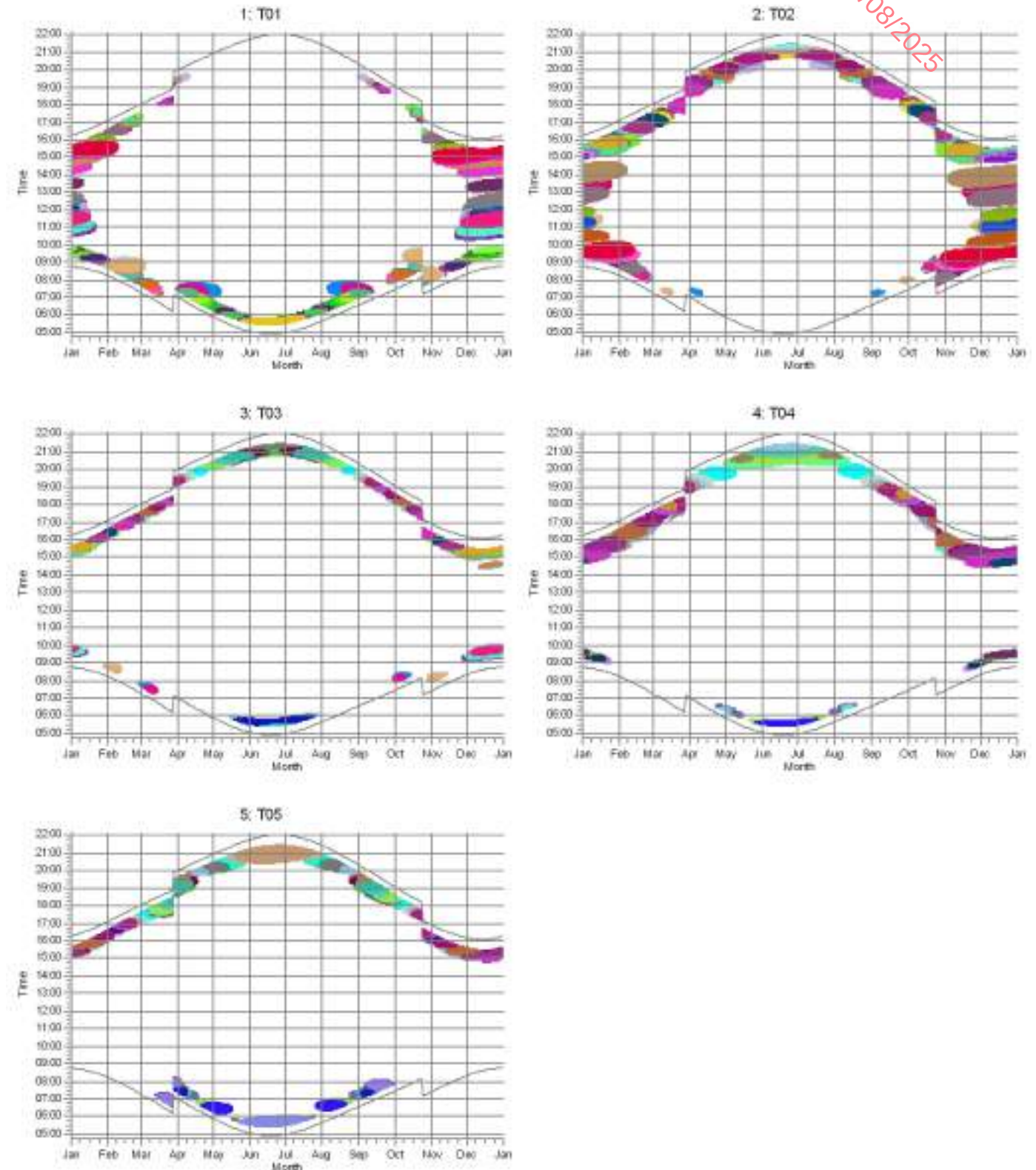
July		August		September		October		November		December	
1	04:59 20:30-21:24/54	05:39 20:09-20:50/41	06:33 18:52-19:50/58	07:26 17:57-18:36/39	07:24 15:50-16:23/33	08:19 14:55-15:34/39					
2	05:00 20:31-21:24/53	05:40 20:09-20:50/41	06:35 18:50-19:48/58	07:28 17:55-18:33/38	07:26 15:46-16:21/35	08:21 14:55-15:33/38					
3	05:00 20:31-21:23/52	05:42 20:07-20:50/43	06:36 18:49-19:45/56	07:30 17:53-18:31/38	07:28 15:44-16:19/35	08:22 14:55-15:32/37					
4	05:01 20:32-21:23/51	05:44 20:07-20:48/41	06:38 18:47-19:43/56	07:32 17:52-18:29/37	07:30 15:43-16:17/34	08:24 14:55-15:32/37					
5	05:02 20:32-21:23/51	05:45 20:05-20:46/41	06:40 18:46-19:41/55	07:33 17:51-18:26/35	07:32 15:41-16:15/34	08:25 14:55-15:30/35					
6	05:03 20:33-21:22/49	05:47 20:05-20:45/40	06:42 18:46-19:38/52	07:35 17:50-18:24/34	07:34 15:41-16:12/31	08:26 14:55-15:30/35					
7	05:04 20:34-21:22/48	05:49 20:04-20:43/39	06:43 18:40-19:35/55	07:37 17:49-18:15/26	07:36 15:39-16:10/31	08:28 14:55-15:29/34					
8	05:05 20:34-21:21/47	05:51 20:03-20:41/38	06:45 18:36-19:33/57	07:39 17:49-18:15/26	07:38 15:36-16:08/32	08:29 14:55-15:28/33					
9	05:06 20:35-21:21/46	05:52 20:03-20:39/36	06:47 18:33-19:31/58	07:41 17:40-18:15/35	07:40 15:34-16:06/32	08:30 14:56-15:29/33					
10	05:07 20:35-21:20/45	05:54 20:02-20:37/35	06:49 18:30-19:28/58	07:42 17:37-18:14/37	07:42 15:31-16:05/34	08:31 14:56-15:28/32					
11	05:08 20:36-21:19/43	05:56 20:02-20:35/33	06:51 18:29-19:26/57	07:44 17:35-18:11/36	07:44 15:29-16:03/34	08:33 14:56-15:27/31					
12	05:09 20:36-21:18/42	05:58 20:01-20:34/33	06:52 18:27-19:24/57	07:46 17:33-18:09/36	07:45 15:27-16:01/34	08:34 14:56-15:27/31					
13	05:11 20:37-21:17/40	05:59 19:58-20:31/33	06:54 18:26-19:22/56	07:48 17:32-18:07/35	07:47 15:26-15:59/33	08:35 14:56-15:27/31					
14	05:12 20:37-21:16/39	06:01 19:57-20:29/32	06:56 18:24-19:18/54	07:50 17:30-18:04/34	07:49 15:21-15:58/37	08:36 14:57-15:26/29					
15	05:13 20:37-21:15/38	06:03 19:56-20:28/32	06:58 18:21-19:16/55	07:52 17:28-18:02/34	07:51 15:19-15:56/37	08:37 14:49-14:53/4					
16	05:14 20:38-21:15/37	06:05 19:55-20:25/30	06:59 18:18-19:14/56	07:54 17:26-18:00/34	07:53 15:15-15:54/39	08:38 14:48-14:55/7					
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19	05:19 20:35-21:11/46	06:10 19:52-20:19/27	07:05 18:12-19:06/54	07:59 17:20-17:52/32	07:59 15:09-15:49/40	08:40 14:49-14:58/9					
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21	05:21 20:34-21:09/45	06:13 19:50-20:15/25	07:08 18:09-19:01/52	08:03 17:17-17:48/31	08:02 15:08-15:46/38	08:41 14:50-14:59/9					
22	05:23 20:33-21:07/45	06:15 19:49-20:12/23	07:10 18:08-18:59/51	08:05 17:13-17:45/32	08:04 15:07-15:44/37	08:42 14:50-14:59/9					
23	05:24 20:32-21:07/45	06:17 19:49-20:10/21	07:12 18:08-18:56/48	08:07 17:10-17:43/33	08:06 15:07-15:43/36	08:42 14:51-15:00/9					
24	05:26 20:31-21:05/44	06:19 19:49-20:09/20	07:14 18:07-18:54/47	08:09 17:08-17:41/33	08:08 15:06-15:42/36	08:43 14:51-15:00/9					
25	05:27 20:31-21:04/43	06:20 19:43-20:06/23	07:15 18:06-18:51/45	08:11 16:06-16:38/32	08:09 15:06-15:41/35	08:43 14:52-15:00/8					
26	05:29 20:30-21:02/42	06:22 19:41-20:04/23	07:17 18:06-18:48/42	08:13 16:05-16:36/31	08:11 15:00-15:40/40	08:43 14:52-15:00/8					
27	05:31 20:30-21:01/41	06:24 19:39-20:02/23	07:19 18:06-18:46/40	08:15 16:03-16:34/31	08:13 14:58-15:38/40	08:44 14:54-15:01/7					
28	05:32 20:30-21:00/40	06:26 19:37-19:59/22	07:21 18:06-18:44/38	08:17 16:00-16:31/31	08:14 14:57-15:38/41	08:44 14:55-15:01/6					
29	05:34 20:29-20:59/45	06:28 19:37-19:57/20	07:22 18:06-18:41/35	08:19 15:57-16:29/32	08:16 14:56-15:36/40	08:44 14:57-15:00/3					
30	05:35 20:29-20:58/45	06:29 18:57-19:55/58	07:24 18:00-18:38/38	08:20 15:54-16:27/33	08:18 14:55-15:35/40	08:44 15:04-15:34/30					
31	05:37 20:28-20:55/45	06:31 18:53-19:52/59	07:26 18:00-18:38/38	08:22 15:51-16:25/34	08:20 14:55-15:35/40	08:44 15:04-15:34/30					
Potential sun hours	512	460	382	328	259	233					
Sum of minutes with flicker	1885	1910	2412	1035	1088	1069					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

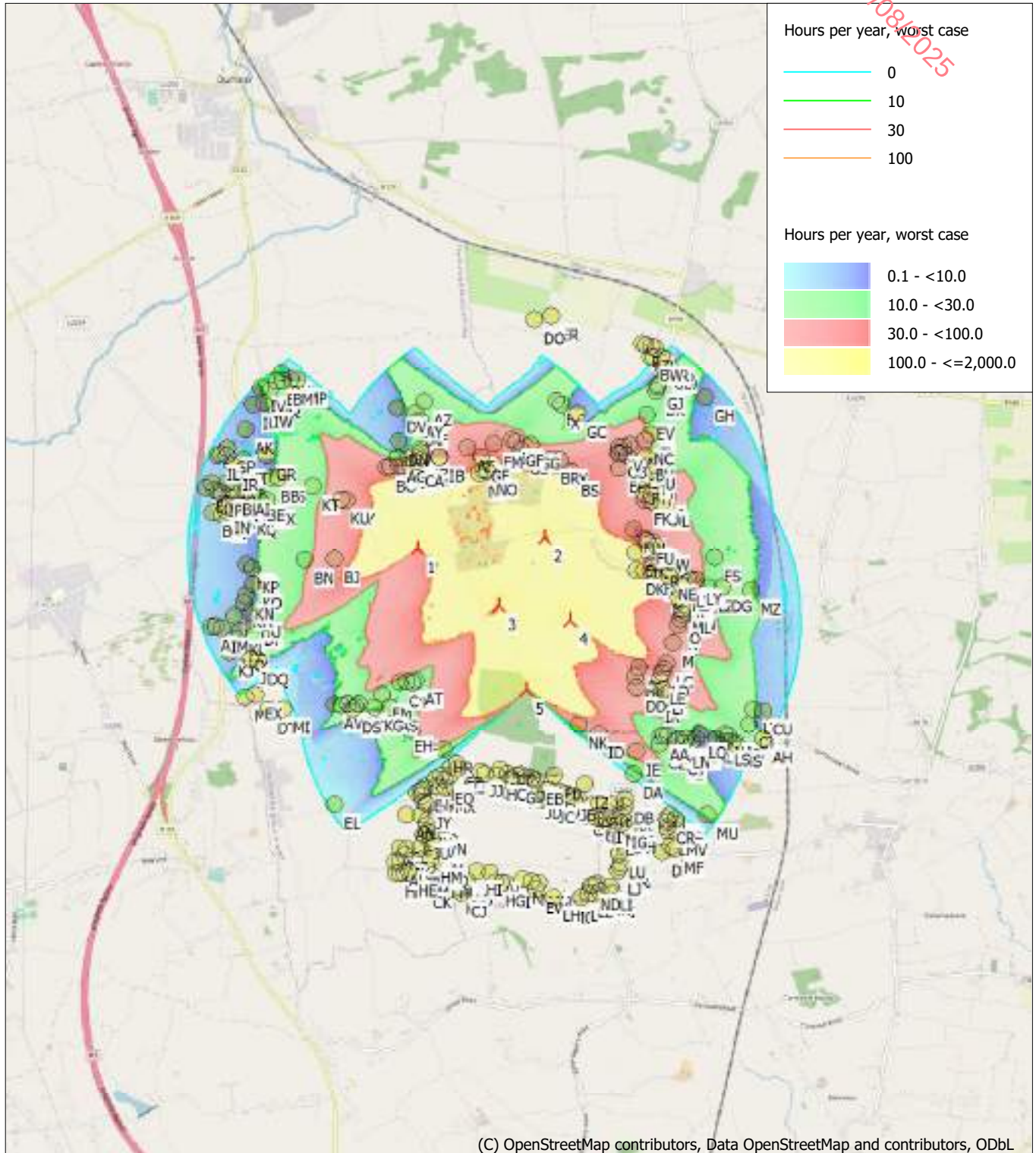
SHADOW - Calendar per WTG, graphical

Calculation: Kellystown SG155 Worst Case



SHADOW - Map

Calculation: Kellystown SG155 Worst Case



Map: EMD OpenStreetMap , Print scale 1:50,000, Map center Irish ITM-IRENET95 (IE), geocentric, GRS80 East: 708,030 North: 783,620

New WTG

Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_6918 Kellystown_3.wpo (3)

Time step: 2 minutes, Day step: 3 days, Map resolution: 10 m, Visibility resolution: 5 m, Eye height: 1.5 m